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RICHARD P. ROTHWELL, C. E., M. E., Editor.
ROSSITER W. RAYMOND, Ph. D., M. E., Special Contributor.
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THE collection of the statistics of production, etc., of the various metals in the United States and other countries for the MINERAL INDUSTRY, Volume 2, 1893, is rapidly approaching completion, and those of such metals as gold, silver, iron, copper, lead, zinc, etc., are now all in, and await only final revision. A number of these production statistics will be published in the ENGINEERING AND MINING JOURNAL from week to week.

THE production of spelter in the United States in 1893 was about 74,500 tons of 2,000 lbs., as against 83,619 tons in 1892. The figures of 1893 are still provisional, but are very nearly correct. This decline is much less than was expected. The final figures will be ready in a few days.

The production of copper from domestic ores in 1893 exceeded somewhat the output in 1892 (which was reported in the MINERAL INDUSTRY at 325,180 tons), notwithstanding a heavy reduction in the output of the Anaconda, which mine wisely curtailed production when the market was so low. On the other hand the Calumet & Hecla considerably increased, though the publication of certain erroneous figures for 1891 and 1892 from the State reports has misled many in this item.

The production of lead in the United States declined only in domestic desilverized, which amounted to about 122,000 tons (of 2,000 lbs.), and of antimonial lead 5,300 tons were produced. The soft lead of Missouri and Kansas was almost the same as in 1892 and amounted to 31,300 tons, while lead produced from foreign ores amounted to about 23,000 tons, and foreign bullion refined here in bond to no less than 35,000 tons. The entire production of our works, was therefore, 159,600 tons from domestic ores and 58,000 tons from foreign ore and bullion. These figures are subject to revision, but are all official, and nearly all are final.

OUR contemporary, the Deadwood *Pioneer*, criticises somewhat severely the statements made by Dr. L. D. GODSHALL recently, in an article on "Chlorination of Gold Ores" published in our columns. The point to which especial exception is taken is the argument in that article that the process as used in the Black Hills would be improved by finer crushing of the ores, which point the author sought to establish by numerous experiments, and deductions made therefrom.

The *Pioneer* makes the interesting statement that at the works of the Golden Reward Company during the past six months the chlorination process has been improved to such a degree "that 92 per cent. of the gold is saved, and the total cost of treatment per ton is but $3.77, labor and other mill expenses being one-third higher than in Colorado, where it is said, the extremely low cost of $3.55 per ton is obtained." The manager of the Golden Reward mill is certainly to be congratulated on his success, but it seems to us these figures are not so great an improvement on former practice at that mill as is here intimated; nor are the costs of Colorado working mentioned the minimum already reached by this process. We look for $2 a ton as a possible Western cost of chlorination.

IRON AND STEEL PRODUCTION IN THE UNITED STATES.

The statement of the American Iron and Steel Association, compiled from the returns made by the furnaces, and published in the "Bulletin" of the Association, puts the production of pig iron in the United States in 1893 at 7,124,502 tons (of 2,240 lbs.), a decrease of 2,032,498 tons, or 22 per cent., from 1892, and of 2,078,207 tons from the high-water mark of 1890. Our own estimate, made at the close of the year and published in our number for January 7th, was greater than these official figures by only about 1 per cent.; a very close agreement especially in a period like the second half of last year, when sharp fluctuations in production and frequent changes in the status of furnaces made it peculiarly difficult to estimate the output closely.

In the article just referred to the course of production throughout the year was traced, and but little further comment on the statement is now required. The decrease in the output was entirely in the second half of the year, the production in that period, as compared with the corresponding half of 1892, showing a decrease of 22 per cent., while if we compare it with the first half of 1893, we find a reduction of 44 per cent., the greatest difference between two halves of the same year of which we have any record.

Classifying the product according to fuel used, we find that the reduction in charcoal pig iron last year was about 28 per cent.; in anthracite pig, 25 per cent., and in coke pig, which constitutes nearly three-quarters of the total output, the decrease was 21 per cent. Of the total production almost exactly one-half—3,568,598 tons—was classified as Bessemer pig iron.

Taking the production again by States, we find that three States—Georgia, Maryland and Colorado—showed a gain in 1893 over 1892. None of these is an important producer, however, and their combined output for last year was only 237,103 tons, or a little over three per cent. of the total. All the other States showed decreases last year, most marked in the large producers. The ratio of change did not differ greatly between the Northern and Southern producing centres, Pennsylvania and Alabama.

The production of Bessemer steel for the year followed very nearly

making $1.89 the cost of coke per ton of iron. Limestone costs on an average 65 cents delivered, and three-fourths of a ton is required, or 50 cents, per ton pig.

Taking these figures, the material used in one ton of pig iron is as follows:

1¼ tons coke	@ $1.51	$1.89
2½ " ore	@ .50	1.48
¾ ton limestone	@ .65	.50
Labor		1.25
Repairs		.50
Supplies		.50
Selling expenses		.25
Total		$6.37

At one plant labor costs $1 per ton of iron, repairs 50 cents and selling expenses 25 cents, a total of $1.75, but this is undoubtedly below the average. It is a comparatively short time since the lowest labor in the district, excepting possibly two plants, was over $1.50, and in certain known cases $1.80. A fair average now is $1.25, though a number of plants show the labor item at $1.10 to $1.20 through considerable periods. In the matter of repairs, supplies and selling expenses, while in the instance given they amount to but 75 cents, this is at least 50 cents under the average, as repairs and supplies alone, taking a period covering one campaign, or even a year, will amount to 50 cents each, and selling expenses 25 cents more. On this latter basis $2.50 for all items other than material gives a total cost of $6.37 per ton, while in the exceptional instance given it is but $5.62. Of course these figures do not include interest or capital accounts.

It is hardly necessary to comment upon these figures, other than that they are actual working costs. When a mixture containing brown hematites is used the cost increases slightly, and this is also true where washed coal is used for coking. In this latter case, however, experience has shown that the increase in the primary cost of the coke is more than balanced by a decrease in the amount required per ton of iron. With washed ores similar results have been shown. The whole tendency has been toward improvement; and when it is remembered that in 1886 three prominent Northern iron men took a trip through the South, carefully investigating the cost of making iron, and reported, upon their return, substantiating their opinion with reliable figures, that only two plants could produce iron for less than $8, and at most of them it cost $10, the improvement which has been made can be appreciated.

At present it may be counted, at the best works, as not exceeding $6 per ton (2,240 pounds) of pig. Where else in the whole world can these figures be equaled? And yet further economies are expected from the magnetization and concentration of the red ores, successful experiments on which have recently been made at Birmingham.

With a cost of 60 cents a ton for coal, and freight to Pensacola or Mobile 90 cents, it is not surprising that Alabama coal is rapidly widening its foreign markets, and has almost supplanted Pennsylvania and West Virginia coal in the New Orleans market.

The day is not distant when Alabama will capture the South American markets now supplied by England and Germany, and will even become a formidable rival in some of the European markets. The future of Alabama coal and iron is established beyond question.

NEW PUBLICATIONS.

LEGENDS OF GEMS. By Frank Shelley. New York; R. H. Russell & Son Pages 124; with portrait. Price $1.

Gems and precious stones have always had a peculiar fascination for the human mind, and around almost every kind there has gathered a cluster of legends and tradition—folk-lore is the most approved term—which forms an interesting study. In this attractive little volume Mr. Shelley has gathered many of these legends, and grouped them appropriately, adding in each case particulars as to the gem itself, its origin and value. It is an entertaining book and well worth reading.

THE INFRINGEMENT OF PATENTS—FOR INVENTIONS, NOT DESIGNS. By Thomas B. Hall. Cincinnati, O.; Robert Clarke & Co. Pages 276. Price $5.

In the present day the infringement of patents and the claims of patentees are a constant source of litigation, and to any one holding a patent of any value it is of great importance to clearly understand the law affecting his property. To give the best and latest information is the object of this book, the author of which, appreciating the fact that only the highest authority can finally determine disputed questions under the law, has given a digest of the decisions of the United States Supreme Court on patent questions, without any personal comment or opinion. This digest is arranged under four heads: License under the Patent; Identity of the Invention; Validity of the Patent; and Recovery for Infringement. Under each of these heads are numerous sub-titles, showing the divisions of the subject and classifying the decisions and references. In every case the full title of the suit is given, with the volume of the reports where it may be found, so that the reader is able, should he think it necessary to go beyond the digest, to find, without difficulty, the full statement of the case. To a lawyer practicing in patent cases this digest would seem to be indispensable, while to patentees or others interested in patents it must be a very useful work. Those who understand how much law depends upon the decision of the courts will appreciate its value. We may add that a very complete index is given.

LES MOTEURS A GAZ ET A PETROLE EN 1892. By Gustave Richard, Mining Engineer. Paris, France; Vve. Ch. Dunod. Pages 292; illustrated.

This book is intended as an addition to the author's previous work on the same subject, recording recent progress made and bringing up to date the information gathered. After stating that in 1892 no important progress in general principle has been made with gas or petroleum engines, the author gives a general description of some new types which have been brought forward, following this by an examination of the details of their construction and of improvements claimed in operation, in regulating, in starting, in cooling the cylinders and in lubrication. He shows on each of these points the advances made and also how inventors have been quick to realize the defects of earlier engines and to remedy them in different ways. The chapter on petroleum motors contains details of improvements made in carbureters and in the motors themselves. These motors seem to be for several reasons exceedingly economical in operation.

In this country the use of gas and petroleum engines is still comparatively limited, although there ought to be a good field for them. They are used to a much greater extent in Europe, and many of our readers may be surprised to learn that gas engines have been built there which will develop 100 and even 150 H. P. Large gas engines are used to run electric plants, and M. Richard enters into careful calculations to show that the gas consumed in running the engine in such a plant would give, if burned, less than half the light which can be obtained from the dynamos operated. Gas engines of large size are also in use for pumping water, running elevators and similar purposes. Petroleum motors are generally smaller and are used chiefly for special purposes, pumping, running boats and light work. The book is illustrated and shows the latest types of gas engines very fully.

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 on another page of the Journal.

Bureau of the American Republics: Bulletin No. 62 Haiti. Washington; issued by the Bureau. Pages 240; illustrated.

Economic Geology of the United States. By Prof. Ralph S. Tarr. London and New York; Macmillan & Co. Pages 510; illustrated. Price $4.

Metallurgische Beitrage aus Chile. Von Andreas Gmehling. Freiberg-in-Sachsen, Germany; Craz & Gerlach. Pamphlet, 24 pages; illustrated.

Annnal Report of the Inspector of Mines of Gogebic County, Michigan. Clarence M. Boss, Inspector, Ironwood, Mich. Pamphlet, 40 pages; illustrated.

Machinery for Metalliferous Mines. By E. Henry Davies, F. G. S. London; Crosby, Lockwood & Son, and New York, D. Van Nostrand Co. Pages 564; illustrated.

State of Iowa: Fifth Biennial Report of the Bureau of Labor Statistics, 1892-93. J. R. Sovereign, Commissioner. Des Moines, Ia.; State Printer. Pages 350.

The Inventions, Researches and Writings of Nikola Tesla. By Thomas Commerford Martin. New York; the "Electrical Engineer." Pages 496; illustrated. Price $4.

The Canadian Ice Age. By Sir J. William Dawson, C. M. G., Montreal; William V. Dawson. New York and London; The Scientific Publishing Co. Pages 302; illustrated. Price $2.

Twenty-first Annual Report of the Director of the Mint to the Secretary of the Treasury: for the Fiscal Year Ended June 30th, 1893. Washington; Government Printing Office. Pages 324.

Annual Report of the Comptroller of the Currency to the Second Session of the Fifty-third Congress of the United States: December 4th, 1893. Washington; Government Printing Office. Pages 342.

Thermodynamics of Reversible Cycles in Gases and Saturated Vapors. By Dr. M. I. Pupin. Edited by Max Osterberg. New York; John Wiley & Sons. Pages 114; with diagrams. Price $1.25.

'Mongst Mines and Miners: Underground Scenes by Flash-Light. By J. C. Burrow and William Thomas. London, England; Simpkin, Marshall, Hamilton, Kent & Co., Limited. Pages 32, with 64 photographs.

Department of the Interior: United States Geological Survey. Mineral Resources of the United States: Calendar Year 1892. David T. Day, Chief of the Division of Mining Statistics and Technology. Washington; Government Printing Office. Pages 850.

CORRESPONDENCE.

We invite correspondence upon matters of interest to the industries of mining and metallurgy. Communications should invariably be accompanied with the name and address of the writer. Initials only will be published when so requested.
All letters should be addressed to the MANAGING EDITOR.
We do not hold ourselves responsible for the opinions expressed by correspondents.

Lead Deposits of Southwest Missouri.

EDITOR ENGINEERING AND MINING JOURNAL:

Sir: In your issue of January 13th E. O. Hovey has referred to the lead deposits of southwest Missouri as the carbonate (cerusite) being the direct product of decomposition of galenite, and is found near the surface. This is a mistaken idea among our theorists, as can be easily proven. The carbonate of lead is found near the surface in the whole southwest and so is carbonate of zinc. It lies in a horizontal form on hillsides, and where denundation has failed to traverse. The zinc sulphate, together with and intermixed with galenite, is found deep in the Grand and in the valleys where denudation had progressed and fallen in. Now this carbonate shows plainly the dissolving action from the sulphureted waters by their honeycombed texture, and the solution deposited in the lower basins becomes crystallized into sulphides. If the sulphides be exposed to the action of the atmosphere in an old mine, or otherwise, they become sulphurets, which can be plainly seen associated with galenite found frequently in open ground. The sulphuric acid water

the same course as that of pig iron, the total output of Bessemer ingots in 1893 was 3,123,524 tons, being 1,044,911 tons, or about 25 per cent., less than in 1892. The decrease was, as with pig iron, entirely in the second half of the year, and the steel works reported for that period an output a little less than 50 per cent. of that made in the first six months. The production of steel rails showed a still greater decrease, being last year, 1,036,353 tons, the smallest since 1885, and showing a decrease of 422,379 tons, or about 29 per cent., from 1892. Last year was no exception to the rule which has prevailed for several years past, that the rail production forms each year a smaller proportion of the total steel output, as the use of the metal for construction and other purposes extends, and new applications for it are found, while its substitution for iron continually goes on.

SILVER AND THE INDIAN TROUBLES.

When the decision was made last June to close the Indian mints to silver coinage, a standard value of 15 rupees to the pound sterling was made, and it was announced that India Council bills would be sold only at a fixed minimum price of 16 pence, afterward reduced to 15¼ pence per rupee. These bills are drafts drawn by the Indian authorities in London upon the revenues of the Indian government, and have been largely used in commercial transactions, forming a convenient means of exchange and of transferring funds in payment for produce bought. It was then believed that the adoption of this fixed minimum would have the effect of steadying exchanges and of preventing violent fluctuations in values and the excessive speculation which always results from such fluctuations.

Not all the results expected followed the action of the Indian government, however—in fact, some of the consequences were altogether unexpected. In the first place the demand for silver and its absorption have continued to a degree that was not at all anticipated. That exports of the white metal to China and other Eastern countries should continue was to be expected; but the shipments to India itself, though showing a decrease, have nevertheless remained large in amount and still continue. It was for some time reported that to check them an import duty would be imposed, but very recently the Indian government announced that this would not be done. In the Indian commercial centers an active speculation in silver has sprung up, and has to a great extent taken the place of speculation in grain, cotton and other produce, which is for the time almost at an end. The unexpected Eastern demand has, however, had the effect of steadying the price of silver in London, and has prevented any further considerable fall from following the sharp decline of last summer.

Another result that was apparently not anticipated has been that the sale of India Council bills in London has for several months almost ceased. Week after week bills were offered at the price, first at 16, and then at 15¼ pence per rupee, but were not taken at all, or taken in only small amounts, and the result has been a serious embarrassment, to meet which the Indian authorities in London have been compelled to borrow money to meet their obligations. The demand for exchange has been so light that it was satisfied with the offerings of commercial bills, which were sold at a rate below the Council bills. The government seems to have finally decided that this state of affairs could not continue, and at the close of last week it announced that the minimum rate of 15¼ pence per rupee would no longer be insisted on, but that all tenders for bills would be considered on their merits—that is, that a lower rate would be accepted if the upset price could not be obtained. This announcement, with the possibility which it indicated of a further fall in the value of the rupee had a most disturbing effect on the Indian markets, where confusion and something approaching a panic are reported. Two days later, while not withdrawing its announcement, notice was further published of an Indian loan of $12,500,000 gold, in London; which is taken to mean that the government intends to strengthen its financial position so that, while withdrawing from the fixed minimum rate, it will still be able to reject offers for bills which it believes to be unreasonably low.

It is evident that the experiment made of abolishing silver currency in India, and substituting the single gold standard for that which has been so long in prevailing use there, is a failure, and the successive actions of the India Council seem to show that it is puzzled by the situation and hardly knows what to do. Those who advised and effected the change do not seem to have fully recognized the difficulty of enforcing it, or the impossibility of abolishing at once, in a slow and conservative population like that of India, the standard which had been recognized for centuries. That the government now regrets its action of last summer is not unlikely; that it will withdraw from it is altogether improbable.

We have frequently expressed in these columns our opinion of the bad policy of destroying or attempting to destroy the monetary value of the white metal, which is accepted by so large a proportion of the people of the world as a standard, and our conviction that the true course was the adoption of a bimetallism which would recognize and accept both gold and silver as the world's money. The existing troubles, have resulted from the experimenting with the currency of the country, without any well considered plan and international co-operation, which brought already some of the evils which might have been anticipated. And we believe in advancing the cause of bimetallism. We can only repeat the hope that this discussion now going on may lead to the international agreement which alone can settle this most important problem, since no one nation can, in these days of universal commerce and exchange, solve it without the concurrence of others. Our belief still is that the International Monetary Clearing House presents a solution at once reasonable and practicable and permanent, since it has within itself all the conditions necessary not only for present settlement, but for future adjustment to all the varying conditions of the world's commerce and finance.

THE COST OF COAL AND IRON IN ALABAMA.

The cost of making iron in the South is one of those much debated questions in which each side seems to have argued, not for the purpose of gaining information and thus finally arriving at definite and indisputable facts, but without the least intention of being convinced as to anything other than its own views of the question. During the days of "boom" speculation there was good reason for hesitancy in accepting statements of cost, for men who were supposed to have at least a fair degree of moral responsibility and cautious judgment did not hesitate to offer figures, and present arguments in support of them, which were absolutely incorrect. Since then the iron business has been sailing over very uncertain waters, and more than once has bumped against the bottom with such force as to throw out the weaker concerns and make the stronger take every precaution to avoid like disaster.

These conditions, hard as they have been from a financial point of view, have been invaluable to the South from a technical and economic standpoint. When iron was selling at high figures or the sale of town lots depended upon the operation of a furnace, it was not regarded as important that every possible means be taken to reduce cost and prevent waste, but when the selling price gradually slipped down and, as a prominent operator once put it, "commenced to monkey with the cost of production," it became necessary to reduce the latter, and then, as the same thing had to be repeated a number of times, the cost finally was, and is now, down to a point which five years ago was considered impossible, except in a town prospectus. Of course the costs vary with the location of the plants, some having slight advantages in one way or another, but the fact that they have kept in active operation during the long period of depression reflects the greatest credit upon those who have had the active management, both technical and financial, in every department, from the limestone quarry, coal and ore mines, coke-ovens and furnace, to the selling of the final product. The natural resources of the South have become no greater in this period, but improvements in methods of working and better financing have taken place with almost unexampled rapidity.

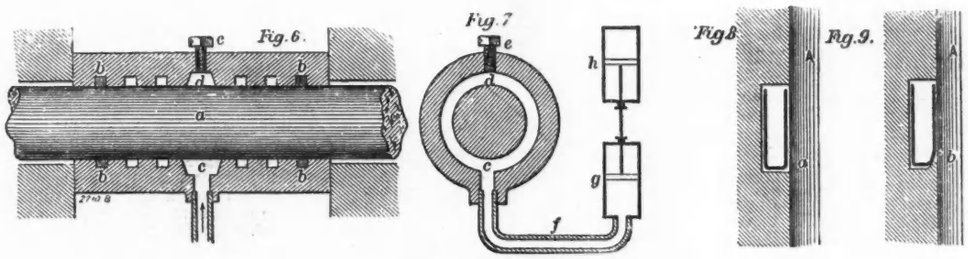
In the matter of costs the comparison between those of the present and the past is interesting. Referring more particularly to the Birmingham district, when the red ore mines were first opened below Birmingham the soft outcrop ore, requiring almost no stripping, was loaded into cars for 30 to 35 cents per ton, but in early underground development it cost almost double this price. Now, though it is taken from considerable depths underground, and air drills and dynamite are required for the work, it is delivered on cars for 50 cents per ton, this price allowing a good profit to the contractor. With 17½ cents freight to the furnace and using 2·2 tons per ton pig iron, the cost of ore per ton of pig is $1.485. It is interesting to observe, regarding this ore, that as the seam has been developed at greater depths, while the ore is hard and more compact, there has been but little increase in the percentage of lime, though as yet it can hardly be said that the workings have reached beyond the drainage level of the country.

In coal mining, notwithstanding the fact that a much greater distance is covered in the workings, there has been a marked decrease in cost of production. When, a few years ago, coal was loaded at the mine for 70 cents a ton, it was thought to be exceedingly low, being a reduction of nearly 10 cents a ton under the cost not long before. But at present this work is being done for 60 cents a ton, and in some few cases for less, and the coal is produced in cleaner and better condition than formerly. This reduction in cost is largely due to substituting common labor for miners in loading the coal in the mine; now the miner only cuts the coal. The freight charge from mine to ovens is 12½ cents per ton, and the practice of the district requires 1·6 tons coal to one ton coke; consequently coal and freight per ton coke amount to $1.16. Adding to this 35 cents, the contract price for coking (the contractor keeping up the plant and furnishing everything but the coal), the total cost of coke is $1.51. At some plants 45 cents is paid for coking, adding 10 cents to the cost given. Good furnace practice uses about 1¼ tons of coke per ton iron,

HYDRAULIC PACKING.

At the recent meeting of the American Society of Mechanical Engineers, one of the topics for discussion was: "What is the best method for packing the rods and plungers of hydraulic machinery, particularly under high pressure?" This question was discussed by President Coxe and Mr. A. H. Raynals. The former described and illustrated an extremely simple method employed at his works intended for pressures up to 400 lbs. The diagrams are given herewith and the description is as follows: "a is the piston rod surrounded by a sleeve with six angular grooves, the end ones b containing ordinary piston rings which are sprung in, the others being empty. The groove c d (shown in section) is formed in this sleeve, its upper portion being provided with an opening closed by the screw plug e, and its lower portion being connected with the pipe f. The lower portion of this groove is wider than the upper. Connected with the pipe f is the cylinder g, the piston of which is operated by pressure admitted to the cylinder h. The piston g is removed from its cylinder and the latter filled with tallow cut into small pieces, when the piston is returned to its place and the pressure admitted on the upper side of the piston of the cylinder h. This forces the tallow through the pipe f and into the groove c d, surrounding the pump piston rod. During the operation of the piston rod the tallow finds its way into the empty grooves, and serves not only as a perfect lubricant, but also assists and effectually packs the piston rod."

Mr. Raynals dwelt on the necessity of correctly forming the recesses to contain cropped leather packing intended for rods subjected to high pressures. To make the recess with a right angle, as shown in a, the pressure upon the inside of the U-shaped leather will cause the latter to buckle in this corner and destroy it quickly. This joint should be made as indicated at b (in the right-hand diagram), and as sharp as possible, and should be curved in order that there should be no tendency of the leather to buckling, and when properly constructed in this way he had found packing of this description to work well.



HYDRAULIC PISTON PACKING.

VALENTINE'S ESTIMATE OF GOLD AND SILVER PRODUCTION IN 1893.

The annual report of Wells, Fargo & Co. showing the precious metals produced in 1893 in the States and Territories west of the Missouri River (including British Columbia) shows an aggregate production as follows: Gold, $34,202,691; silver, $38,491,521; copper, $23,631,339; lead, $7,756,640; gross result, $104,081,591. The several metals mentioned have been estimated at the following commercial value: Silver, 74c. per oz.; copper, 10c. per lb.; lead, $3.50 per hundred.

Mr. J. J. Valentine, president of Wells, Fargo & Co., who has collected and arranged these figures, says, by way of explanation: "As in former reports allowance must be made for probable variations from exact figures, by reason of constantly increasing facilities for transporting bullion, ores and base metals from the mines outside of the express and the difficulty of getting entirely reliable data from private sources. Estimates obtained in this way are liable to be exaggerated and are, to a considerable degree, guesswork; but with some modifications on this acount, made herein, the general results reached, while only approximately correct, may be accepted as the closest approximation possible under the circumstances."

States and Territories.	Golddust and bullion by express.	Go'ddust and bullion by other conveyances.	Silver bullion by express.	Ores and base bullion by freight.	Total.
California	$9,697,036	$1,475,000	$257,005	$1,667,907	$13,096,948
Nevada	1,418,603	.....	1,236,869	847,579	3,503,051
Oregon	1,076,977	75,000	111,662	.....	1,263,639
Washington	249,553	25,000	128,852	.....	403,405
Alaska	.....	918,246	.....	.....	918,246
Idaho	1,645,000	.....	1,481,973	904,167	4,031,140
Montana	3,100,500	.....	10,730,000	18,550,000	32,380,500
Utah	377,352	.....	1,041,115	7,518,397	8,936,864
Colorado	7,229,643	.....	16,369,257	3,878,635	27,477,535
New Mexico	302,541	125,000	207,857	977,487	1,612,885
Arizona	1,082,348	225,000	224,769	5,858,293	7,390,410
Dakota	2,283,000	.....	200,000	15,000	2,498,000
Texas	.....	.....	315,000	.....	315,000
British Columbia	253,968	.....	.....	.....	253,968
Totals	$28,716,521	$2,843,246	$32,304,359	$40,217,465	$104,081,591

The gross yield for 1893, shown above, separated by metals, is approximately as follows:

Gold	32·86	$34,202,691
Silver	36·98	38,491,521
Copper	22·71	23,631,339
Lead	7·45	7,756,040
Total		$104,081,591

The exports of silver during the past year to Japan, China, the Straits, etc., have been as follows: From London, $55,973,825; from San Francisco, $11,741,660; total, $67,715485, as against $67,342,524 last year.

MINING IN SOUTHERN NEVADA IN 1893.

Written for the Engineering and Mining Journal by M. H. Joseph.

The condition of the silver market has told on the welfare of Nevada, and the news from all over the State shows only discouragement. The agricultural and stock-raising interests, which were becoming a feature in the growth of the State and the retention of its population, are dwarfed by the influence and effect of the low price of silver on the mining industry. The people of the State, who were remarkable for their enterprise, are now despondent.

Eureka County had always been remarkable for the self-sustaining condition of her mines, but the development of the natural resources of gold, silver, lead and other minerals has received a check from the low condition of the silver market. Prospecting in dead ground is now seldom heard of. Many of the small mines have been abandoned and numbers of the tributers in the larger ones have failed in making a living during the year. The majority of the chance-taking miners have not made the equivalent of days' wages, and those who have made over $3 per day are exceptional. There is no encouragement to prospect virgin ground, and a great deal of the ore that was mined during the year, which formerly paid, is now thrown over the waste dump as worthless material. The result is therefore a great decrease in the tonnage. A careful count shows a decrease in the number of mines of less than 10% for the year. The average number of miners employed in the mines of this county during the year was 308, of whom 229 were lessees and tributers, and 79 were days' pay men. The average number of miners employed in Eureka District during the year was 64 on days' pay and 208 an lease, tribute, etc. As compared with 1892 there was a decrease of 61 days' pay miners, an increase of 29 lessees and tributers, a net decrease of 32 men. The few who made clean gains on this year's work realized their profits on the gold contents of the ore they mined. The shipments of ore over the Eureka & Palisade Railroad have been reported monthly in our columns.

The total number of producing mines worked in the county during 1893 was 30. Fourteen small mines, with a total gross yield of 293 tons for the nine months ending September 30th, 1893, were not reported to the county assessor, whose books for that period show 16 mines, a total yield of 10,691½ tons, with a total gross value of $283,214. Total costs of extraction, transportation and reduction were $260,200, leaving a net value of $23,014. The net proceeds over and above the special costs of extraction, transportation and reduction were returned by different mines as follows: The small mines owned by individuals, $758; Diamond mine, $18,812; Eureka Con., $2,988; Jackson, $2,762; Phenix, $212; Pioneer, $625; Richmond, $101. The general expenses of the mines and companies are not returned to the assessor, so that the foregoing figures do not represent actual profits.

The only companies in the county that have made outlays for exploration work are the Diamond of Eureka District and the Cortez Mines, Limited, of Cortez District.

The decrease in the tonnage and value of the output is shown by the following comparisons from the assessor's books for the years ending September 30th, 1892 and 1893:

	1892.	1893.
Tons ore	24,533	14,757
Estimated value	$790,714	$390 044
Average per ton	$22.43	$26 43
Cost of working, transportation, etc	$550,471	$372,894

The increase in average value of the product is accounted for by the low price of silver and lead acting as an extraordinary inducement to the tributers to keep their ore clean while getting it out and thus raising the grade.

Two new companies, the Diamond and Excelsior, were organized during the year and prepared for extensive working. The Ruby Mining Company was wound up.

In White Pine District, White Pine County, there are about 56 miners employed. Up to November 30th the ore shipments for the year, by way of Eureka, amounted to 1,439 tons. The average value was placed at about 26 oz. silver per ton and about 55% lead. Operations in the Eberhardt Tunnel were suspended some months ago and the Monitor mine and mill at Taylor were closed down shortly afterward. Very little is being done in Robinson District.

The Bay State mine of Nevada District has recorded only one shipment for the present year of eight tons of ore, valued at about $300 per ton. There are at present only four men prospecting in the mine. Three men have shipped 40 tons of ore, valued at about $200 per ton, from the Rescue mine, Pinto District. At Seligman seven men are now employed. At Osceola 50 men are employed at the hydraulic diggings. There is some astivity at Aurum and Shell Creek, but reports from those places are indefinite.

From Nye County the ore shipments, by way of Eureka, for 11

originates from the iron pyrites beds in our Southern coalfields, and is charged to an extent that we are obliged to use bronze lining in our pump cylinders all through the Joplin district.

GREGG, Mo., Jan. 17, 1894. JACK MINER.

Granulating Slag and Matte.

EDITOR ENGINEERING AND MINING JOURNAL:

Sir: Having read a letter of Mr. A. Raht's in your issue of December 23 in reference to the granulation of slag, I have thought the following information might be worthy of publication: In 1877, when Mr. A. Raht and myself were superintendents of adjoining smelting works near Salt Lake City, he described to me the operation of sluicing away the slag with a stream of water. Later, in 1888, when I was manager of the Carlisle gold mine, in New Mexico, I had occasionally to call on the Copper company at Clifton in regard to railroad freights, as that company owned the narrow-gauge road by which we received all our supplies. The Copper company's furnaces were built near the Gila River, with only a few feet reserved for a slag dump, and this had been completely filled to the level of the working floor, and carried so far into the river that the existence of the town of Clifton on the opposite bank was seriously threatened at high water. Under these conditions the manager and superintendent of the company talked with me of various plans for getting rid of the slag by elevators, inclines, etc., but these all involved a considerable outlay for installation and operating which caused them to defer the matter. This appeared to me a good opportunity to put into operation the plan Mr. Raht had described to me, but not being engaged professionally in the matter, I gave no advice in regard to it, till at the time of my last visit at Clifton I found the Copper company in trouble and threatened with suspension. I told the manager gratuitously to sluice the slag away, as it flowed from the furnace, with a swift flow of water, and to carry it directly into the river, and that the freshets would then wash away the granulated slag at every flood and they would have a slag dump that would last for all time. Thus the credit for the introduction of the process at Clifton, Ariz., indirectly belongs to Mr. A. Raht.

SALT LAKE CITY, Utah, Jan. 19, 1894. JOHN LONGMAID.

Some Proposed Reforms in Coinage.

EDITOR ENGINEERING AND MINING JOURNAL:

Sir: Allow me to suggest some reforms in coinage. I think important changes necessary in the substance, form and devices of our coins.

1. As to substance. Our coins are composed of certain quantities of the precious metals and alloy. I do not suggest any change in the quantity of precious metal in any coin, since such changes are of momentous financial effect, and only to be made when their necessity is generally realized. I refer now to the alloys used. The wear of gold coin in active circulation is a very important source of loss. Those connected with the operations of the mint tell us of the devices used to diminish this waste. The use of copper as an alloy, though it lessens the loss, fails to impart the necessary hardness. Copper is also positively objectionable as an alloy, by reaon of its offensive odor and poisonous qualities. It has only been retained in use so long because gold alloyed with it preserves to a considerable extent its original appearance. Some metal should be selected which shall impart greater hardness. Whether nickel or some other metal will best answer the purpose is a question which it may require many experiments to determine. Such experiments can be best conducted at the mint of this or some other government.

The two objects to be kept in view are the greater durability of gold and silver coin, and the preservation of the natural color of each precious metal. If the latter object is not entirely compatible with the former it should so far be attained that no two metals used in coinage should have the close resemblance of color which exists between gold and copper and between nickel and silver.

2. As to form. It is sometimes necessary for the blind to handle coin, and often necessary for those who are not blind to handle it where light is deficient. Who has not occasionally hesitated in determining whether a coin was a new copper cent or a five-dollar gold piece? Their color and form are the same, and many mistakes are made in regard to them. The large new nickels are too near 25-cent pieces in both color and form. Every metal should have its own form and its own color. As the most valuable, gold coin should retain the usual round form, which is least subject to wear. Silver coins might have a form nearly as little subject to wear, and be made sufficiently oblong to distinguish them from gold. Nickel coins might be hexagonal, and copper, if retained for use (which I think hardly desirable), might be made square with blunted corners. To determine the best forms would require some experiments on the effect of changes in the form of metallic disks upon their mutual attrition. For such experiments, I would again remark, the mints of the different countries have the best facilities.

3. As to devices. Every coin should bear on its face the name by which it is known among the people. It should identify by word or emblem the nation by which it is used, as well as show the time and place of issue. These things all appear on our coin. It shows itself as money of the United States of stated denomination stamped at a certain date and place. But it should show further what is the precious metal used and what the alloy and what the weight of each. True, these things are fixed by public law which every one is presumed (by the courts) to know. Yet few save those engaged in the actual business of coinage can tell, without reference to tables, the exact weight of precious metal and alloy in each of our coins. These facts appearing on the face of each coin would render it easier to determine the extent to which it is worn. Where the wear of a coin has reached a certain percentage government should withdraw from it the legal tender quality in private transactions, but receive it for government dues or replace it with coin of full weight. The clipped or mutilated coins should, of course, be treated only as bullion. While each coin should show all these facts of origin and value, historical emblems and inscriptions should not be altogether rejected, but retained at the expense of all that is merely ornamental.

In my judgment the silver coin struck before the War is still superior in clearness of inscription and neatness of general appearance to that now made. This is largely due to the superior simplicity of the earlier designs. There will some day be an international coinage conference at which these questions will be discussed; and perhaps at some future time an international system of coinage in which these problems will be solved. Meanwhile present imperfections should be discussed.

GEORGE W. SHAW.

Some Ontario Gold and Copper Mines.

EDITOR ENGINEERING AND MINING JOURNAL:

Sir: It is now more than a quarter of a century since gold was discovered in the county of Hastings, Province of Ontario. For several years mines were worked at various points in the townships of Marmora and Madoc, and a number of veins gave promise of rich workings. Several mills for treating the ores were built, and excitement at times was raised to fever heat as new discoveries were made. But in almost every case it was found that when a shaft had been sunk to the water line the ore ceased to be free-milling, and no process then known made the economic treatment of it possible.

The disaster which a short time ago overtook silver mining led to a reawakening of interest in gold mining and once more attention began to be directed to the old Hastings field. A Montreal company was organized about two years ago to reopen a mine at Malone and a mill was put up there to treat the ore. It has 10 stamps and a complete equipment from Fraser & Chalmers' works, and last year bullion to the amount of several thousand dollars was produced. This year, however, the mill has been idle for the greater part of the time, pending some reconstruction of the company. There are some who say that the supply of ore on the company's property has given out, and that in all the shafts put down the veins are found to pinch out at a depth of 90 or 100 ft., but probably this is a misapprehension. It is to be hoped that better results will be obtained when the company decides on making a fresh venture. The ore of the Malone mine is so far free-milling, although some veins in the locality hold mispickel ore.

In the township of Belmont gold has been discovered on two lots near the Marmora line, upon which some development work has been done. One of these is known as the Belmont mine, on which there are four or five veins of gold-bearing quartz. On one of these a shaft has been sunk to a depth of about 130 ft., and it has also been explored by open workings at various points. A Crawford mill has treated a considerable quantity of the ore, and several thousand dollars of gold have been extracted; but the owners have not been convinced that the best results are obtainable by this process, and at present the mine is idle. One large vein of quartz and schist has been opened by pits and cross-cuttings, which show a width of over 30 ft., and reports made by experts encourage the hope that it carries gold in paying quantities should a stamp mill of good capacity be erected. The Ledyard mine occupies an adjoining lot, and on this there is at least one well-defined quartz vein from which some samples of ore carrying free gold have been taken. No mill to treat this ore has yet been built, the owner of the property preferring to first prove what he has got by mining work. The Belmont and Ledyard mines are about eight miles northwest of the village of Marmora, in the band of Laurentian rocks, which there rises behind the silurian limestones.

Interest in the mispickel mines which lie farther southward, but chiefly to the east and southeast of Marmora vilage, has been revived by the operation of a new method of treating these refractory ores. Late in 1892 a company was organized under the title of the Hastings Mining and Reduction Company to test an invention of Messrs. Walker & Carter, of Philadelphia, for which a patent has been taken out in Canada and the United States. The chief members of this company are citizens of Toronto and Philadelphia, the president being W. B. Scott, of the latter city. The first mill to operate the Walker-Carter process has been erected in the village of Marmora, on a small granite island in Crow River, just below a dam which there supplies power to this and several other mills and factories. Work on the mill was commenced in November, 1892, and in June following the whole of the plant was set up and made ready for trial. Perhaps it goes without saying that the original plans were not perfect; original plans seldom are, and in this instance many changes of detail had to be made before all the parts of the plant were fitted to do the exact work for which they were designed by the inventors. As it now stands, however, the mill is running in a satisfactory way.

A recent discovery of copper ore on lots 18 to 22 in the fourth concession of the township of Cowper is noteworthy as having been made in a locality hitherto supposed to be barren of minerals. The township of Cowper is on the east shore of Georgian Bay, a few miles south of the town of Parry Sound, and is included in the Laurentian formations which characterize a large part of northeastern Ontario. The vein is described as occurring in gneiss, and is a mile and a quarter long, cropping out at various points on the location, both on the shore of the bay and on an adjacent island, and is covered for a considerable part of its length by water. Its strike is nearly east and west. The width is irregular, being 16 ft. at one point where a test pit has been sunk. The ore is a chalcopyrite, and the vein in some parts is said to carry considrable zinc and some molybdenite. Specimens from the surface have assayed about 5% copper, and samples from a depth of 12 or 13 ft. about 20%. The gangue is an amethyst quartz, and on the north side of the vein is a band of conglomerate. The location is said to be a promising one, and has the advantage of being situated immediately upon deep water. A mining lease of the property has been taken out by Thomas Wilcox and Henry Harris.

G.

TORONTO, Ont., Dec. 28, 1893.

months amounted to four tons from Belmont and 12 tons from Morey. The ore from each place was very rich, running from $300 to $1,000 per ton in silver.

In Lincoln County, in the Ferguson District, there has been much prospecting for gold, and discoveries of importance are reported on the Monitor, Jim Crow and Magnolia mines.

THE SILVER MINES OF COLQUECHACA, BOLIVIA.

Written for the Engineering and MiningJournal by Prof. Robert Peele, Jr.

The town of Colquechaca, forming the center of a mining district of small extent but considerable importance, is situated in Central Bolivia, in the Eastern range of the Andes, and at an elevation of about 14,000 ft. above sea level. The neighboring peaks reach an altitude of nearly 18,000 ft., and although within the limits of the tropics their summits are covered with snow during the winter months, and traces of snow are to be seen almost the year round. The population of the town, about 7,000, is wholly dependent for a livelihood upon the mines. The town is 90 miles from the narrow-gauge railroad which enters Bolivia from the port of Antofagasta, Chile. During the past year this distance has been covered by a rough wagon road, but, previous to the last extension of the railroad, the only means of access from the nearest station was by an exceedingly bad mule trail some 225 miles long. From the present station the distance to the coast is 510 miles. The railroad traverses the great alkali desert separating the Eastern range from the coast, and on reaching a point near the Huanchaca mines, at an elevation of 12,000 to 12,500 ft., turns to the north on the wide elevated plain which forms so large a part of western Bolivia.

HISTORY.

Though the present town itself is of recent date, Colquechaca is one of the many old mining districts of Bolivia, and it is not positively known where the first work was done. One of the earliest works recorded is the driving of a part of the long tunnel of San Bartolome, previous to the year 1700, but after reaching a length of 1,500 ft. this tunnel was abandoned for many years. The ruins of the village of Anconaza, which dates from the latter part of the last century, lie farther up the basin, and much higher than the town of Colquechaca. Near these ruins are large accumulations of "desmontes" (waste rock), which mark old surface workings. The size of the dumps indicates workings of considerable importance, and the success which attended these operations led to the resumption of work in the San Bartolome tunnel. About the middle of the present century two rich lodes were cut at 4,000 ft. from the mouth.

Meanwhile, the increasing depth of the upper workings had greatly augmented the cost of extraction. As is usual in the older South American mines, these workings were entered by means of long and tortuous galleries, often too small in cross-section for a man to stand erect. Irregular zigzag footways, sometimes cut in form of rude steps to depths of hundreds of feet, led to the bottom of the mine, and through these "piques," by dint of almost incredible labor, not only ore and waste, but also water, was carried out on men's backs. Finally, the time came when such primitive methods no longer sufficed, and for want of proper pumping and hoisting machinery these extensive workings were abandoned in 1855. About this time discoveries were made upon the outcrops of the Embudo, Gallofa and other veins, and the little town of Aullagas, at an altitude of fully 15,500 ft. became the seat of operations.

From the old San Bartolome tunnel abundance of rich ore had been taken, and from 1862 to 1890 the mine was in "bonanza." The tunnel was driven in still farther, and in 1891 the main lode of the district —the Embudo—was cut at 4,490 ft. from the mouth, and at a depth of about 1,350 ft. Before this, another tunnel had been begun—the Amigos—about 800 ft. higher than the San Bartolome, but it was abandoned before reaching the lode, and work was not resumed until March, 1883. In October, 1884, the Embudo lode was cut by this tunnel in a large pocket of rich ore, and in less than three months the cost of driving it was returned to the shareholders, in addition to a substantial dividend.

It would be difficult to estimate the amount of silver extracted previous to 1865 from the upper workings of the lodes, as records are either incomplete or wholly lacking. Since 1865, however, it is certain that, through the San Bartolome tunnel alone, silver has been taken out to the value of about $21,000,000. From the upper tunnel, since 1884, about $5,700,000 has been extracted. These figures are up to May, 1892, when the mines were consolidated. From May 1, 1892, to March 1, 1893, the production was 809,000 oz., and the output will be greatly increased when the new machinery lately ordered is in place.

THE VEINS.

The Colquechaca veins are fissures occurring in dacite and rhyolite. Within the boundaries of the Consolidated mines the most important veins are the Embudo, the Empresa, Carmen, San Matias and San Augustin. There are others of note in the district, such as the Gallofa and San Miguel, but of these it is not my intention to speak further.

The Embudo, or main lode of the group, outcrops at an altitude of 15,000 to 16,000 ft., and is traceable a distance of over two miles. It dips into the mountain from about 75° to nearly vertical. The vein splits in the Aullagas mine, but is undivided throughout the others. Both branches of the split have carried rich ore of the same character as the main vein, and no enrichment has been noted either at or below the junction. The embudo is a pocket fissure, and, as is usual in such veins, the ore is very irregular in value. The thickness varies generally between 2 and 12 in., the richer ore occurring in zones or belts separated by ground either nearly barren, or carrying lower grade ore. These variations occur both horizontally and vertically; in some places the irregularities are abrupt and frequent, forming successions of pockets from 1 ft. to 3 ft. or more wide. The vein matter is usually banded in structure, often containing cavities or "vugs" lined with beautiful crystals of pyrargyrite and quartz with wire silver. It is clearly defined and breaks away easily from the country rock. Slickensides and clay gouge are of frequent occurrence. Two classes of ore are distinguished: "Broza-guia," or first class, and "Broza," or second class. The first consists mainly of ruby silver (pyrargyrite), native silver, and argentite, sometimes accompanied by high-grade tetrahedrite. Associated with these minerals are sphalerite and a little galena. Masses of blende and galena, with ruby, and interlaced with filigree silver, and large pieces of native silver ore, in wire and filigree form, are of common occurrence. The greater part of th value of the ore is carried in pure massive, crystalline, ruby silver. Large and perfectly terminated crystals of pyrargyrite are often found. The second class consists of the poorer one associated in the pockets with the first class, and of the lower grade material carried by the vein in the portions lying between the pockets. The values of the two classes vary greatly; the rich ore may be said to run from 500 to 5,000 oz., and the second class from 100 to 200 oz. per ton.

The other lodes of the group are similar in character to the Embudo, and lie on one side of, and within 400 ft. of the latter. They have produced largely, but, though they hold good to the bottom of the mine, their lateral extent is comparatively small.

THE MINES.

The five properties making up the Consolidation, or "Compania Colquechaca Aullagas de Bolivia," include within their limits about 6,000 ft. of the Embudo lode. In addition, the extension of the vein is covered by a large tract. I shall notice only the two principal mines.

The Aullagas Mine has a length on the Embudo lode of about 1,200 ft., throughout which regular levels have been driven at intervals of 25 meters. This system of exploitataion was adopted in order to avoid missing any of the rich pockets, and, to explore thoroughly the intermediate ground, frequent connections are made between the levels by "chiffoles" (inclined winzes). Development has been carried on well in advance of extraction, so as to keep open, if possible, several pockets at one time, and so maintain regularity in production. There are two main shafts, in each of which formerly was a large "malacate" (mule-whim), operated by four mules, and raising both ore and water This seems a rude and inefficient method of hoisting, but, up to a depth of 750 ft. it answered the purpose on account of the very small quantity of water encountered. The adjoining mines are several hundred feet deeper and naturally take most of the drainage.

A year and a half ago an underground boiler plant and small hoisting engines were erected to replace the malacates, but, since the consolidation, all work at the upper tunnel has been suspended. Had the mine possessed an outlet through the lower tunnel several years ago, the results would have been better; for, hoisting from deep shafts at an elevation of 15,000 ft. above sea level is not economical work, whether it be by mule-whim or by steam.

The Colquechaca Mine.—From the standpoint of past production this mine ranks first, but for years it has suffered from poor management and from its peculiar position with respect to other mines. Extraction has kept pace with development; no proper working reserve has been maintained, and of late years, with inadequate machinery for hoisting and for draining the deep workings, the company has been laboring under great disadvantages. During the writer's visit to the property, the deepest workings—1,735 ft. from the surface, and 380 ft. below the deep tunnel—though in an extremely rich pocket, could be kept clear of water only long enough to permit a hasty examination. The narrow stopes were crowded with men, a large number of whom were occupied in bailing out the sinks—raising the water to points from which it would run to the shaft. This was made necessary by the unfortunate habit of following the rich ore without proper provision for drainage and handling.

The drainage plant, consisting of a self-filling, cylindrical iron tank, holding 3,000 lbs. of water, and a large rawhide bucket—operated respectively by a 40-H. P. and a 12-H. P. engine, at the two main shafts, or winzes—labored hard to keep down the water, but the larger of the engines gave out under the strain, and work was temporarily discontinued. From the bottom, however, where the pay streak was 10 in. thick, and ruby silver plentiful, the writer took three samples which assayed 3,825, 4,032, and 5,169 oz. The great variation in value of this vein is indicated by another sample, taken a few feet from the above, and assaying only 68 oz. The engines and boilers were underground, 4,400 ft. from the tunnel mouth, the chimney passing tortuously 1,350 ft. through the old workings to the surface. While the engines were kept running to their full capacity the boilers were forced in a wasteful manner. The native fuels are "Yareta"* and turf, both high in ash, and, as enormous quantities were consumed, to handle it, together with the ash, in cars running out through the long tunnel, was very costly and interfered seriously with the regular mine work. The San Bartolome tunnel has now a total length of 5,035 ft., it has been recently straightened and enlarged to permit the use of mine locomotives. This plan of placing boilers far underground is a common practice in South American mines, and where the tunnel is so long as in the present instance there seems to be no alternative but the employment of electricity. In the case in point the arrangement was very unsatisfactory. The engines and boilers were placed in specially excavated chambers with no provision for ventilation. But, in the main tunnel, the current of air was strong and cool, and "splits" could have been easily made, as in coal mining practice, for carrying air into these rooms, and reducing the temperature. The heat was so great that the firemen and engineers had to be frequently relieved, going in turns into the draught of the tunnel to cool off. In running this little 52-H. P. plant, 30 engineers and firemen were required—15 on each shift. Besides these were the men and mules employed in transporting the fuel and ashes. Including the laborers engaged in

* "Yareta" is a heavy, resinous, mass-like growth, very plentiful in many parts of the Andes, and when dry makes a valuable fuel. It has been found that in heating power one ton of good coal is equal to from five to six tons of yareta: but until Colquechaca possesses direct rail communication with the coast, the use of coal is out of the question.

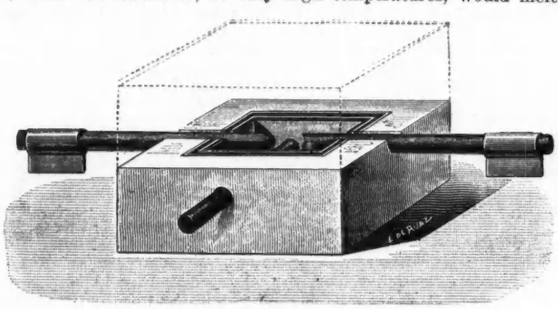
raising water from the stopes by hand windlasses, not over 20% of the underground hands in this mine were employed in productive work; a condition of things due largely to the absence of regular levels, and the consequent difficulty of getting ore, waste and water to the shafts. The mine was receiving most of the drainage from the whole group, and when the engines stopped the water rose rapidly and drowned out the lower workings of all the mines, bringing about an almost complete temporary suspension of operation.

The negotiations which had been for some time in progress were quickly brought to a close, and in May, 1892, the mines were, by mutual consent, united under a single management. By this step the annoying litigation and disputes which had attended the operations of the individual companies were ended; the separate establishments hitherto maintained by the various mines were done away with, and the work concentrated at the lower tunnel; a more efficient general management was mode possible and contracts were let at once for the hoisting and pumping plants so long needed.

(To be Continued.)

THE NEW MOISSAN ELECTRIC FURNACE.*

In this note the author recalls the electric furnace which he described to the Academy last year, and which was a true reverberatory furnace since the material heated was not brought into direct contact with the electric arc; and he also remarks on the importance of making the electrodes movable, an arrangement which simplifies the experiments very much. He describes a new form of furnace which he has devised, and which is shown in the accompanying illustration; this permits him to use the full temperature of the current, and at the same time to heat the body under treatment in a position entirely separate from the current. The apparatus consists of a block of Courson limestone of the form shown, having two grooves for the passage of the electrodes, and a cavity in the center of the same form as the block. The walls of this cavity are lined with alternate plates of magnesia and carbon, arranged in such a way that the magnesia is always in contact with the limestone, the carbon plates forming the chamber of the furnace. The oxide of magnesium is not reducible by the carbon, and thus could only be removed by volatilization, while the limestone, at very high temperatures, would melt in



MOISSAN'S ELECTRIC FURNACE.

contact with the carbon and would produce a liquid carburet of calcium.

The furnace is closed by a double plate of magnesia and carbon covered by another block of limestone, as indicated by the dotted lines. A carbon tube, from 0·01 to 0·02 meter in diameter, passes through the block and enters the furnace at right angles with the electrodes. Thus arranged, the apparatus can be heated for several hours by currents varying from 300 amperes and 70 volts to 1,000 amperes and 60 volts. At the temperature reached that part of the carbon tube entering the furnace is transformed into graphite, but with a tube of pure carbon carefully prepared this change makes little difference, and the diameter is not sensibly changed. To avoid direct action of the carbon on the body under experiment the tube is lined with magnesia, and although the work must be limited by the point of vaporization of the oxide, still within this limit many interesting experiments can be made.

If, instead of placing the carbon tube horizontally, it is inclined at an angle of about 30°, the furnace is changed into an apparatus for reducing refractory metals. In this continuous electric furnace M. Moissan distinguishes the phenomena of the heating properties of the arc from the electrolytic phenomena. With a current of 600 amperes and 60 volts he obtained without difficulty a button or small ingot of metallic chromium weighing about 2 kilograms, in a molten condition.

Slate production of the United States.—According to the "American Slate Trade Journal," the production of slate in the United States in 1893 was as follows:

	No. of Quarries.	Roofing Slate—Squares.	Roofing Slate—Value.	Other slate. Value.
Bangor region, Pa.	61	330,000	$930,000	$200,000
Lehigh region, Pa.	49	143,000	393,000	225,000
Peach Bottom, Pa.	10	29,500	143,000	4 000
Vermont and New York	73	305,000	876,000	300,000
Maine	5	43,000	213,600	6,000
Virginia	4	21,000	85,600	2,400
Total	202	871,500	$2,780,600	$737,400

The total value of the output of manufactured slate was thus $3,578,000. The production showed little decrease from 1892, but low prices are reported.

* Note contributed to "Comptes Rendus" of the French Academy of Sciences, by M. H. Moissan.

UNITED STATES IRON AND STEEL PRODUCTION IN 1893.

The American Iron and Steel Association has received from the manufacturers complete returns of the production of pig iron in the United States in 1893, and also complete returns of the stocks of unsold pig iron in the hands of makers or their agents at the close of the year. The total production of pig iron in 1893 was 7,124,502 gross tons, against 9,157,000 tons in 1892, 8,279,870 tons in 1891, and 9,202,703 tons in 1890. The production in 1893 was 2,032,498 tons, or over 22%, less than in 1892. This decline in production occurred wholly in the second half of 1893, as the production of the first half was larger than that of the second half of 1892 and almost as large as that of the first half of 1892. In the following table is given the production of pig iron by half years during the last four years:

Periods.	1890.	1891.	1892.	1893.
First half	4,560,513	3,368,107	4,769,683	4,562,91
Second half	4,642,190	4,911,763	4,387,317	2,561,58
Total	9,202,703	8,279,870	9,157,000	7,124,502

As compared with the first half of 1893 the production in the second half of that year shows a decrease of nearly 44%, the largest semi-annual decrease in production of which there is any statistical record. All the States show a reduced production of pig iron in the second half of 1893, as compared with the first, with the single exception of Georgia, which is not a large producer of pig iron at any time. Comparing the total production in 1893, however, with the total production in 1892 we find that three States, Georgia, Maryland and Colorado made more pig iron in 1893 than in 1892. All the other States made less. The number of furnaces which were in blast December 31st, 1893, was 137, which was the smallest number in blast for years. The number of furnaces in blast on June 30th, 1893, was 226, against 253 on December 31st, 1892, and 256 on June 30th, 1892. The number out of blast on December 31st, 1893, was 381.

The stocks of pig iron which were unsold in the hands of manufacturers or their agents, December 31st, 1893, and which were not intended for their own consumption, aggregated 662,068 gross tons, against 506,116 gross tons at the close of 1892; 596,333 tons at the close of 1891, and 608,921 tons at the close of 1890. On June 30th, 1893, the stocks of unsold pig iron amounted to 549,141 gross tons. There was, therefore, an increase in unsold stocks in the last half of 1893 of 112,927 tons. This increase was distributed among the different fuels used. In addition to the stocks of pig iron above noted as unsold, December 31st last, there should be added 45,250 tons in the yards of the American Pig Iron Storage Warrant Company, which had passed out of the hands of the makers, making 707,318 gross tons, which may be said to have been on the market on December 31st.

The production, arranged by States, has been as follows for three years past, in tons of 2,240 lbs.:

States.	1891.	1892.	1893.
Massachusetts	8,990	7,946	7,853
Connecticut	21,811	17,107	12,478
New York	315,112	310,395	191,115
New Jersey	92,490	87,975	74,305
Pennsylvania	3,952,387	4,193,805	3,643,022
Maryland	123,398	99,131	151,773
Virginia	295,292	342,847	302,856
North Carolina	3,217	2,908	2,843
Georgia	49,858	9,950	39,675
Alabama	795,673	915,296	726,888
Texas	18,662	8,613	6,257
West Virginia	86,283	154,793	81,591
Kentucky	44,844	56,548	47,501
Tennessee	291,738	300,081	207,915
Ohio	1,035,013	1,221,913	875,265
Indiana	7,729	7,700	5,567
Illinois	669,202	949,450	405,261
Michigan	213,145	184,421	117,538
Wisconsin	197,160	174,961	131,772
Missouri	29,229	57,020	32,360
Minnesota	1,226	14,071	10,373
Colorado	18,116	39,441	45,555
Oregon	9,295	7,628	4,739
Totals	8,279,870	9,157,000	7,124,502

The production of Bessemer pig iron in 1893 was 2,374,890 tons in the first half of the year and 1,193,708 tons in the second; a total of 3,568,598 tons, or 50·1% of the total output. The quantity of spiegeleisen and ferro-manganese produced in 1893 was 81,118 gross tons, against 179,131 tons in 1892.

From the same authority we have also statistics which give the complete production of Bessemer steel ingots and of Bessemer steel rails of all weights and sections in the United States in 1893, except the comparatively small quantity of standard rails and a larger quantity of street rails which were made by manufacturers from purchased blooms. In statistics of ingots are included the production of the few Clapp-Griffiths and Robert-Bessemer plants and also the production of steel castings. The total output of Bessemer steel ingots in 1893 was 3,123,524 gross tons, against 4,168,435 gross tons in 1892, showing a decrease in 1893 of 1,044,911 tons, or over 25%. The output in the last half of 1893 was less than half the production in the first half. The following table gives the production of Bessemer steel ingots in each half of 1893 and the total production in that year as compared with the total production in 1892:

States—Ingots.	First half 1893. Gross tons.	Second half 1893. Gross tons.	Total 1893. Gross tons.	Total 1892. Gross tons
Pennsylvania	1,337,079	696,979	2,034,058	2,397,984
Illinois	221,059	94,770	314,829	879,952
Ohio	232,980	115,161	348,141	469,855
Other States	301,959	124,557	426,496	480,644
Total	2,092,057	1,031,467	3,123,524	4,168,435

The production of Bessemer steel rails in 1893 was the smallest since 1885. The decrease, as compared with 1892, was 422,379 tons, or almost 29%. The greater part of this decrease was in the second half of the year.

The following table shows the production of Bessemer steel rails

in each half of 1893 and the total production of the year compared with that of 1892, with the exception above noted for both years:

States—Rails.	First half 1893. Gross tons.	Second half 1893. Gross tons.	Total 1893. Gross tons.	Total 1892. Gross tons.
Pennsylvania	429,059	210,372	639,431	885,652
Illinois	170,263	61,997	232,260	450,542
Other States	104,918	59,744	164,652	122,538
Total	704,240	332,113	1,036 353	1,458,732

The rail output was 33·2% of the total steel production, against 35% in 1892, thus following the general course for several years past and showing the increased proportion of steel yearly used for structural and other purposes outside of the railroad demand.

In this connection we give also the full statement of the shipments of iron ore from the Lake Superior district as collected by the Cleveland "Iron Trade Review." The shipments, by ranges, were, in tons of 2,240 lbs.:

	1892.	1893.	Changes.
Marquette	2,666,856	1,829,053	Dec. 837,803
Menominee	2,261,499	1,466,197	Dec. 795,302
Gogebic	2,973 993	1,329 464	Dec. 1,644,529
Vermilion	1,167,650	820,621	Dec. 347,029
Mesaba	4,245	613,620	Inc. 609,375
Total	9,074,243	6,058,955	Dec. 3,015,288

The total decrease last year was thus 33·2%. The older ranges held their own much better than the Gogebic, which was most affected of all, showing a decrease of 55·3%. The Mesaba range appears as an important factor in the trade for the first time. The shipments by ports were as follows in 1893: Escanaba, 2,048,981; Ashland, 1,117,524; Marquette, 1,086,934; Two Harbors, 903,329; Duluth, 440,292; Gladstone, 203,585; Superior, 80,273; total lake, 5,880,918 tons; rail shipments, 178,037 tons; total, 6,058,955 tons. The all-rail shipments compare with 528,930 tons in 1892, a decrease of 66·3%, showing the sharp reduction in output by the charcoal furnaces of the upper lake district.

THE MODERN PRACTICE OF CHLORINATION.

Written for the Engineering and M'ning Journal by H. J. Jory.

There is no department of metallurgy of so prolific an interest as the treatment of the so-called rebellious gold ores. In the early history of the West, and indeed until of late years, it was considered an essential qualification of a gold mine, that the gold therein should be free, that is, readily extractable by the simple operation of a wet-crushing battery. But recently, such has been the demand for gold properties that this discrimination has become far less exacting. For many years the Plattner process was looked upon merely as a means of treating the sulphuret concentrates from wet-crushing mills, the opinion obtaining in many quarters that free gold was not extracted in the ore-vats, that a line of amalgamated plates, or pans and settlers, would be necessary to prevent a loss of any possible coarse gold. It would be interesting in this connection to note how many of the inevitable pans now lie rusting away after their unsuccessful attempt to extract the value from California gold-bearing sulphurets. Smelting facilities being not generally available in gold-producing districts the chief recourse is to chlorination. I have often been in receipt of letters of inquiry from parties in regard to the application of the method to their particular ore. For the benefit of these I will state that there is scarcely any native gold-bearing material that will not yield its value in the gassing vats. In all cases where lead is not present to such an extent as to render the ore more valuable to the smelter, or too fusible to obtain a perfect roast, where the copper contents are not of commercial value, and, most of all, where dolomite does not exist as an important constituent of the ore, chlorination is applicable. Silver, for reasons to be seen hereafter, is not very thoroughly extracted in chlorination works, hence a large proportion of the white metal also militates against the advisability of chlorination. Not only is silver in itself a disagreeable feature, but some gold is almost sure to be alloyed with it, and not extractable by chlorine except the silver be chloridized by a preliminary chloridize-roast.

As an illustration of the fact that a heavy percentage of copper does not seriously interfere with chlorination, I at one time had the working of the concentrates—on Frue and Triumph machines—from a California gold mill yielding sulphurets at the rate of 50 tons a month. This ore was very nearly an even mixture of pyrite and chalcopyrite, often giving by the cyanide volumetric method as high as 17% copper. The assay varied as the mine deepened, running from 6 oz. gold and 4 oz. silver, to the reverse proportion. At first an attempt was made to treat by the ordinary Plattner method—a dead roast and plain gassing in ore vats. Upon leaching, the solution was found to be saturated with copper, and notwithstanding the consumption of an unusually large amount of gas but a small percentage of the gold was dissolved. After much thought and a few laboratory tests I decided to attempt the removal of the copper as a preliminary to chlorination. As a substitute for the dead roast with a high temperature at the finish I inaugurated the method of roasting for soluble sulphates, the intention being to convert as much as possible of the copper into sulphate, and withdraw the charge with no increase of heat at the end of the roast. To this end I also introduced about 5% of powdered salt cake or acid sodium sulphate, a waste product of the acid works and very cheap, toward the end of the roast. By means of samples taken from the finishing hearth before dropping a charge, and leaching tests made upon the same in the laboratory, it was possible to control the roasting and obtain the desired effect. The roasted ore, after being spread to cool, was charged into vats of a capacity of from 15 to 20 tons. Upon leaching, a phenomenon occurred, that was particularly striking. With cold water and cold ore, the first leach water was steaming hot, unbearable to the hand in fact, evidently owing to the anhydrous sulphates absorbing their water of crystallization. The saturated blue copper solution was run direct to the copper vats, there to deposit its contents upon the scrap iron. Besides the copper a considerable amount of silver was also dissolved, and found its way into the copper vats. After the washings showed but little copper the vat was plugged at the bottom and about 4 in. of water run on top of the ore. Then from a pitcher, sulphuric acid was added at the rate of 5 lbs. per ton of ore. This was allowed to percolate slowly through the ore in the vat and finally to drain dry. By this acid washing the basic copper compounds and what little lime and magnesia there was in the ore was removed. The washed ore was shoveled out, taken back to the furnace, and dried; then moistened to the proper consistency and sifted back into the ore vats. These vats were 14 ft. in diameter by 5 ft. 6 in. high; were provided with a gravel filter 1 ft. in thickness; water-joint covers swung by chains and counterpoised, and had a maximum capacity of 25 tons. The generator had for a basis a cast iron crock 40 in. in diameter, lined with heavy sheet lead, and secured by a wooden cover, also lead lined. and fastened to the bottom by bolts, the heads of which came under the outer rim of the crock. The cover was provided with hand-hole lead pipe for gas, and a small gooseneck pipe connecting with a lead basin for acid. This generator held chemicals sufficient for gassing 20 tons of ordinary ore. After this preliminary treatment, the gas came through the ore readily, the gold leach water still showing copper, though not the deep green of the previous attempt. The precipitate was of the typical brown color, always an evidence of purity, and the gold bars, for a period of several years, averaged 935 fine. The tailings carried $5 in gold and about 3 oz. in silver. The copper water from the gold tanks was also run to the copper vats, and some unsettled gold obtained. Every few months the cement was cleaned up and sent to the smelter, the average contents being 60% copper, 120 oz. silver and upward of 20 oz. gold per ton. This alone very nearly paid the expense of running the works on this ore.

With regard to lead as an enemy to chlorination, beyond a little extra consumption of gas the interference is not very marked. However, a heavy galena percentage in gold concentrates nearly always points to a high silver assay, and this, as already stated, is objectionable. Unless a chloridized roast is used, lead, even in considerable quantity, does not materially affect the fineness of the precipitate, but the addition of even a small amount of salt to the roasting ore converts large quantities of lead into chloride, which being dissolved and finding its way into the gold tanks is there thrown down as sulphate to the great deterioration of the gold precipitate, the result being a very base bar. After many experiences of this kind, and of gold loss by volatilization, I have entirely discontinued the use of salt in roasting, except in the re-roasting of ore for the silver contents. As an illustration of the success of chlorination on a lead bearing ore, I will cite the case of the Buffalo mine. This ore was an iron-stained quartz, carrying on an average 1 oz. of gold per ton, and 2·5 oz. of silver. The gold was contained in about 5% of gray lead carbonate, which, from its extreme fineness, resisted all attempts at successful concentration. Chlorination being restored to, two small double hearth reverberatory furnaces were erected. These handled eight tons of ore a day. Salt roasting on this ore, besides giving a heavy gold loss, yielded a precipitate that was unbearably base. The consumption of gas was very small and the tailings scarcely varied from the value of $2 in gold and the silver.

Silver extraction in chlorination works is usually quite unsatisfactory, owing partly to the fact that a high percentage of silver chloridized is synonomous with a heavy loss of gold by volatilization. The temperature and amount of salt necessary to properly chloridize silver admit of gold losses that are ruinous, so the white metal is usually sacrificed to the more valuable. Again the chlorine left in leached ore is fatal to the hypo salts. When this fact first dawned upon me in the early years of my experience, I provided myself with a burette and an iodine solution properly standardized, and proceeded to investigate. Starting with a 2% hypo solution, I found that after passing once through ore that had been reroasted, regassed and leached for gold, the solution had deteriorated to 0·7%. A second circulation and the hypo was entirely gone. Here indeed was a dilemma. The cause, however, was apparent. The chlorine remaining in the leached ore, though scarcely apparent by odor, had a marvelous capacity for "chewing up" hypo. Indeed it is my belief that tens of thousands of tons of ore have been leached for silver in California, with an old stock solution, from which every trace of the original salt had disappeared, and this for want of chemical knowledge and the necessary apparatus to investigate. A precipitate, indeed, will usualy appear upon adding the sulphide to the washings from ore that is being leached with an old stock solution, not of silver, however, but of copper. Owing to the destructive action of the retained chlorine upon the hypo solution it was necessary to introduce a modification. This was to pump back some of the ferrous solution from the copper vats, and thus remove the traces of chlorine from the ore. Another method applied in the case of rich ores that would pay for extra treatment was to first leach with hypo, wash thoroughly, shovel out, wheel back to the furnace for drying, sift back into the vats, and gas for gold. This gave the maximum results in all cases. It must be understood, however, that in all cases of working gold sulphurets, the ore had first been plain dead roasted, gassed and all the gold extracted that the ore would yield without chloridizing the silver.

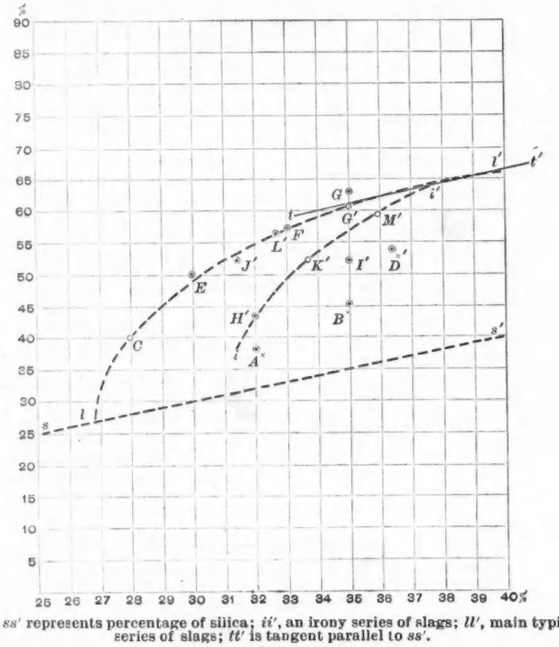
As regards the treatment of the sulphides, after many a laborious drying and roasting upon the top of the furnace and subsequent tedious melting into coppery bullion. I prefer to ship direct to the smelter, in many cases mixing with the cement cleaned up from the copper vats to save the trouble and expense incident to separate shipment. Free gold, even though quite coarse, is readily extractable by chlorination. I have never yet seen the "color" in tailings from chlorination works if the ore had been properly gassed. Some years ago I had the working of a quantity of ore from a group of California mines, that carried upward of $400 in gold and an average of 29 oz. silver per ton. Gold was freely visible in the rock, some of the

pieces being as large as pin heads. The quartz carried about 30% of arsenical pyrite. This was dry-crushed in a Dodge pulverizer through a 40-mesh screen. The first tailings gave a value of 1 oz. in gold, and upward of 30 oz. of silver. After reroasting with 5% salt, hypo leaching, drying and regassing, the final tailings carried but $3 in gold and 5 or 6 oz. in silver. One very serious drawback to the chlorination of crude ore has always been the want of a really efficient dry-crushing machine. For precaution's sake on high-grade ore and particularly where coarse gold is present, as in the case just cited, it is advisable to let the ores tand in gas five or six days. One point to be always borne in mind in regard to silver extraction is never to wet down chloridize-roasted ore in the pits or when very hot. Steam has the effect of converting silver chloride into an oxide, which is not extractable in hypo leaching. Altogether, with the price of silver, lead and copper so low that the profit of mining them is in many cases negative, with acid down to less than half its cost of three years ago, and a considerable reduction in the other chemicals employed, the future certainly looks bright for the chlorination process.

THE COMPOSITION OF LEAD SLAGS.

Written for the Engineering and Mining Journal by L. S. Austin.

The following discussion upon the constitution of the successful slags, produced in the smelting of silver-lead ores, is intended to bring out graphically the law of their relations and the limitations to which they are subject. The table found in Hofman's "Metallurgy of Lead," page 135, gives a series of well-tried slags used in the smelting of these ores. In the slags of the original table, which do not add to 90%, I have interpolated values by which the total has been brought to that amount, retaining, however, the same ratio



Line *ss'* represents percentage of silica; *ii'*, an irony series of slags; *ll'*, main typical series of slags; *tt'* is tangent parallel to *ss'*.

DIAGRAM SHOWING COMPOSITION OF SLAGS.

among their constituents. Thus modified, the percentages have been plotted upon the appended chart

The straight line ss' represents a series of values of the silica running from 25% to 40%. The distances measured from this line vertically to the lettered points represent the percentages of lime so lettered in the table, while the remaining distances to the horizontal line at 90%, the corresponding FeO. The points thus determined group themselves about the line ll', which represents graphically the variations between CaO and FeO, in consequence of the gradual increase in the percentage of SiO_2. A secondary line ii' represents a series of irony slags which appear to be connected, and there remain some erratic ones which seem to belong to no series.

The chart is based upon the assumption that the bases, other than the FeO and CaO, amount to 10% of the slag, and the discussion is confined to the principal series here presented. The data of the table are somewhat defective from zinc not having always been taken into consideration as replacing lime. At the time those types were published to the world, zinc cut but a small figure in the composition of the slags, owing to the clearer ores then generally in use. The chief effect of such consideration would be to slightly raise the line ll' of the chant without affecting the law of change of composition due to change of silica.

Historically considered, and as far as smelting in the United States is concerned, the types of slags, beginning with those expressed by the lower part of the curve ll', have advanced to the more extended use of those indicated by the upper part of the same line. This rule is by no means invariable, but I am now speaking of what has been the general tendency of modern practice.

Beginning at the lower part of the line ll' we find that the lowest silica permissible is 27%, at which figure a considerable variation in the limit between CaO and FeO is observable. In other words, with a low silica (27%), a considerable variation in the percentage of CaO and FeO is permissible.

We now advance to the type of slag containing 28% of silica, and known as the quarter slag (CaO = ¼ FeO). This type has now become fixed, but variations in either of the bases have equal importance, and such variations, to the extent of 1% or more, do not affect appreciably the value of the slag. The type is elastic in its requirements, and its use is indicated in event of considerable iron excess in the prevailing ores.

Before leaving the consideration of the slags of this part of the series (the irony slags) we may note that their specific heat is low, being 0·14, while the limy slags have a specific heat of 0·17, silica being 0·20. They are likewise quite fusible and of higher specific gravity as compared with the limy slags. They, consequently, do not separate from matte so readily, and the speiss, when present, overpasses the normal, having a high iron (Fe_5 As, or Fe_6 As).

The next slag to be considered is the well-known half slag (CaO = ½ FeO), having 30% silica. This type marks the line of separation between the irony slags on the one hand and the limy ones on the other. It has been largely used in the past, and has many good points; but the amount of bases needed for fluxing this amount of silica seems excessive as compared with the types we are about to consider.

The three-quarter slag, carrying about 33% SiO_2, presents itself to our consideration as being one of the most satisfactory ones known in our modern practice. Its specific gravity is low; its melting point and specific heat high, and the quantity of bases, compared with its silica, moderate. It has yet a permissible variation before reaching the maximum limit of CaO, as expressed by the tangent tt' drawn parallel to ss.'

We now come to those silicious slags belonging to the upper part of the curve, and which show, according to the chart, some singular qualities. This type, or these types, the whole slags (CaO = FeO approximately) have reached the upper limit of CaO, and while the silica is shown to increase, the lime may not; that is, we have reached our upper limit, for we have already noticed that CaO should increase with the SiO_2. Anomalous as it may seem, cases have arisen when the slag remains good, even when the silica has risen to 40%, which however, is in accord with the position of the advancing curve of the chart. A slight variation of this curve, as already alluded to, by raising the upper portion, and consequently the tangent tt', will also permit a higher silica than that indicated; still the consideration of the subject would have to be carried out in the same manner. Without undertaking to fix this limit for CaO, we can safely say that it is quite close to the tangent here drawn.

I would also call attention to the fact that, as silica preponderates in a given charge, the totals are crowded up beyond 90% (say to 92% or 93%), thus leaving more room for the bases needed to flux the high silica.

The slags of the upper part of the curve are very economical of iron, and when this base is scarce and limerock plenty, such a slag is properly indicated. It is to be noted that much care is to be exercised to carry the lime at the correct percentage, while variations of 1% or 2% in the silica or iron do not cut much of a figure, especially the latter. Failure to exercise this care means bad furnace-work, and for this reason the slag is not a favored one among metallurgists. It gives a good separation of matte and produces a normal speiss clean and brittle. It requires a higher blast and more fuel than the more irony slags.

A Deep Boring.—According to the "Revue Scientifique," of Paris, the deepest boring of which we have any knowledge up to the present time is at Parvschowitz, in the district of Ribnik, in western Silesia. The depth attained is 6,568 ft., and the diameter of the hole is only 2·75 ins. The work has been temporarily stopped in order to lower especial thermometers, which have been made with great accuracy, into the hole for the purpose of obtaining the temperature at different depths. The boring will then be resumed, and it is hoped that a depth of 8,200 ft. will be reached.

The Tehuantepec Railroad.—The contract between the Department of Communications of Mexico and Chandos S. Stanhope for the completion of the Tehuantepec Railway has been promulgated. The completion of the 59 kilometers of railway necessary to connect the northern and southern sections of the line is the chief feature, also the replacement of as many as half the present telegraph posts. The erection of water tanks, stations and other subsidiary works is provided for. The work provided for in the contract must be completed by September 6th, next, but in cases of absolute impediment the time is to be extended for twice as long as the period for which the impediment lasted. Heavy rainstorms are not to be classed as cases of absolute impediment, but in the event of occurring an allowance shall be made for them, not, however, involving an extension of the contract time beyond October 20th, next. The contract price is $1,483,035.

Railways in Bolivia.—The Bolivian Government is reported to be in treaty for the construction of a network of railways, 1,910 miles in length, connecting the cities of La Paz, Oruro, Cochabamba, Chuquisaca, Potosi and Santa Cruz with one another, and also with the river Paraguay on the east and the Peruvian port of Tacna on the Pacific. The country being mountainous the cost of construction is put down at $50,000 per mile. The total estimated cost of the network is, therefore, $95,000,000, a large sum for Bolivia. The country has at present only one line, connecting Oruro with the Chilian frontier, and 240 miles long. It is appearently desired to develop the interior by means of railway connections with Brazil, Paraguay and the Peruvian seaboard. It is proposed that the government should give a grant of land 30 miles deep on each side of the projected railways, and with such a concession it is considered that the capital might be obtained without a government guaranty of interest.

in each half of 1893 and the total production of the year compared with that of 1892, with the exception above noted for both years:

States—Rails.	First half 1893. Gross tons.	Second half 1893. Gross tons.	Total 1893. Gross tons.	Total 1892. Gross tons.
Pennsylvania	429,059	210,372	639,431	885,652
Illinois	176,263	61,997	232,260	450,542
Other States	104,918	59,744	164,652	122,538
Total	704,240	332,113	1,036 353	1,458,732

The rail output was 33·2% of the total steel production, against 35% in 1892, thus following the general course for several years past and showing the increased proportion of steel yearly used for structural and other purposes outside of the railroad demand.

In this connection we give also the full statement of the shipments of iron ore from the Lake Superior district as collected by the Cleveland "Iron Trade Review." The shipments, by ranges, were, in tons of 2,240 lbs.:

	1892.	1893.	Changes.
Marquette	2,696,856	1,829,053	Dec. 837,803
Menominee	2,261,499	1,466,197	Dec. 795,302
Gogebic	2,973 993	1,329 464	Dec. 1,644,529
Vermilion	1,167,650	820,621	Dec. 347,029
Mesaba	4,245	613,620	Inc. 609,375
Total	9,074,243	6,058,955	Dec. 3,015,288

The total decrease last year was thus 33·2%. The older ranges held their own much better than the Gogebic, which was most affected of all, showing a decrease of 55·3%. The Mesaba range appears as an important factor in the trade for the first time. The shipments by ports were as follows in 1893: Escanaba, 2,048,981; Ashland, 1,117,524; Marquette, 1,086,934; Two Harbors, 903,329; Duluth, 440,292; Gladstone, 203,585; Superior, 80,273; total lake, 5,880,918 tons; rail shipments, 178,037 tons; total, 6,058,955 tons. The all-rail shipments compare with 528,930 tons in 1892, a decrease of 66·3%, showing the sharp reduction in output by the charcoal furnaces of the upper lake district.

THE MODERN PRACTICE OF CHLORINATION.

Written for the Engineering and Mining Journal by H. J. Jory.

There is no department of metallurgy of so prolific an interest as the treatment of the so-called rebellious gold ores. In the early history of the West, and indeed until of late years, it was considered an essential qualification of a gold mine, that the gold therein should be free, that is, readily extractable by the simple operation of a wet-crushing battery. But recently, such has been the demand for gold properties that this discrimination has become far less exacting. For many years the Plattner process was looked upon merely as a means of treating the sulphuret concentrates from wet-crushing mills, the opinion obtaining in many quarters that free gold was not extracted in the ore-vats, that a line of amalgamated plates, or pans and settlers, would be necessary to prevent a loss of any possible coarse gold. It would be interesting in this connection to note how many of the inevitable pans now lie rusting away after their unsuccessful attempt to extract the value from California gold-bearing sulphurets. Smelting facilities being not generally available in gold-producing districts the chief recourse is to chlorination. I have often been in receipt of letters of inquiry from parties in regard to the application of the method to their particular ore. For the benefit of these I will state that there is scarcely any native gold-bearing material that will not yield its value in the gassing vats. In all cases where lead is not present to such an extent as to render the ore more valuable to the smelter, or too fusible to obtain a perfect roast, where the copper contents are not of commercial value, and, most of all, where dolomite does not exist as an important constituent of the ore, chlorination is applicable. Silver, for reasons to be seen hereafter, is not very thoroughly extracted in chlorination works, hence a large proportion of the white metal also militates against the advisability of chlorination. Not only is silver in itself a disagreeable feature, but some gold is almost sure to be alloyed with it, and not extractable by chlorine except the silver be chloridized by a preliminary chloridize-roast.

As an illustration of the fact that a heavy percentage of copper does not seriously interfere with chlorination, I at one time had the working of the concentrates—on Frue and Triumph machines—from a California gold mill yielding sulphurets at the rate of 50 tons a month. This ore was very nearly an even mixture of pyrite and chalcopyrite, often giving by the cyanide volumetric method as high as 17% copper. The assay varied as the mine deepened, running from 6 oz. gold and 4 oz. silver, to the reverse proportion. At first an attempt was made to treat by the ordinary Plattner method—a dead roast and plain gassing in ore vats. Upon leaching, the solution was found to be saturated with copper, and notwithstanding the consumption of an unusually large amount of gas but a small percentage of the gold was dissolved. After much thought and a few laboratory tests I decided to attempt the removal of the copper as a preliminary to chlorination. As a substitute for the dead roast with a high temperature at the finish I inaugurated the method of roasting for soluble sulphates, the intention being to convert as much as possible of the copper into sulphate, and withdraw the charge with no increase of heat at the end of the roast. To this end I also introduced about 5% of powdered salt cake or acid sodium sulphate, a waste product of the acid works and very cheap, toward the end of the roast. By means of samples taken from the finishing hearth before dropping a charge, and leaching tests made upon the same in the laboratory, it was possible to control the roasting and obtain the desired effect. The roasted ore, after being spread to cool, was charged into vats of a capacity of from 15 to 20 tons. Upon leaching, a phenomenon occurred, that was particularly striking. With cold water and cold ore, the first leach water was steaming hot, unbearable to the hand in fact, evidently owing to the anhydrous sulphates absorbing their water of crystallization. The saturated blue copper solution was run direct to the copper vats, there to deposit its contents upon the scrap iron. Besides the copper a considerable amount of silver was also dissolved, and found its way into the copper vats. After the washings showed but little copper the vat was plugged at the bottom and about 4 in. of water run on top of the ore. Then from a pitcher, sulphuric acid was added at the rate of 5 lbs. per ton of ore. This was allowed to percolate slowly through the ore in the vat and finally to drain dry. By this acid washing the basic copper compounds and what little lime and magnesia there was in the ore was removed. The washed ore was shoveled out, taken back to the furnace, and dried; then moistened to the proper consistency and sifted back into the ore vats. These vats were 14 ft. in diameter by 5 ft. 6 in. high; were provided with a gravel filter 1 ft. in thickness; water-joint covers swung by chains and counterpoised, and had a maximum capacity of 25 tons. The generator had for a basis a cast iron crock 40 in. in diameter, lined with heavy sheet lead, and secured by a wooden cover, also lead lined. and fastened to the bottom by bolts, the heads of which came under the outer rim of the crock. The cover was provided with hand-hole lead pipe for gas, and a small gooseneck pipe connecting with a lead basin for acid. This generator held chemicals sufficient for gassing 20 tons of ordinary ore. After this preliminary treatment, the gas came through the ore readily, the gold leach water still showing copper, though not the deep green of the previous attempt. The precipitate was of the typical brown color, always an evidence of purity, and the gold bars, for a period of several years, averaged 935 fine. The tailings carried $5 in gold and about 3 oz. in silver. The copper water from the gold tanks was also run to the copper vats, and some unsettled gold obtained. Every few months the cement was cleaned up and sent to the smelter, the average contents being 60% copper, 120 oz. silver and upward of 20 oz. gold per ton. This alone very nearly paid the expense of running the works on this ore.

With regard to lead as an enemy to chlorination, beyond a little extra consumption of gas the interference is not very marked. However, a heavy galena percentage in gold concentrates nearly always points to a high silver assay, and this, as already stated, is objectionable. Unless a chloridized roast is used, lead, even in considerable quantity, does not materially affect the fineness of the precipitate, but the addition of even a small amount of salt to the roasting ore converts large quantities of lead into chloride, which being dissolved and finding its way into the gold tanks is there thrown down as sulphate to the great deterioration of the gold precipitate, the result being a very base bar. After many experiences of this kind, and of gold loss by volatilization, I have entirely discontinued the use of salt in roasting, except in the re-roasting of ore for the silver contents. As an illustration of the success of chlorination on a lead bearing ore, I will cite the case of the Buffalo mine. This ore was an iron-stained quartz, carrying on an average 1 oz. of gold per ton, and 2·5 oz. of silver. The gold was contained in about 5% of gray lead carbonate, which, from its extreme fineness, resisted all attempts at successful concentration. Chlorination being restored to, two small double hearth reverberatory furnaces were erected. These handled eight tons of ore a day. Salt roasting on this ore, besides giving a heavy gold loss, yielded a precipitate that was unbearably base. The consumption of gas was very small and the tailings scarcely varied from the value of $2 in gold and the silver.

Silver extraction in chlorination works is usually quite unsatisfactory, owing partly to the fact that a high percentage of silver chloridized is synonomous with a heavy loss of gold by volatilization. The temperature and amount of salt necessary to properly chloridize silver admit of gold losses that are ruinous, so the white metal is usually sacrificed to the more valuable. Again the chlorine left in leached ore is fatal to the hypo salts. When this fact first dawned upon me in the early years of my experience, I provided myself with a burette and an iodine solution properly standardized, and proceeded to investigate. Starting with a 2% hypo solution, I found that after passing once through ore that had been reroasted, regassed and leached for gold, the solution had deteriorated to 0·7%. A second circulation and the hypo was entirely gone. Here indeed was a dilemma. The cause, however, was apparent. The chlorine remaining in the leached ore, though scarcely apparent by odor, had a marvelous capacity for "chewing up" hypo. Indeed it is my belief that tens of thousands of tons of ore have been leached for silver in California, with an old stock solution, from which every trace of the original salt had disappeared, and this for want of chemical knowledge and the necessary apparatus to investigate. A precipitate, indeed, will usualy appear upon adding the sulphide to the washings from ore that is being leached with an old stock solution, not of silver, however, but of copper. Owing to the destructive action of the retained chlorine upon the hypo solution it was necessary to introduce a modification. This was to pump back some of the ferrous solution from the copper vats, and thus remove the traces of chlorine from the ore. Another method applied in the case of rich ores that would pay for extra treatment was to first leach with hypo, wash thoroughly, shovel out, wheel back to the furnace for drying, sift back into the vats, and gas for gold. This gave the maximum results in all cases. It must be understood, however, that in all cases of working gold sulphurets, the ore had first been plain dead roasted, gassed and all the gold extracted that the ore would yield without chloridizing the silver.

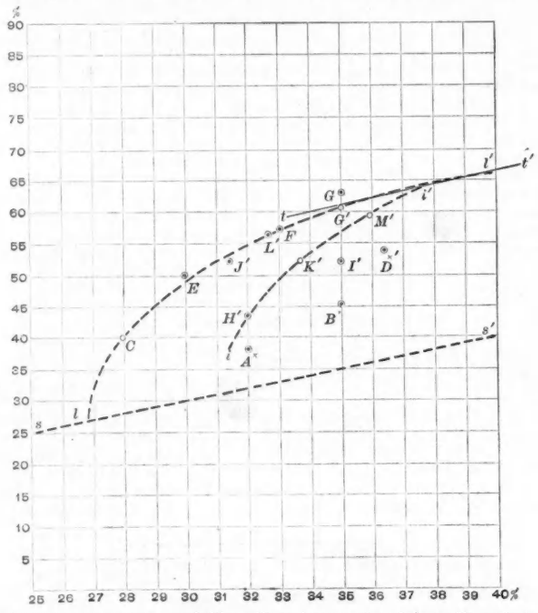
As regards the treatment of the sulphides, after many a laborious drying and roasting upon the top of the furnace and subsequent tedious melting into coppery bullion. I prefer to ship direct to the smelter, in many cases mixing with the cement cleaned up from the copper vats to save the trouble and expense incident to separate shipment. Free gold, even though quite coarse, is readily extractable by chlorination. I have never yet seen the "color" in tailings from chlorination works if the ore had been properly gassed. Some years ago I had the working of a quantity of ore from a group of California mines, that carried upward of $400 in gold and an average of 29 oz. silver per ton. Gold was freely visible in the rock, some of the

pieces being as large as pin heads. The quartz carried about 30% of arsenical pyrite. This was dry-crushed in a Dodge pulverizer through a 40-mesh screen. The first tailings gave a value of 1 oz. in gold, and upward of 30 oz. of silver. After reroasting with 5% salt, hypo leaching, drying and regassing, the final tailings carried but $3 in gold and 5 or 6 oz. in silver. One very serious drawback to the chlorination of crude ore has always been the want of a really efficient dry-crushing machine. For precaution's sake on high-grade ore and particularly where coarse gold is present, as in the case just cited, it is advisable to let the ores tand in gas five or six days. One point to be always borne in mind in regard to silver extraction is never to wet down chloridize-roasted ore in the pits or when very hot. Steam has the effect of converting silver chloride into an oxide, which is not extractable in hypo leaching. Altogether, with the price of silver, lead and copper so low that the profit of mining them is in many cases negative, with acid down to less than half its cost of three years ago, and a considerable reduction in the other chemicals employed, the future certainly looks bright for the chlorination process.

THE COMPOSITION OF LEAD SLAGS.

Written for the Engineering and Mining Journal by L. S. Austin.

The following discussion upon the constitution of the successful slags, produced in the smelting of silver-lead ores, is intended to bring out graphically the law of their relations and the limitations to which they are subject. The table found in Hofman's "Metallurgy of Lead," page 135, gives a series of well-tried slags used in the smelting of these ores. In the slags of the original table, which do not add to 90%, I have interpolated values by which the total has been brought to that amount, retaining, however, the same ratio



Line *ss'* represents percentage of silica; *ii'*, an irony series of slags; *ll'*, main typical series of slags; *tt'* is tangent parallel to *ss'*.

DIAGRAM SHOWING COMPOSITION OF SLAGS.

among their constituents. Thus modified, the percentages have been plotted upon the appended chart

The straight line ss' represents a series of values of the silica running from 25% to 40%. The distances measured from this line vertically to the lettered points represent the percentages of lime so lettered in the table, while the remaining distances to the horizontal line at 90%, the corresponding FeO. The points thus determined group themselves about the line ll', which represents graphically the variations between CaO and FeO, in consequence of the gradual increase in the percentage of SiO_2. A secondary line ii' represents a series of irony slags which appear to be connected, and there remain some erratic ones which seem to belong to no series.

The chart is based upon the assumption that the bases, other than the FeO and CaO, amount to 10% of the slag, and the discussion is confined to the principal series here presented. The data of the table are somewhat defective from zinc not having always been taken into consideration as replacing lime. At the time those types were published to the world, zinc cut but a small figure in the composition of the slags, owing to the clearer ores then generally in use. The chief effect of such consideration would be to slightly raise the line ll' of the chant without affecting the law of change of composition due to change of silica.

Historically considered, and as far as smelting in the United States is concerned, the types of slags, beginning with those expressed by the lower part of the curve ll', have advanced to the more extended use of those indicated by the upper part of the same line. This rule is by no means invariable, but I am now speaking of what has been the general tendency of modern practice.

Beginning at the lower part of the line ll' we find that the lowest silica permissible is 27%, at which figure a considerable variation in the limit between CaO and FeO is observable. In other words, with a low silica (27%), a considerable variation in the percentage of CaO and FeO is permissible.

We now advance to the type of slag containing 28% of silica, and known as the quarter slag (CaO = ¼ FeO). This type has now become fixed, but variations in either of the bases have equal importance, and such variations, to the extent of 1% or more, do not affect appreciably the value of the slag. The type is elastic in its requirements, and its use is indicated in event of considerable iron excess in the prevailing ores.

Before leaving the consideration of the slags of this part of the series (the irony slags) we may note that their specific heat is low, being 0·14, while the limy slags have a specific heat of 0·17, silica being 0·20. They are likewise quite fusible and of higher specific gravity as compared with the limy slags. They, consequently, do not separate from matte so readily, and the speiss, when present, overpasses the normal, having a high iron (Fe_5 As, or Fe_6 As).

The next slag to be considered is the well-known half slag (CaO = ½ FeO), having 30% silica. This type marks the line of separation between the irony slags on the one hand and the limy ones on the other. It has been largely used in the past, and has many good points; but the amount of bases needed for fluxing this amount of silica seems excessive as compared with the types we are about to consider.

The three-quarter slag, carrying about 33% SiO_2, presents itself to our consideration as being one of the most satisfactory ones known in our modern practice. Its specific gravity is low; its melting point and specific heat high, and the quantity of bases, compared with its silica, moderate. It has yet a permissible variation before reaching the maximum limit of CaO, as expressed by the tangent tt' drawn parallel to ss.'

We now come to those silicious slags belonging to the upper part of the curve, and which show, according to the chart, some singular qualities. This type, or these types, the whole slags (CaO = FeO approximately) have reached the upper limit of CaO, and while the silica is shown to increase, the lime may not; that is, we have reached our upper limit, for we have already noticed that CaO should increase with the SiO_2. Anomalous as it may seem, cases have arisen when the slag remains good, even when the silica has risen to 40%, which however, is in accord with the position of the advancing curve of the chart. A slight variation of this curve, as already alluded to, by raising the upper portion, and consequently the tangent tt', will also permit a higher silica than that indicated; still the consideration of the subject would have to be carried out in the same manner. Without undertaking to fix this limit for CaO, we can safely say that it is quite close to the tangent here drawn.

I would also call attention to the fact that, as silica preponderates in a given charge, the totals are crowded up beyond 90% (say to 92% or 93%), thus leaving more room for the bases needed to flux the high silica.

The slags of the upper part of the curve are very economical of iron, and when this base is scarce and limerock plenty, such a slag is properly indicated. It is to be noted that much care is to be exercised to carry the lime at the correct percentage, while variations of 1% or 2% in the silica or iron do not cut much of a figure, especially the latter. Failure to exercise this care means bad furnacework, and for this reason the slag is not a favored one among metallurgists. It gives a good separation of matte and produces a normal speiss clean and brittle. It requires a higher blast and more fuel than the more irony slags.

A Deep Boring.—According to the "Revue Scientifique," of Paris, the deepest boring of which we have any knowledge up to the present time is at Parvschowitz, in the district of Ribnik, in western Silesia. The depth attained is 6,568 ft., and the diameter of the hole is only 2·75 ins. The work has been temporarily stopped in order to lower especial thermometers, which have been made with great accuracy, into the hole for the purpose of obtaining the temperature at different depths. The boring will then be resumed, and it is hoped that a depth of 8,200 ft. will be reached.

The Tehuantepec Railroad.—The contract between the Department of Communications of Mexico and Chandos S. Stanhope for the completion of the Tehuantepec Railway has been promulgated. The completion of the 59 kilometers of railway necessary to connect the northern and southern sections of the line is the chief feature, also the replacement of as many as half the present telegraph posts. The erection of water tanks, stations and other subsidiary works is provided for. The work provided for in the contract must be completed by September 6th, next, but in cases of absolute impediment the time is to be extended for twice as long as the period for which the impediment lasted. Heavy rainstorms are not to be classed as cases of absolute impediment, but in the event of occurring an allowance shall be made for them, not, however, involving an extension of the contract time beyond October 20th, next. The contract price is $1,483,035.

Railways in Bolivia.—The Bolivian Government is reported to be in treaty for the construction of a network of railways, 1,910 miles in length, connecting the cities of La Paz, Oruro, Cochabamba, Chuquisaca, Potosi and Santa Cruz with one another, and also with the river Paraguay on the east and the Peruvian port of Tacna on the Pacific. The country being mountainous the cost of construction is put down at $50,000 per mile. The total estimated cost of the network is, therefore, $95,000,000, a large sum for Bolivia. The country has at present only one line, connecting Oruro with the Chilian frontier, and 240 miles long. It is appearently desired to develop the interior by means of railway connections with Brazil, Paraguay and the Peruvian seaboard. It is proposed that the government should give a grant of land 30 miles deep on each side of the projected railways, and with such a concession it is considered that the capital might be obtained without a government guaranty of interest.

THE MISSOURI GEOLOGICAL SURVEY.

The work of the Missouri Geological Survey during the last year has consisted chiefly in completing the fieldwork and preparing the manuscript for the reports on the lead and zinc ores and the clays of the State. In addition, however, other work in hand, which was well advanced at the beginning of the year, has been pushed forward toward completion. Because of the small appropriation made by the last legislature the force had to be considerably reduced; thus some work in progress was suspended and no new lines of work were engaged in. The fieldwork for the lead and zinc report was completed last year, and the manuscript is now largely prepared, and it is anticipated that the report will be ready for the printer by the end of the winter. The fieldwork of the clay report is also completed, but the manuscript will not be ready before next summer. Two short reports, relating to portions of northern and southeastern Missouri, are now in the hands of the printer, and, together with the accompanying maps, will be issued shortly. It will take all of the remaining funds available to publish part of the reports printed this year and to place the unfinished work in condition for publication. Several volumes will have to be held back until another appropriation is made, as will the reports upon 12 topographic and geologic maps of different portions of the State fieldwork for which was done during past years. The prosecution of the fieldwork and the preparation of the report on the building stones of the State had to be suspended. Large numbers of deep-drill hole records of great value and other results relating particularly to the coals of the State, have had also to be held back for lack of funds to prepare and publish them. State Geologist Winslow receives constantly applications for reports on different subjects from all parts of the world. Some of these he is able to satisfy with reports already published; others there is nothing to meet the demand with. Requests are also frequently made for examinations of materials and localities and for extensions of the work in the State. Under the present conditions very few of these requests can be complied with.

THE PREPARATION OF METALLIC LITHIUM.*

By M. Gunts.

The preparation of metallic lithium must seem at first sight an easy operation, but on repeating the experiments of Bunsen, Hilier and Troost we quickly perceive, on making quantitative determinations, that the yield, though very variable in different operations, is in general extremely low with reference to the intensity of the current employed.

On studying the best conditions for the preparation of lithium we have found that the yield of metal is so much the higher as the temperature of the electrolysis is lower. An impure salt, containing potassium and sodium chlorides, gives, when electrolyzed at its melting point, much better results than pure lithium chloride. This result led us to lower the melting point of the lithium chloride by the addition of potassium chloride. I have found that LiCl melting about 600° the mixture of LiCl and KCl at equal weights melts about 450°. A mixture of equal mols. of the two chlorides melts about 380°; a mixture of 2 mols. KCl with 1 mol. of LiCl melts at 550°, and pure potassium chloride melts at 740°. The most favorable mixture for electrolysis contains equal weights of the two chlorides. This mixture can be easily kept in fusion below 450°; and, moreover, during the electrolysis the mixture loses lithium chloride and its fusibility becomes greater. This is not the case with the mixture formed of equal mols. of LiCl and KCl, the fusibility of which diminishes rapidly under the same conditions.

To obtain large quantities of lithium we heat from 200 to 300 grms. of the mixture of the two chlorides in equal weights in a porcelain over a simple Bunsen burner. The mixture melts very readily, and the two electrodes are then introduced. The positive electrode is a rod of carbon of about 8 mm. in diameter; the negative electrode is a rod of iron from 3 to 4 mm. in diameter, which is placed in the axis of a glass tube of 20 mm. in diameter. The current is passed in and the experiment goes on very rapidly by using an electromotive force of 20 volts and a current of 10 amperes. At the end of an hour the lithium exceeds the level of the liquid in the glass tube by more than a centimeter. To extract the metal the tube is raised after interrupting the current; the lithium floats on the surface of the melted chloride without igniting. It is taken up in an iron spoon and poured into a dry ingot mold.

The metal thus obtained is free from iron and silicon, but contains 1% of potassium by weight, which corresponds to 1 atom Ko to 273 atoms Li. For most uses the metal is sufficiently pure.

When the electrolysis is effected at a red heat, about 700°, with pure lithium chloride, the metal arriving at the negative pole combines with the chloride to yield a lithium sub-chloride, Li_2Cl, which remains at the negative pole. This compound, less conductive than the original chloride, diminishes the intensity of the current as it is observed at ammeter. This sub-chloride, being diffused in the melted liquid, arrives at the positive pole, where it recombines with the chlorine with emission of light; this compound producing oscillations of the needle of the ammeter. When the temperature of electrolysis reaches 500°, or even falls lower, the lithium does not combine with lithium chloride, and is found altogether at the negative pole and may be collected. This is the reason of the high yield obtained in this case.

This phenomenon of the formation of metallic sub-chlorides by electrolysis seems general for the alkaline metals. I have not yet been able to obtain by this method compounds in a state of satisfactory purity.

*Abstract of article in "Comptes Rendus" for December 29th, 1893.

THE HEALTH OF LEAD SMELTERS AND WHITE LEAD WORKERS IN ENGLAND

Written for the Engineering and Mining Journal by Our London Correspondent.

In April last the British Home Secretary appointed a committee of experts to inquire into the conditions under which lead smelting and the production of white lead and other lead compounds are conducted, with the object of diminishing any proved ill effects on the health of the workpeople, to ascertain if the present government regulations relating to the manufacture of white lead are sufficient to suggest any additional precautions. This committee after sitting for six months, visiting 46 works, and examining 184 witnesses, have issued their report. From this it appears that they consider that the existing regulations are fairly efficient, and they have only a few minor suggestions to make. By the present government regulations the masters are required to provide bath accommodation, weekly visits from a physician, suitable drinks for counteracting the poison, etc., and the workmen have to obey very stringent rules about washing, bathing, changing clothes, wearing respirators, etc.

The committee find that the danger attending the manufacture of white lead by the old Dutch process is centered in the strippig of the white beds, the rollers, the washbecks, but chiefly in the stoves and the packing. The danger in all these cases arises from the fact that manual labor is used, and the committee strongly recommend manufacturers to turn their attention toward adopting mechanical substitutes. They have also found that women are more susceptible to poison than men, and young girls more than full grown women. They recommend that no girl under 20 years of age shall be employed in a white lead factory, and that no woman shall be employed in the particularly dangerous operations enumerated above. They also call attention to the fact that in the washbecks, where the white lead settles from the water, the water contains an appreciable amount of acetate of lead. As the workers have to plunge their hands into this liquid and are splashed with it, there must be a source of danger there, and they recommend some modification of the process. The committee do not think that the wearing of gloves and respirators secures immunity from danger, though the danger is considerably reduced, neither do they think that the regulation about packing under a ventilator is of any use, unless there is a hood and a powerful fan. There are also several other minor recommendations.

Their opinion on substitutes for carbonate of lead is instructive. They say they have carefully examined the sulphate of lead lately introduced as a substitute, and while agreeing that it is much cheaper to make and far less poisonous, they confess that it is far from equaling the carbonate as a pigment and in covering power. Neither can they recommend the other processes than the old Dutch process for manufacturing the carbonate—the chamber process and the precipitation process. Of the 46 works visited, only three used the chamber process, and one the precipitation process. There is therefore no alternative but to adhere to the old process and to eliminate as far as possible manual labor of every kind.

The committee report that the process of lead smelting is almost free from danger to the workers. They state that the only cases of lead poisoning met with in the process have occurred after the cleaning of the flues in smelting works. They therefore recommend that respirators and overall suits shall be worn; that no one shall be allowed to remain more than two hours at a time in the flue, and that everyone so employed shall be compelled to take a bath before leaving the works. The desilverizing process is considered practically free from risk.

RECENT DECISIONS AFFECTING THE MINING INDUSTRY.

Supreme Court of Alabama.

Action to Enjoin Mining from School Lands.

In an action to enjoin the mining and selling of coal from school lands, one cannot question the legality of the statute under which an agent was employed by the State to select lands in lieu of lost school lands, nor the regularity of proceedings with the Federal Government, whereby a selection of the land in controversy was approved by the Department of the Interior and certified to the State.—Holmes vs. State, 14 So. Rep. 51.

Supreme Court of the United States.

Right to Acquire Mining Claims by Forfeiture.

The right to acquire by forfeiture, under the statutes, the part interest of one who fails to pay his proportion of the expenditure for annual labor exists only in favor of one who is co-owner in the year for which such labor is performed. One is not a "co-owner" within the meaning of the statute, who merely holds a sheriff's certificate of purchase at an execution sale of a part interest, for title does not pass until he receives a deed. The owner of a part interest in a mining claim is a cotenant with the other owners; and if, without their knowledge, he procures a patent in his own name, he becomes a trustee for them, and equity will enforce the trust in their favor.—Turner vs. Sawyer, Supreme Court Reports U. S. 192.

United States Circuit Court of Appeals, Eighth Circuit.

Following Vein in Adjoining Claims.

Where one owned two mining claims, the veins of which united below the surface, and at a much greater depth, met the vein of another's claim, which had been located long after the location of the older of his claims, in ejectment for the ore below the point of meeting which he claimed, under the statute, as having the prior location, the only issue was whether the veins united or crossed each other. It was immaterial whether the location of his junior claim was prior or subsequent to the other's location, and rulings

upon evidence on that question, if erroneous, were not prejudicial to him.—Little Josephine Min. Co. vs. Fullerton, 58 Fed. Rep. 521.

Equitable Jurisdiction in the Dissolution of Foreign Corporations.

The Circuit Court has no inherent power, as a court of equity, at the suit of domestic shareholders, to dissolve an English mining company owning and operating a mine in the United States, and to wind up its business operations; nor has it any power under the act of Parliament known as the "Companies Act, 1862." The fact that a resolution to wind up a foreign company was confirmed at a meeting of the shareholders held on insufficient notice is no ground for the appointment of a receiver by the Circuit Court. Adequate relief may be afforded, where the parties submit themselves to the jurisdiction of the court, by a decree declaring the resolution invalid and enjoining them from carrying it into effect. Where the articles of association of an English company are in conflict with the act of Parliament under which the company was organized, the act of Parliament must prevail.—Republican Mountain Silver Mines vs. Brown, 58 Fed. Rep. 644.

French Iron and Steel.—For the month ending October 31st French imports were (in metric tons) 73,127 tons pig iron, 17,297 tons finished iron and 4,631 tons steel. The exports for the same period were 83,337 tons pig iron, 18,172 tons finished iron and 8,677 tons steel. Imports show a slight increase and exports a decrease.

Wire Wound Steam Pipes.—The system instituted by the Admiralty of winding all steam pipes over 8 in. in diameter with 3-16-in. copper wire, thereby about doubling the bursting pressure, has within recent years been adopted on many merchant steamers using high-pressure steam, says the London "Engineer." The Italian naval authorities have adopted the system to some extent, and they find that, as with the "wire-wound gun," wire of square section coiled round the pipe under tension adds enormously to the strength. Some prolonged experience in actual service will be necessary before the practice can be safely followed even with the brazed pipes now in use, but if, as is the present tendency, the thickness of the copper forming the pipe proper is reduced in virtue of the accession of strength due to the use of wire, the need for caution will be all the greater. The results of some of the Admiralty tests showed that a wired pipe stood just about the pressure it ought to have stood when unwired, had the copper not been injured in the brazing. To obviate the risks of careless brazing, and enable the thickness of sheet copper forming the pipe to be reduced to a minimum, at the same time that full advantage of wire-winding is secured, a patented system of manufacturing steam pipes is at the present time being experimented with by a west of Scotland firm. It forms even a closer analogy to the wire-gun than the present system of wire-winding and consists in using copper of the thinnest practicable gauge, to form the interior or core of the pipe, the body of the pipe proper being composed of steel wire wound closely round the core, and the interstices between the coils being filled in solid with copper by a patented system of copper electro-deposition. Pending this and other possible improvements on copper pipes, one result of past experience with these is to give an impetus to the use of lap-welded wrought iron pipes. In the "Campania" and "Lucania," the main steam pipes are of this type, and experience with these so far bears out the contention of some engineers, that for modern high pressures they are, on the whole, the best that can be used.

Effect of Sulphur Water on Pumps.—At the January meeting of the Montana Society of Civil Engineers, Mr. Goodale, superintendent of the Gagnon mine, at Butte, spoke of the corrosion of iron pumps and columns caused by the presence of sulphuric acid in the water pumped from the Butte mines. He stated that in the Gagnon mine there is considerable water constantly leeching down through the old stopes, and in so doing it seems to become impregnated more or less with sulphuric acid, which acts on the columns and pumps. He said: "There is quite a difference in the character of the water in the different parts of the mine. The silver mines do not have water that is particularly troublesome, but in the copper mines there is a great deal of trouble. In the Gagnon mine we have very troublesome and corrosive water. A few years ago it was not causing any particular trouble. We often used it for boiler feed, but found that its action on the mud-drums made it necessary for us to discontinue using it for that purpose. It was still giving us no trouble in the pumps and columns, but as time went on and the mine was opened up there was more of this low-grade ore for the water to leech through until the present year has brought us face to face with the necessity of using something besides iron for the columns. Some 2½ years ago we put in a 7-in. column to throw this water to the surface, and for a while it showed no particular corrosive action, but during the last spring a corrosive action on the iron was very apparent, and the surprising thing about it is, that the action showed first at the top of the column. As it went on more leaks occurred until one length of pipe of 15 ft. had 13 clamps on it. It was fully determined that we must use something besides iron, but just what ought to be used is a serious question. There is one copper column in the mines in Butte, but copper is so expensive that it is almost out of the question for us to think of duplicating that column. There is also one brass column 5 in. in diameter, but I understand there is some objection to that. I think it is probable that we will have to come down to using iron pipes lined with wood, which is the cheapest method I know of keeping the water away from the iron."

Electricity and Steam Power in Switzerland.—According to a recent report of the United States Consul at Chemnitz, Saxony, of which that locality is the most important manufacturing center, is at present much interested in the comparisons being made in Switzerland between the cost and advantages of steam power and of electricity gained by utilizing water.

It used to be urged that Switzerland's water supply, if properly utilized for obtaining electricity, would reduce very considerably her cost of production. The necessary sluices were laid, dams made, wheels hung and wires put down. Every effort that science could suggest, ingenuity devise or mechanics arrange, was made in the different cantons to gather electricity by, and transmit it from the rivers and streams. The following table, recently published at Chemnitz, shows what 50, 300 and 500 H. P. costs per horse power per annum (steam power) in Bohemia, England, Germany and Switzerland:

	50 H. P.	300 H. P.	500 H. P
Bohemia	$27.50	$14.77	$13.00
England	25.25	12.60	9.92
Germany	29.22	15.54	13.50
Switzerland	46.86	29 63	25.50

Compared with the preceding, the cost of the same amount of horse power produced by electricity and transmitted 3·2 miles by air line in Switzerland, according to results published in connection with the foregoing table, is: 50 H. P., $30.44; 300 H. P., $17; 500 H. P., $12.56. Adding to this the cost of transmission the total cost will be: 50 H. P., $57.70; 300 H. P., $31.25; 500 H. P., $25.50.

It is only by building a large plant, 500 H. P. at the very least, that electricity begins to show any profit that would commend it as a substitute for steam. Switzerland, with its freshets, its uncertain supply of water, for though there may be always enough, there may at times be too much, its icy waters, electrical disturbances during mountain storms and the dangers from high-tension currents, causing much inconvenience and labor in laying, caring for and repairing the wires carrying currents over long distances, is hardly the best place for the experiment. Add to all these disadvantages the necessity of keeping up a large steam plant to carry on business when electricity fails. Where work is carried on day and night, in cases where the power is used also to supply light, which it does at very small cost, it can be made to take the place of coal at less cost. Some streams are much better suited for electrical power purposes than others, and are often much more easily utilized. There are valleys and places where the transmitting plant need not be very long, from one-half to three miles. In such cases the transmitting plant, which increased the price almost double in the case of 50 H. P. and 300 H. P., need be neither very large nor very costly. The experiments being made in Switzerland are of great interest.

PATENTS PUBLISHED IN GREAT BRITAIN.

The following is a list of patents published by the British Patent Office on subjects connected with mining and metallurgy:

WEEK ENDING JANUARY 13TH, 1894.

23,773 of 1892. Electric Smelting Furnaces. R. Niewerth, Berlin.
1 916 of 1893. Pulverizers. G W. Elliott, Sheffield.
3,661 of 1893. Plumbago Crucibles. E. J. T. Digby, London.
3,743, 3,744 of 1893. Poles for Electrolytic Apparatus. E. H. Liveing, London.
4,001 of 1893. Manufacture of Oxide of Iron Paint. H. W. Hemingway, London.
13,722 of 1893. Electrolysis of Salt. C. Kellner, Vienna.
16,857 of 1893. Basic Bessemer Converters. A. Raze, Liége, Belgium.
22,291 of 1893. Manufacture of White Lead. E. Waller, New York.
22,161 of 1893. Copper Nickel Zinc Alloy. J. Cox, Birmingham.

PATENTS GRANTED BY THE UNITED STATES PATENT OFFICE.

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

TUESDAY, JANUARY 16TH, 1894.

512,679. Sectional Boiler. Erasmus T. Carr, Miles City, Mont.
512,680. Apparatus for Handling Coal in Bulk. Pette B. Clarke, Birmingham, Ala.
512,682. Apparatus for Feeding Boilers. Nicholas Clute, Schenectady, N. Y.
512,712. Wind or Current Operated Wheel. James P. Kelso, Jackson, Brown County, Ind.
512,735. Furnace Grate. Telie H. Muller, Philadelphia, Pa.
512,737. Pump for Water Systems. Elijah Neff, Milford, Ind.
512,761. Apparatus for Removing Slag. Otto Stalmann, Anaconda, Mont., Assignor to Marcus Daly, same place.
512,776. Hydraulic Air Pump. Edward H. Weatherhead, Cleveland, O., Assignor to the Cleveland Faucet Company, same place.
512,784. Apparatus for Pickling Iron Plates. John Williams and George L. Morris, Landore, England.
512,791, 512,792. Glass Melting Furnace. Addison M. Bacon, Pittsburg, Pa.
512,801, 512 802, 512,803. Process of Manufacturing Aluminum. Willard E. Case, Auburn, N. Y.
512,811. Ore Concentrator or Mineral Saving Machine. Thomas Davidson, Mount Brydges, Canada.
512,816. Method of Blasting Rock. George M. Githens, Brooklyn, N. Y.
512,825, 512,827, 512,828. Dredging or Excavating Apparatus. Charles W. Hunt, West New Brighton, N. Y.
512,845. Mold for Casting Metals. Eugene C. Smith, Providence, R. I.
512,846. Grinding Mill. Ambrose W. Straub, Philadelphia, Pa.
512,848. Chain-Making Machine. Elihu Thomson, Swampscott, and Charles E. Harthan, Lynn, Mass., Assignor to the Thomson Electric Welding Company, of Maine.
512,865. Device for Transferring Earth, Ores, etc. Caleb G. Collins, Woodsburg, Assignor to C. Amory Stevens, New York.
512,874. Vessel for Collecting Precipitates. Horatio N. Fraser, New York, N. Y.
512,879. Smoke Consumer. Nathan Harper, Newark, N. J.
512,884. Smoke Consumer. James L. Johnson, St. Louis, Mo., Assignor of one-half to Leslie A. Moffett and Tobias Mitchell, same place.
512,891. Brick-Kiln Furnace. Robert B. Morrison, Rome, N. Y.
512,893. Muller for Grinding or Amalgamating Mills. Walter N. Nolan, El Oro, Mexico.
512,895. Amalgamator. Doc. A. Patterson, Summitville, Colo., and Emery Anderson, White Oaks, N. Mex., Assignors to themselves and Benjamin H. Dye, White Oaks, N. Mex.
512,918. Gold Separator. Monroe Stewart, San Bernardino, Cal.
512,950. Apparatus for the Manufacture of Gas. Paul Dvorkovitz, London, England.
512,958. Apparatus for Treating Phosphate Rock. George Guild, Knoxville, Tenn., Assignor of two-thirds to E. W. Coddington and C. Gustavus Memminger, Bartow, Fla.
512,988. Apparatus for Loading Wagons with Gravel, Sand, etc. John McTurner, Walter J. Boren, and Samuel H. Turner, Hannibal, Mo.
512,991. Sinking Pump. James Renshaw, Denver, Colo.
513,001. Process of Making Alkali salts. Henry S. Blackmore, Mount Vernon, N. Y.
513,034, 513,035, 513,036, 513,037, 513,038. Brick-Kiln. Joseph Conley, St. Joseph, Assignor to the Conley & Wolfe Improved Kiln Company, Tarkio, Mo.
513,045. Tubular and Sectional Boiler. George H. Hersey, Clinton, N. J.
513,053. Apparatus for Heating Compressed Air for Power Purposes. Robert A. Parke, New York, Assignor of one-half to John Boyd Thacher, Albany, N. Y.

PERSONALS.

Mr. Charles Archibald has resigned his position as manager of the Gowrie coal mines at Cow Bay, Cape Breton.

Mr. Luther A. Roby has severed his connection with the Otis Works, at Cleveland, O., Mr. George Bartol being his successor.

M. L. Beguin has become associate editor of "L'Echo des Mines," of Paris. He has been a frequent contributor to that paper.

Mr. E. H. Dewey has resigned his position as manager of the Trade Dollar mine, at Silver City, Idaho. His successor is Mr. James A. Hutchinson, late of Denver, Colo.

Mr. E. T. Whatley, formerly connected with the Georgia Geological Survey, is now superintendent of the Yonah Land and Mining Company, in White County, Ga.

Mr. W. K. Gordon, formerly of Fredericksburg, Va., has been appointed chief engineer and general superintendent of the Texas & Pacific Coal Company, with office at Thurber, Tex.

Mr. James F. Beattie has been appointed general manager of the Twelve-Pole Coal and Iron Company, which owns large interests in Wayne and Logan counties, in West Virginia.

Messrs. Jerome Keeley & Co., consulting engineers in metallurgy and mining, and dealers in iron and steel, have removed to their new offices, at 421 Chestnut street, Philadelphia, Pa.

Mr. J. W. Astley, for a long time connected with the Montana company, and now vice-president of the American Developing and Mining Company, recently visited Marysville on business.

Mr. S. L. Shoomaker, New York, representative of the Homestead Works and of the H. C. Frick Company, will take a few months' rest. Mr. A. L. Griffen, formerly with the Keystone Bridge Company, has taken charge for the present.

Mr. James T. Cowan, who was formerly connected with the foundry department of the Dickson Manufacturing Company, of Scranton, and later with the foundry of the General Electric Company, at Lynn, Mass., has been appointed superintendent of the foundries of the Corning Iron Works, Corning, N. Y.

An effort is being made by the council of the Scientific Alliance, of New York, to establish a fund for the endowment of original scientific research in honor of the late Prof. John Strong Newberry. A committee was appointed at a meeting last year to devise a method of permanently commemorating his important services to geological and biological science. The committee, which has lately made a report, recommends the establishment of a fund, to be known as the John Strong Newberry Fund, to carry on original research under the direction of the Alliance. The fund they hope to make not less than $25,000, and it will be devoted especially to encouragement and investigation in the departments of geology, paleontology, zoology and botany.

OBITUARY.

Harmon Brown, superintendent of the Black, Sheridan & Wilson Company's interests in Allegany County, Md., died on January 16th, at Barton, Md., aged 62 years. He was a native of Germany.

C. H. Buhl, a prominent citizen of Detroit, Mich., died there on January 23d, aged 54 years. He was a leading merchant, manufacturer and banker, being among the first to move in the establishment of national banks in Detroit.

John H. Harris died in this city on January 22d, aged 55 years. He was vice-president and general manager of the Worthington Pumping Company, of London, England, and chairman of the executive committee of the Henry R. Worthington Company, of this city. He was born in Troy, N. Y., in 1838, but spent his early life in Springfield, Mass. He was a member of the Engineers' Club.

Osborne Monroe Macdaniel died in this city on January 21st, aged 81 years. He entered the New York Custom House in 1835, and remained there until his interests in mining caused him to devote himself entirely to that pursuit. He was a United States Commissioner to the London World's Fair in 1851, representing large mining interests. His studies in the science of money and currency were earnest and comprehensive. He was a bimetallist.

The death is announced of August Werner in the Keystone mining district, Nevada, on January 14th. He fell down a shaft and was instantly killed. He was a mining and smelting superintendent, widely known and highly esteemed in Utah, Colorado and Nevada. He was foreman of the Germania works, in the Jordan Valley, Utah, more than 25 years ago; at a later period he was superintendent for a time of the Elgin smelter at Leadville, Colo., still later he had charge for three years of the smelting works at Pioche, Nev., and at the time of his death he was engaged in the examination of mines in which he was interested. His death is keenly felt by a large circle of friends.

SOCIETIES AND TECHNICAL SCHOOLS.

Association of Engineers' of Virginia.—At the monthly meeting, in Roanoke, January 17th, a paper on "Railroad Signals" was read by Mr. Charles S. Churchill and discussed by members present.

Engineers' Club of St. Louis.—At the regular meeting, January 17th, the programme for 1894 was announced. Mr. Geo. R. Olshausen then addressed the club on street railways, dealing particularly with special work in track construction. The discussion was participated in by Messrs. Crosby, Johnson, Laird, Hermann, Bryan, Kinealy, McCulloch and Crow. The necessity for a better form of brakes was discussed, the present types described and the practical experience with each stated.

Scranton Engineers' Club.—This new club was organized at Scranton, Pa., January 11th. A constitution and by-laws were adopted, and the following officers were elected for the ensuing year: President, James Archbald; vice-president, F. W. Gerecke; recording secretary, H. W. Rowley; corresponding secretary, C. C. Conkling; treasurer, A. H. Storrs; directors, Capt. W. A. May, Rufus J. Foster and Henry Wehrum. The object of the club is the advancement of engineering and scientific knowledge and the discussion of engineering and scientific questions. The regular meetings will be held on the second Saturday evening of each month. The club starts with a membership of between 30 and 40.

Iowa Society of Civil Engineers and Surveyors.—The sixth annual meeting was held in the Wetumpka Club Rooms, Cedar Rapids, January 17th and 18th, the following officers being present: President, Wm. Steyh; vice-president, F. L. Easley; secretary-treasurer, Seth Dean, and a fair attendance of members from different parts of the State. The reports of the various standing and special committees were of a satisfactory character and showed the Society to be increasing in numbers and out of debt. A number of interesting papers on various subjects were read and discussed. Excursions to various points of interest in and near the city were made. The following officers were elected: President, William Steyh, of Burlington; vice-president, J. D. Wardle, Cedar Rapids; secretary-treasurer, Seth Dean, Glenwood.

Brooklyn Polytechnic Institute.—The new course in practical chemistry promises to be very successful. The course includes thorough instruction in experimental chemistry and the various branches of chemical analysis, pure and applied chemistry and other branches necessary to the analytical and technical chemist. Special attention is to be paid to instruction and laboratory work in organic chemistry, and also to the study and testing of technical products, wastes, processes, etc. The new laboratories are commodious and are fully provided with the apparatus and chemicals required in analytical, experimental and research work. Facilities are also to be given for post-graduate work in both pure and applied chemistry and in chemical engineering. The new chemical course will be under the direction of Peter T. Austen, Ph. D., F. C. S., late professor of chemistry in the New Jersey State Scientific School and Rutgers College, who has been successful not only as a teacher and organizer, but as an inventor and chemical engineer.

Canadian Society of Civil Engineers.—At the meeting in Montreal, December 21st, the election for officers resulted as follows: President, P. A. Peterson, Montreal; vice-presidents, Herbert Wallis, Montreal; Alan Macdougall, Toronto; P. W. St. George, Montreal; treasurer, K. W. Blackwell, Montreal; secretary, Clement H. McLeod, Montreal; librarian, W. McNab; council, Prof. H. T. Bovey, J. Galbraith, H. N. Ruttan, P. S. Archibald, G. C. Cunningham, G. H. Duggan, W. Haskins, H. A. F. Macleod, J. T. Barnett, L. A. Vallee, H. Donkin, H. Peters, H. Abbott, G. H. Garden and O. Chanute. The retiring president, E. P. Hannaford, gave an interesting address, in which he gave some useful information concerning the cost of various items in railway construction work, etc. He then presented the Gzowski medal to Prof. J. T. Nicolson, for his paper on "The Transmission and Distribution of Power by Compressed Air." It was resolved to apply to government to make some provision for the establishment of bureaus for tests on cements, etc.

Mining Association of Quebec.—Meetings of this Society took place on Wednesday and Thursday, January 10th and 11th, at the Windsor Hotel, Montreal. The following officers were elected: President, J. Blue; vice-presidents, Colonel Luke, G. E. Drummond, F. P. Buck and J. B. Smith; secretary, B. T. A. Bell; treasurer, A. W. Stevenson; council, Capt. R. C. Adams, Montreal; J. J. Penhall, Black Lake; F. A. Halsey, Sherbrooke; E. R. Smith, Thetford Mines; James King, M. P. P. Quebec; G. P. Franchot, Buckingham; R. T. Hopper, Toronto; Hector McRae, Ottawa; and F. Cirkel, Ottawa. A resolution was passed providing for the affiliation of the Association with the mining department of McGill University, Montreal. It was resolved to present Secretary B. T. A. Bell with a gratuity of $150 for the great services he had rendered to the Association during the past. The next meeting, it was decided, will be held at Quebec. Papers were read by J. Burley Smith on the "Diamond Drill in Prospecting"; by M. Carlyle, on "Tunnels in Mining"; by Mr. Obalski, on "Mica Deposits of the Saguenay"; by Dr. Adams, on the "Nature of Ore Deposits," and by J. T. Donald, on "Methods of Sampling."

Scandinavian Engineering Society of Chicago.—At the meeting of January 4th, Mr. A. F. Pocrad commenced a series of lectures on "City Architecture," which will continue once a week until finished. The lectures are intended for publication and are kept in a popular form in order to spread knowledge among the public about the important questions in city building and evolution. It was the author's opinion that American cities would be better regulated if the public at large were informed in regard to such matters. The first lecture was introductory, and gave, after a definition of what city architecture is, a chapter about the origin of this branch of the art, and another about the conditions in America for its development. In the second lecture on January 11th, the author treated the general principles of city architecture; these he divided into sanitary, practical and aesthetical. The third part will deal with the elements of city plans, such as the different kinds of streets; underground conduits; markets; harbors and waterways; railroads; parks and public buildings; followed by a chapter on buildings laws. Although this work is destined for a public without technical education, it contains much of interest even for those conversant with the subject.

Montana Society of Civil Engineers.—The annual meeting was held in Helena, January 13th. S. T. M. B. Kielland was elected an active member, and Joseph T. Dodge an honorary member of the Society. The following officers were elected for the ensuing year: President, W. A. Haven; first vice-president, J. S. Keerl; second vice-president, A. M. Ryon; secretary and librarian, G. O. Foss; treasurer, A. S. Hovey; trustee for three years, W. S. Kelley; member of the board of managers of the Association of Engineering Societies, J. S. Keerl. President Haven delivered a very interesting address reviewing the progress of the Society during the past year, and gave a unique summary of engineering progress. The secretary's report shows that the Society now has 39 active members, 1 honorary member and 8 associate members. It was voted that the Society, through its officers, request the honorable commissioner of the general land office to continue in force the practice which has been in vogue for the past few years, of allowing deputy mineral surveyors to hold commissions in more than one State or survey district. At the evening session Mr. John Herron presented a paper entitled "Conduct of Repair Work in Railway Emergency Cases." Mr. Herron illustrated several temporary bridges used by him in washouts on the Montana Central Railway. The Society then entered upon discussion of certain questions relating to the measurement of water under the State statute. It was generally conceded that the statute was very indefinite, and that different engineers could secure results varying at least 50% in the amount of water measured by employing different methods, all of which would comply with the wording of the statute. After the discussion President A. M. Ryon, of the State College of Agriculture and Mechanic Arts, was appointed a committee of one to make experiments and to report to the Society some more satisfactory method of measuring water than that provided for in the statute. Mr. Goodale, superintendent of the Gagnon mine, at Butte, then addressed the Society in regard to the matter of the corrosion of iron by mine waters.

Ohio Institute of Mining Engineers.—The regular annual session was held at Columbus, beginning January 17th. There was a large attendance. The new Ohio geological maps were shown for the first time. These maps were prepared by Prof. Edward Orton, who delivered a lecture on "An Approximate Determination of the Coal Resources, Based on the Recent Maps of the Geological Survey." He first stated that the coal area of Ohio was about 10,000 square miles. Out of about 35 veins in the State 12 or 13 seams were good for mining almost anywhere along their course. The remaining 20 were mine-supporting only here and there. The Nos. 7 and 8 veins could be traced around the entire border of the great coal belt, and as far south as Willard, Ky. The great Pittsburg could be traced through Jefferson, Belmont and Harrison counties. It was lost in Monroe County. The Lower and Middle Kittanning, the two Freeport veins and the Pittsburg figured most extensively on the maps. After giving statistics in detail the different seams were considered as follows: Of Kittanning there were 3,873 sq. miles in the State, averaging 4 ft. in depth; of Freeport there were 3,149 square miles, averaging 4½ ft.; of Pittsburg there were 1,251 square miles, average 4 ft. The total square miles were 8,893, and the total estimated tons of coal 41,478,000,000. Professor Orton deducted from this 40% for mistaken judgment and loss in mining, and left 25,000,000,000 tons as the available product of Ohio. The present product marketed is about 14,000,000 tons per year.

Another paper was that of Prof. F. W. Sperr, of

the Ohio State University, on "Coefficient of Friction as Found from the Measurements in Leisenring Mine No. 3," of Pennsylvania. "Experiences with Mines Which Generate Firedamp in the Connellsville Coke Region" was a paper by Hon. Frederick Keighley, of Uniontown, Pa. Mr. Wm. Hibbs, of Scio, O., discussed the qualifications requisite to a successful mine foreman, and thought the foreman should be a man of fair education and good physical powers, so as to withstand the effects of impure air. He should also have some knowledge of ventilation. Capt. J. L. Morris, of Canal Dover, gave a description of the visit of the institute to the Connellsville coke region in 1892. A paper by Mr. Thomas Middleton, on "The Mining and Ventilation of the Monongah Mines of Marion County, W. Va.," was read by Secretary Hasletine, the author not being present. Officers for the ensuing year were elected as follows: President, Edward Orton, Jr., of Columbus; vice-president, Daniel J. Harry, of Jackson; secretary-treasurer, R. M. Hasletine, of Columbus; executive committee, N. W. Lord, of Columbus; Frank A. Ray, of Congo, and J. L. Morris, of Canal Dover.

INDUSTRIAL NOTES.

E. C. Stearns & Co., Syracuse, N. Y., have issued a very handsome catalogue of hardware and tools. It is profusely illustrated.

The well known firm of Etherington & Hapgood, paper dealers, have removed their office to the "Times" Building, in New York.

Newberry Furnace, at Newberry, Mich., has gone into blast and is making 60 tons of iron a day. The furnace, charcoal kilns and wood camp employ over 200 men.

The entire plant of Sternbergh's Bolt and Nuts Works, at Reading, Pa., which has been only partly in operation for some months, started up full handed on January 22d.

The stockholders of the Bethlehem Iron Company, South Bethlehem, Pa., will meet at that place on February 14th next to vote on a proposition to increase the capital stock of the concern from $5,000,000 to $10,000,000.

Part of the Whittaker Cement Works, near Easton, Pa., were burned on January 22d. Loss, $50,000; insurance, $60,000. The establishment was running night and day on an order for 20,000 barrels of cement for the Philadelphia Bourse Building.

The F. D. Cummer & Son Company, Cleveland, O., have issued an excellent catalogue of their drying, roasting, washing and other machinery for treating ores, phosphates, clays, etc. The catalogue is handsomely illustrated, and shows a variety of machinery, most of which has been tested by successful use.

Messrs. S. Flory & Co., of the Bangor Foundry and Engine Works, Bangor, Pa., have just furnished the Manor Big Vein Coal Company, of Elk Garden, W. Va., a 75-H. P. double-drum haulage engine with an 80-H. P. boiler and fittings. This machinery is used in a very successful tail rope haulage plant.

All the departments of the Reading (Pa.) Tube Works, with the exception of a single furnace, started up January 22d on double turn. The one idle furnace is being rebuilt and will be started as soon as it is completed. The new galvanizing works of the company are nearly completed and when finished will at once be put in operation.

The men in Morehead Brothers & Co.'s mills, at Sharpsburg, Pa., which shut down about two weeks ago, have been notified of a reduction, to take effect as soon as the mills start again. The puddlers have been reduced from $4 to $3.25 per day, and a 15% reduction is made in all other departments. The colored workers have accepted the reduction, but the white men refused. The firm employs about 500 men.

At the annual meeting of the stockholders of the Cleveland Rolling Mill Company, Cleveland, O., held last week, the following board of directors was elected for the year 1894: Hon. H. B. Payne, J. H. Wade, William Chisholm, G. W. Howe, W. B. Chisholm, Douglas Perkins and E. S. Page. At a meeting of the directors the following officers were chosen for the ensuing year: William Chisholm, president; W. B. Chisholm, vice-president; and E. S. Page, secretary.

A dispatch from Birmingham, Ala., January 23d, says: The Williamson Iron Company and the Birmingham Iron Works went into the hands of receivers to-day. Both plants are in operation, and will keep at work. The corporations themselves asked for the receivers. C. P. Williamson was appointed receiver of the first-named, and William Hardie receiver of the latter. The object of the receivership is to apply the pruning process, and leave the plants free from debt.

The National Tube Works at McKeesport, Pa., resumed work with 1,000 men on January 24th. Only a few of the departments were put in operation, but the company expects to have the entire plant running in full in a few days. About 600 employees will be put on night turn. At the National Rolling Mill the plate and continuous mills resumed on the same date and the Belgian mill on the following day. It is expected that within the next few days the entire works will be in operation.

The annual meeting of the stockholders of the Brier Hill Iron and Coal Company, operating the Brier Hill furnaces, was held in Youngstown, O., last week, and the old directors, consisting of George, John and Henry Tod, J. G. Butler, Jr., and H. H. Stambaugh were re-elected. After the meeting of the stockholders the directors met and elected the following officials: George Tod, president; Henry Tod, vice-president; H. H. Stambaugh, secretary and treasurer; and J. G. Butler, Jr., manager.

The Berlin Iron Bridge Company, of East Berlin, Conn., has received the contract for an iron roof for the boiler and engine-room of De Land & Co., at Fairport, N. Y. The roof will be covered with the company's patent anti-condensation corrugated iron. Other recent contracts include the new mill of the Diamond Mills Paper Company, at Millbank, N. J., and an iron roof for the new producer-house of the Citizens' Gas Company, of Brooklyn, N. Y. The last-named building is 69 ft. wide and 151 ft. long, with an iron roof covered with slate.

The Westinghouse Machine Company held an adjourned annual meeting last Tuesday, and the following directors were elected: George Westinghouse, Jr., H. H. Westinghouse, John Caldwell, E. E. Keller and D. E. Jackman. Upon organization of the board, the following officers were elected: George Westinghouse, Jr., president; E. E. Keller, vice-president and general manager; D. E. Jackman, secretary and treasurer. Mr. E. E. Keller is the gentleman who was formerly connected with the Westinghouse Electric and Manufacturing Company, and it was he who had charge of the work the company did at the World's Fair. It is understood that in the future the machine company and the electric company will give especial attention to the manufacture of combined dynamos and engines.

MACHINERY AND SUPPLIES WANTED.

If any one wanting machinery or supplies of any kind will notify the "Engineering and Mining Journal" of what he needs he will be put in communication with the best manufacturers of the same.

We also offer our services to foreign correspondents who desire to purchase American goods, and shall be pleased to furnish them information concerning goods of any kind, and forward them catalogues and discounts of manufacturers in each line.

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

GENERAL MINING NEWS.

ARIZONA.

Gila County.

Old Dominion Copper Company.—Superintendent N. S. Berray has furnished the following figures to the Globe "Belt," showing the work done by the company during 1893: Ore smelted, 63,597,300 lbs.; lime used for flux, 14,618,208 lbs.; coke consumed, 11,040,775 lbs.; copper produced, 7,866,475 lbs., against 8,019,059 lbs. in 1892. The output during the early part of 1893 was light, and the prospect for the year was further reduced by a suspension of about a month in the summer. The development work done during the year amounted to 5,620 lin. ft., and the mine is in good shape. The smelting plant, cable tramway and other works are in a condition for efficient service. An important improvement made at the smelter was the introduction of the auxiliary windbox, now in use on all the furnaces.

ARKANSAS.

Johnson County.

Western Coal and Mining Company.—This company has purchased the mines of Stiewell & Co. at Coal Hill. The new owners propose to develop the Spadra mine, and to sink two new shafts at the north or dip side of the coal lands, which aggregate about 5,000 acres. They intend to push the prepared coal from these mines into the Western markets. The coal is a semi-anthracite in character.

Marion County.

An important discovery of zinc ore is reported at a point half a mile from White River and 2½ miles from the Lion Hill mine. Carbonate of zinc appears to exist there in large quantities, and can be taken out by a drift into the mountain.

CALIFORNIA.

Placer County.

Mayflower Gravel Mining Company.—A shipment of bullion valued at $3,500, the result of a two-weeks run, was received at the San Francisco office last week.

Mendocino County.

The local papers report that Messrs. Mackay & Flood have bonded their coalfields for $400,000, to the Fort Bragg Lumber Company. These coalfields, which were purchased by Mackay & Flood three years ago, lie near Covelo, 58 miles above Ukiah, in the north central part of the county. The principal ledge has been traced for miles, running in a northerly direction. The company bonding the mines will construct a railroad to connect with the North Pacific & San Francisco Railroad.

COLORADO.

Mineral surveys approved by the United States Surveyor-General for Colorado during the week ending January 13th, 1894:

8434 (Leadville)—Silver, Lead, Stockton, Golden Treasure and Hardscrabble lodes.
8691 (Pueblo)—Hill Top, Hill Top No. 2, Hill Top No. 3, Sarah Bell and Larence Worden lodes.
8710 (Pueblo)—Morning Star No. 2.
8591 (Durango)—Whale millsite.
8457 (Leadville)—Club.
8629 (Pueblo)—Midnight and Midnight Extension lodes.
8562 (Pueblo)—Trenton.
8630 (Pueblo)—Minna S.

Chaffee County.

Concerning the recent coal discovery near Marshall Pass, the Denver "Republican" says: The vein is developed for 70 ft. and is from 5 to 6 ft. thick. The owners say when the vein is uncovered a further distance of 12 ft. it will disclose a body of coal 10 to 12 ft. thick. It is situated three miles from the railroad track, four miles from Chester station and three miles from Buxton, either of which will make a good shipping point. In times past other parties have found coal indications on the pass, but samples brought to Salida always failed to stand the tests and nothing more was ever done on the prospects from which they were taken.

El Paso County.

According to the local papers, every man operating a property in the Cripple Creek mining district, with the exception of two mine managers, has signed an agreement to, on and after the first of February, work all their men nine hours each day instead of eight, as has been the custom and a requirement of the Miners' Union. Of course, this cannot apply to properties running three shifts each 24 hours. The Miners' Union has 800 members and it is thought they will not quietly submit to the new schedule.

Gilpin County.

Concrete Mining Company.—The Coshen mill, which has been remodeled by Hon. Sam Newell, of the Concrete Mining Company, will begin crushing ore this week. The mill is now in good condition and will handle the entire output of the Concrete.

Gilpin County Stamp Mill.—The new Gilpin County stamp mill at Black Hawk will begin operations shortly with 25 stamps, but this number will be doubled within a short time.

Gold Rock Mining Company.—Notice has been issued for a meeting of the Eastern shareholders of this company, in Boston, Mass., on February 14th. The Gold Rock was sold on a judgment last July for about $900 and the time of redemption expired two weeks ago. The meeting in Boston is called to raise money to buy out the judgment creditor, and, it is said, this will be accomplished, as the property is variously estimated as worth more than $50,000.

Gregory-Bobtail Mining Company.—Advices from Black Hawk report that a body of ore has just been discovered in the 665-ft. level of the Gregory. The strike was made in drawing a winze, and is believed to be the old Gregory vein, which was lost several years ago, and has been sought for ever since. Considerable prospecting has been done in the effort to follow up this crevice. The crevice is a large one, being almost 6 ft. wide. A mill run made last week is said to have yielded 12 oz. gold per ton. Reed & Co. are the proprietors of the company. In the Bobtail conditions are encouraging. Prospectors in the 900-ft. level are nearing the Mammoth vein, which will be tapped at the greatest depth reached on this vein in the county. The Mammoth is one of the best-defined crevices in Gilpin County, and at other points has carried rich deposits of gold.

Spur-Daisy Mining Company.—The annual meeting of this company was held in Denver last week; the following officers and board of directors were elected: President, B. W. Osborn; vice-president and superintendent, Daniel Munday; treasurer, G. H. Ames; secretary, R. L. Wilson; board of directors, B. W. Osborn, Daniel Munday, David May, R. L. Wilson, G. H. Ames. The company will continue development work on the Two Sisters lode as well as other veins, which form a group owned by them on Negro Hill.

Lake County.

Joseph D. Stacey has sold to N. Rollins, of Leadville, a one-third interest in the Headwater lode, in the Alicante mining district.

Burlington.—A quit-claim deed was filed with the recorder from P. Ferry to George W. Timble, conveying an interest in the Burlington lode, Breece Hill. Consideration private.

La Plata Mines, Limited.—The La Plata Mining and Smelting Company, of New York, has transferred all its property, etc., in Colorado, to the La Plata mines, Limited. This company during the past year sold its Leadville Smelting Works to the Bi-Metallic Smelting Company, which at present is using the Austin system of pyritic smelt-

ing there. The La Plata mine at Leadville is now being worked by lessees; the English company (La Plata Mines, Limited) did not do any work on the property, and in fact has practically abandoned silver mining in America for gold mining—or rather prospecting—in the Mozambique, South Africa.

Mansfield Group Mining Company.—This company has filed a certificate showing its capital stock to be $5,000,000, in 200,000 shares of $25 each, which has been fully paid in. The aggregate sum of the existing debt of the company January 1st was placed at $68,368.

Triumph.—Emma J. Harris, of Kansas City, has sold to J. M. Woolson, of Routt County, a 1-16th interest in the Triumph and Yankee consolidated mining claims, located in the California mining district. Consideration private.

(From our Special Correspondent.)

A. Y. & Minnie.—A good lead sulphide ore is being mined in the upper levels. Eighty tons daily are being taken out, and this is concentrated down to about 20 tons.

Black Prince.—A suit is now in progress here—A. Zabel vs. J. T. Briggs—in which the former contests the right of Briggs to secure a patent on the Black Prince, setting forth that Briggs did not do his assessment work for the years 1887-90. Defendant claims to be one of the first owners of the mine and claims to have expended $80,000 in labor on the property.

Commercial Mining Company.—The strike in the Capitol shaft has brought to light a body of high-grade lead ore. No details have yet been made public.

Esther Shaft.—The recent strike of gold and silver ore in the Esther shaft of the Wolcott ground has proved to be a good find and some excellent development work is being carried forward.

Fraction.—A new shaft is being sunk and some bowlders of carbonate ore running well in lead have just been encountered.

Leadville Lime and Fluxing Company.—This company has been incorporated with a capital stock of $10,000. The firm consists of William Hinman, A. H. Garfield and P. A. Kalbaugh.

Mansfield Group Mining Company.—The annual report of this company has been filed. The capital stock of $5,000,000 has all been issued. The existing indebtedness is placed at $68,360. The president of the company is D. B. Gonen.

The Smelter Situation.—Since my letter of last week the smelter outlook has greatly improved. The Arkansas Valley plant, as predicted, started up January 16th with 250 men, and is now treating about 350 tons of ore a day, paying over $1,000 daily in wages. The old Holden smelter which was bought in at sheriff's sale, has been sold again to Denver parties, incorporated as the Union Smelting Company, with a capital stock of $250,000. Messrs. R. W. Woodbury, Frank Trumbull, L. S. Smith and W. R. Harp are at the head of this company, and Mr. Harp to-day placed the plant in the hands of carpenters and masons preparatory to starting up two furnaces by February 5th.

There is still some talk concerning the purchase or leasing of the St. Louis Company's plant here, but no definite information regarding same has been given out. At any rate there are three smelters now in full blast with the New Union plant to blow in within two weeks.

Ouray County.

American Nettle.—Nearly 100 men struck at this property last week. The difficulty was over the price of board, and will probably be adjusted shortly.

GEORGIA.

Cherokee County.

Cherokee Mining and Milling Company.—This company has its mill now nearly completed at the old Worley mine, near Holly Springs, and is ready to begin work actively.

White County.

Corundum.—The outlook for corundum at present is very encouraging, says the Cleveland "Progress." There is a force of hands at work on the Stroud, Kinsey, Tatum and Elder properties, under the supervision of Mr. G. Wanner. The corundum on these properties is of the pink and crystal white varieties. Mr. Wanner's recent visit to the mine found a vein 14 ft. wide opened, bearing the most valuable variety. There has been a new discovery made near Porter Springs in corundum, by J. W. McAfee.

Glover Mine.—This is a new mine and has so far shown so well in free gold that a five-stamp mill has been ordered.

Yonah Land and Mining Company.—This company has just been organized, and has acquired the properties known as the Allison, Butt and J. L. Richardson mines, says the Cleveland "Progress." Mr. E. T. Whatley, late assistant State geologist, has been appointed superintendent, and is now in charge of the company's affairs. Mr. Whatley did some prospect work on the mines last fall, opening some veins, carrying paying quantities of the yellow metal. It is the intention of the company to erect a Theis roasting and chlorination plant this coming spring, and work on a stamp mill will also commence before many days. The shareholders are mostly residents of Charleston, S. C.

IDAHO.

Alturas County.

Red Elephant Mine.—A rich strike is reported in this mine, in the extreme west end of the property, on the 500-ft. level. This is in entirely virgin ground, and a drift will at once be run to corresponding limits on the 200 and 700 levels to test the magnitude of the vein.

ILLINOIS.

Sangamon County.

Wilmington & Springfield Coal Company.—At the annual meeting in Ridgely, last week, the following directors were chosen: John W. Moore, C. T. Oliver, Charles Ridgely, Edward Ridgely, William Ridgely.

Shelby County.

Moweaqua Coal and Mining Company.—This company has increased its capital stock from $30,000 to $50,000 for the purpose of extending its operations.

St. Clair County.

Nicol Coal and Mining Company.—This company has been organized by Louis Nicol, Thomas Flynn and John Klee. The office is in Belleville.

Vermilion County.

Pawnee Coal Company.—This company on January 16th reduced miners' wages from 60 cents to 52½ cents per ton. The same action was taken by other coal companies in the district.

INDIANA.

Clay County.

Vigo Coal Company.—This company has been organized to mine coal on property leased near Cloverland. The office is at Newburg, and the officers are: C. Ehrlich, president; John Laughner, vice-president; M. D. West, superintendent.

INDIAN TERRITORY.

Choctaw Coal and Railway Company.—At the annual meeting of this company at Philadelphia, Pa., the receivers submitted their report of the operations of the company for the 11 months ending November 30th, 1893. It showed the coal tonnage for 1893 to be 320,361 tons, against 200,147 tons in 1892. The total revenue was $578,695 in 1893, against $349,838 in 1892. The above figures include a charge of $38,372.08 expended in opening up and equipping shaft No. 2, necessitated by the increased demand for coal. The report for December, not yet received, is expected to increase the net earnings for the full year to an amount in excess of $150,000.

Talala & Iron Mountain Coal and Iron Company.—This company has been organized to mine coal, lead, zinc and iron in the Cherokee Nation. The office is at Coffeyville, Kan., and the directors are: H. C. Dooley, E. H. Fitzgerald, A. F. McCaleb, J. H. Matthews and W. S. Upham.

IOWA.

A Des Moines dispatch says that at a meeting of the coal miners of the district January 22d, at which 1,500 miners were represented, it was decided not to accept the 25% reduction, but agreeing to accept one of 10%. The latest dispatches say that the operators have accepted the compromise.

Monroe County.

Deep Vein Coal Company.—This company has bought a tract of coal land near Foster and will put down a shaft at once.

Van Buren County.

Pittsburg Coal Mining Company.—This company has been incorporated by B. R. Boggs, J. M. Boggs and others, to mine coal.

MICHIGAN.

Iron—Gogebic Range.

Ashland.—Wednesday of last week, says the Norway "Current," the local management of the Ashland mine received orders to close down the mine, if possible within 24 hours. The Ashland had been employing during the past two months about 100 men and was being operated at a loss. Some of the pumps were taken up, but the Cornish pump and the large Worthington, together with several No. 10 Camerons, are still in place, having been put in as good condition as possible for future work. Friday noon the fires were drawn, the pumps stopped and the water is rising. It must not be supposed that the mine is a wreck or that the ore is all out. The facts are that the mine has been a profitable one in the past and that the stockholders do not propose to go on at present prices and under present conditions and put back the money which they have taken out.

Iron—Marquette Range.

Cleveland Cliffs Iron Company.—On January 24th this company put 100 men at work, and will, it is said, increase the force gradually.

Volunteer.—The work of introducing a system of electric signals at B shaft has been completed, and works to perfection. The task was performed under direction of Mine Engineer Sutton. The work at the mine is being confined to the shaft above referred to. The showing of ore has improved greatly during the past six months, and the quality has changed for the better.

Iron—Menominee Range.

Aragon.—This mine added about 40 men to its force this week, making the present number about 280. The stockpiles aggregate 25,000 tons.

Mastodon.—This mine has found employment for something more than 30 men.

Metropolitan Iron and Land Company.—This company has, during the past two weeks, increased the force at the several mines about 200 men.

Pewabic.—This mine is now employing 380 men. The daily output is about 550 tons, and there is about 39,000 tons in stock.

MISSOURI.

Jasper County.

(From our Special Correspondent.)

Joplin, Jan. 22.

There were heavy shipments of ore last week from this lead and zinc mining district notwithstanding the low prices which prevailed. The zinc ore market at Webb City and Carterville was strong at $18 per ton, while at Joplin the highest paid was $16 per ton. Lead ore declined from $17 to $16.75 per thousand and the Picher Lead Company was the only buyer in the market. Following are the sales of ore from the different camps: Joplin, 1,000,020 lbs. of zinc ore and 238,810 lead, value $12,000; Webb City, 243,270 lbs. of zinc ore and 55,535 lead, value $2,801; Carterville, 1,307,850 lbs. of zinc ore and 213,360 lead, value $14,637; Zincite, 106,420 lbs. of zinc and 3,490 lead, value $895; Oronogo, 95,250 lbs. of lead, value $1,490; Alba, 122,950 lbs. of zinc, value $975; Lehigh, 42,660 lbs. of zinc, value $362; Galena, Kan., 946,000 lbs. of zinc and 688,000 lead, value $18,746; Newton County, 590,870 lbs. of zinc and 81,690 lead, value $6,117; district's total value $58,041; Aurora, Lawrence County, 756,140 lbs. of zinc and 225,150 lead, value $7,668; Springfield, 52,000 lbs. of zinc ore, value $442; lead and zinc belt's total value $66,151.

Newton County.

(From an Occasional Correspondent.)

Junter-State Mining Company.—This company was organized last September at the Chicago World's Fair, with E. Hedburg, manager; it is composed of capitalists of Guttenburg, Sweden, and has purchased the Monkey Hill mine in this district. It has reconstructed the plant and now employs 15 men under ground; this ore in the rough carries 40% of blende.

Mystic Mining Company.—This company, of Indianapolis, Ind., has developed a lower run of high-grade ore at a depth of 180 ft. below the bedrock by drilling, and has let the contract for sinking a shaft. This is an entirely new find. No one heretofore has discovered ore below the bedrock.

Roaring Springs Land and Mining Company.—This company owns 400 acres in the Roaring Springs district, southwest of Joplin; the output in 1893 amounted to $120,000, lead forming 25%; zinc, 75%. Owing to the low price of ore, there are at the present time only 10 mines in operation on this land. Mr. E. Hedburg, superintendent for the company since its organization, has been promoted to general manager, with offices at Joplin and Gregg, Mo. The company's general office is at Ebensburg, Pa.

Scotia Mine.—This mine, on the Col. H. H. Gregg land, in the same district, has produced much high-grade blende and is now producing 25 tons per week from a depth of 65 ft. While several new strikes have been made on this land, but low prices of ore prevent extensive working.

MONTANA.

Beaverhead County.

Polaris Mine.—This mine, says the Dillon "Tribune," is rapidly developing into a very valuable property. It is a silver proposition and although times are against it, superior management is rapidly bringing it to the front. Superintendent Allen has caused a deep tunnel to be driven on the property, thereby lessening the expense of hoists and other expensive affairs.

Deer Lodge County.

Bi-Metallic Mining Company.—The contract for driving the long tunnel, referred to in the "Engineering and Mining Journal" for January 13th, has been let to Richard Moyle & Co., who will begin work at once. It will take about 18 months to complete the work.

Sunrise Mining Company.—Recently F. W. Sherman has taken hold of the property and a tunnel has been run in on the vein 250 ft., says the Philipsburg "Mail." Further than that they could not go, as the air had become bad and work was consequently discontinued and another tunnel begun about 125 ft. distant on the same vein. This second tunnel is now in about 80 ft. and is in ore all the way. The vein averages about 8 ft. in thickness throughout this latter working and about 2½ ft. thick in the larger tunnel. The tunnel now being pushed will be continued into the mountain until a length of 250 ft. is attained, when a crosscut will be run to the first tunnel in order that a circulation of air may be obtained. Then one tunnel will be pushed ahead from that point. The company owns a number of claims, and in addition has recently bonded several others, until it now has about 3,000 ft. of the apex of the vein. The

ore is principally gold in the property they are working on and averages about 1 oz. silver to 1 oz. gold. It is the intention to put up a 10-stamp mill in the spring and begin at once to realize on the property.

Lewis & Clarke County.

Montana Company.—This company, says the Marysville "Mountaineer," some 10 days ago encountered a large and rich lead on the 400-ft. level, which carries considerable gray copper in addition to the gold. It is not free milling and will have to be treated by smelting. If the body is large enough to warrant, and development shows a continuance of present grade of rock, there is little doubt but that the company will erect a smelter.

Peerless Jennie Mining Company.—At the annual meeting in Marysville, January 10th, the following board of trustees was elected: E. W. Toole, A. M. Holter, W. F. Sanders, George D. Beattie and E. W. Beattie. The following officers were appointed: E. W. Beattie, president; E. W. Toole, vice-president; G. D. Beattie, secretary and treasurer.

Missoula County.

Iron Mountain Mining Company.—This company has declared a dividend of 2%. It is the first dividend and was entirely unexpected.

Silver Bow County.

Anaconda Mining Company.—This company has bought the Ramsdell-Parrot mine for $65,000. The mine is a copper producer. The company has its mines generally actively at work.

Boston & Montana Mining Company.—A Butte dispatch says that Manager Couch estimates this company's ore output for 1893 at about 350,000 tons, and the copper production, both at Butte (up to June, when the Meaderville smelter was closed down) and at Great Falls, at about 45,000,000 lbs. The production of silver at the Meaderville smelters for the first six months of 1893 was 283,000 oz.

Poulin.—The district court at Butte, says the "Inter-Mountain," has granted permission to the attorneys of the Davis estate to institute a suit against the owners of the Poulin mine. It is claimed that ore has been taken out in large quantities from the Pacific vein, which passes on its dip into the Poulin ground. It is claimed this vein has its apex in the Pacific lode, which is owned by the Davis estate. The petition states it will be necessary to employ mining engineers, miners, surveyors and lawyers to properly prosecute the suit. The Poulin mine lies south of the Estella, which is a triangular fraction between the Pacific and Poulin, but only a small portion of the Estella, it is said, comes in conflict with the Poulin. The latter mine is owned principally by William McNamara. The case is said to be identical with the Bell-Speculator case.

NEVADA.

The annual report of State Controller R. L. Horton, which has just been issued, shows that the total bullion product of the mines in Nevada for the 12 months beginning October 1st, 1892, and ending September 30th, 1893, was $2,501,169. Of this total Storey County is credited with $1,270,008; Elko, $188,729; Esmeralda, $19,320; Eureka, $37[illegible]02; Humboldt, $9,334; Lander, $206,345; Lincoln, $162,950; Lyon, $35,134; White Pine, $7,865. The above statement represents the bullion yield of ores. Following is the product from tailings: Lincoln, $5,000; Lyon, $66,691; Ormsby, $133,713. According to the Virginia "Enterprise," the product credited to Ormsby and Lyon should be added to that of Storey County, as the bulk of the tailings worked in Ormsby and Lyon County mills represents the residue from the total bullion Comstock ore, and this swells the total bullion yield of Storey County to $1,470,000.

Storey County—Comstock Lode.

The suit of the Comstock milling companies against the Carson River ranchers is drawing to a close, says the Virginia "Enterprise," and the defendants were to conclude the introduction of their testimony on January 20th.

At the semi-annual election of the Virginia Miners' Union recently held the following officers were elected: President, William O'Leary (re-elected); vice-president, F. H. Johnson; financial and recording secretary, John F. McDonell; treasurer, Andrew Young; conductor, Daniel S. Sullivan; warden, John D. Lunt; finance committee, Bart Conolly, Jacob Baumann and M. S. Flynn; library directors, M. Carroll, John Rowe, Joseph E. Casey, George Flewellen and E. J. Sheerin.

Belcher Mining Company.—The official letter says: We hoisted during the past week 17 tons of fair-grade ore.

Crown Point Mining Company.—The latest weekly official letter says: The raise from the 300-ft. level shows a width of about 4 ft. of quartz, containing spots of ore, but low in grade on the average. The raise from No. 2 cross-cut on the 700-ft. level is now up 55 ft. The top is in white quartz, from 4 to 6 ft. wide, somewhat mixed with porphyry.

Justice Silver Mining Company.—The winze started on the ore encountered in the Blaine tunnel is down 18 ft. A width of 4 ft. of quartz, yielding good assays, is showing at the bottom. The work of raising on this body continues, being now up 24 ft. above the main tunnel. The top is in low-grade quartz.

Savage Mining Company.—The latest weekly official letter says: We hoisted 200 cars of ore from the 950 and 1,000 level stopes; shipped to the Nevada mill 240 tons and milled 280 tons. Car samples average $25.67; battery average, $18.25; bullion yield for the week, $3,555.80. The west cross-cut from the north drift started 132 ft. from the 1,100 station was advanced to a total length of 29 ft.; face in quartz, clay and porphyry. On the 1,050 level on the east drift at a point 120 ft. from the shaft station, we have started a southeast drift and advanced same 33 ft., face in quartz giving fair assays.

Segregated Belcher & Midas Mining Company.—The latest weekly official letter says: The raise from No. 1 south drift on the 1,100 level is now up 35 ft. The top is in soft porphyry. The raise from the south drift runs from the 1,200 level raise and shows a width of about 3 ft. of quartz containing spots of ore.

Sierra Nevada Mining Company.—The annual meeting of this company was held in San Francisco on January 17th, and resulted in the election of the following officers: President, C. H. Fish; vice-president, C. Hfrschfeld; secretary, E. L. Parker; superintendent, Roger Prendergast; directors, Charles H. Fish, Charles Hirschfeld, A. K. P. Harmon, Thomas Cole and H. Zadig. Out of a total of 100,000 shares, 88,774 were represented at the meeting. The new superintendent has charge of the work in the Union Consolidated mine from the 900 level, of which the joint Sierra Nevada drift is being advanced into the latter ground. It is rumored, says the Virginia City "Enterprise," that there will be an increase in the number of miners employed in the Sierra Nevada next month.

(From our Special Correspondent.)

The following is the weekly tabulated statement of the ore hoisted from Comstock mills and milled, with the average car and battery sample assays, bullion product, etc.:

Mines.	Ore H'st'd	Car S'mple Assay.	Ore Mil'd.	Av. Bat'ry Assay.	Bullion for Week.	Total.
Con. Cal.& Va.....	72[1]	42·19	.....	.....	.....	.....
Chollar....	132	27·95	150	22·39	.....	.....
Hale & Norcross	16[1]	47·67	.....	.....	.....	.....
	5[2]	20·31	.....	.....	.....	.....
Occidental	8	44·	.....	.....	.....	.....
Savage ...	200[4]	25·67	280	18·25	$3,535.80	.....

[1] [2] [4] Cars. [3] Milled during December.

Consolidated California & Virginia Mining Company.—The receipts during December amounted to $18,803 and disbursements $18,101. The southwest, or "Rule" drift, 1,000 level, is out 395 ft. from the station of the old Consolidated California & Virginia shaft, with its face largely in porphyry.

Crown Point Mining Company.—A width of 4 ft. of quartz, containing spots of ore, is showing in the raise from the 300 level. The ore is low in grade.

Justice Mining Company.—The latest weekly official letter says: The winze that was started last week on the ore encountered in the Blaine tunnel is now down to a total depth of 18 ft. The bottom shows a width of about 4 ft. of quartz, yielding fair assays. We are still raising on this same body and are now up a total distance of 24 ft. above main tunnel. The top is in low-grade quartz.

NEW YORK.

Washington County.

New Empire Slate Company.—This company has been incorporated with a capital of $50,000, to quarry and manufacture slate in Granville. The directors are: Hugh Williams, of Middle Granville; Gilson S. Whitson and William H. Kirtland, of New York City.

NORTH CAROLINA.

Carbarrus County.

(From our Special Correspondent.)

Concord Mine.—At this mine they are operating with a five-stamp mill and Huntington pulverizer on quartz that has been yielding good pay. The ore is heavy in sulphurets and it is reported that concentrators and chlorination works will be put up, as at present the gold combined with the pyrites is not recovered. Since its discovery this mine has yielded good gold ore, and, although owned by Senator Jones, has been operated in a dilatory manner.

Nugget Gold Mine.—At this mine they are hydraulicking the surface and finding some nuggets every week together with fine gold and quartz specimens, all of a similar character to the Reed mine, where 60-lb. pockets have been discovered in early days of North Carolina mining. The Nugget is on the same belt as the Reed and two miles distant.

Montgomery County.

Russell Gold Mine.—This mine has been purchased by Mr. Richard Eames, Jr., of Salisbury, for himself and associates.

(From our Special Correspondent.)

Harris Gold Mine.—This is a home enterprise, not vested with much capital, which is necessary to some extent in working even a good gold mine. They have up a one-horse Chilean mill and as the ore is hard cannot work over 800 lbs. per day, which is yielding at the rate of $10 per ton. They are down 35 ft. and have a vein 6 ft. in width with about 10% of sulphurets. Montgomery County has many large deposits of low-grade ore. For economical working they require a large number of stamps with concentration and chlorination. This they have never had.

Rowan County.

(From our Special Correspondent.)

Bear Mining Company.—This is the name of the organization now working the Graft mine. They have some good ore and have been milling and concentrating with fair results. The mine is in charge of Mr. Graft, formerly of Newark, N. J.

Metallurgical Works.—Notices are out for the organization next month of a company in Salisbury for the purpose of erecting works for the treatment of ores together with the manufacture of fertilizers. Such works would probably put many mines in the State on a paying basis. In case they are erected concentration at each mine will simplify matters, as they will be able to dispose of such concentrates on assay value. At present there is no market in the State for the refractory ores which abound.

OHIO.

The coal miners have voted, by a majority of 500 in about 10,000 votes, to refuse the proposed reduction and to demand the continuance of the present rate of 50c. per ton until May 1st. The officers of the United Mineworkers favored the reduction, believing it necessary to enable the operators to meet the competition of the Pittsburg and West Virginia mines, but the votes are against them. A general shutdown will follow, according to the latest dispatches.

Perry County.

Great Vein Coal Mining Company.—This company has been organized to mine coal near New Straitsville.

PENNSYLVANIA.

Anthracite Coal.

We are reliably informed that the report published in this column last week that veins of anthracite coal 26 in. thick were said to have been found near Arcola is not true.

A press dispatch from Wilkes-Barre says that John C. Haddock, owner of some of the largest mines in that region, has commenced suit against the Delaware, Lackawanna & Western Railroad Company for $550,000 alleged to have been illegally paid by the plaintiff as excessive freight toll rates during the last six years while transporting the output of the Haddock mines at Plymouth.

A press dispatch from Pottsville says that all the collieries in the Schuylkill region shut down on Jan. 18th for the usual two-day suspension, and some of them for an indefinite period. Of the Philadelphia & Reading Coal and Iron Company's mines, 11 will remain closed until further orders. These comprise the Draper colliery, at Gilberton, the Bear Valley, Hammond, West Shenandoah, Shenandoah City, Bear Run, Suffolk, Elmwood, Pine Forest and Thomaston. General Superintendent Luther said that the suspension is due to the dullness of trade, the great amount of coal on hand and the unsatisfactory outlook for the disposition of it.

Clear Spring Colliery.—A new slope is being sunk in the Red Ash vein of this colliery at West Pittston, and a new pair of hoisting engines, designed to operate a haulage system 2,000 ft. long, will be in readiness within a month.

Ripsel & Harman will soon reopen the old colliery at Humbolt.

Bituminous Coal.

The river and railroad coal miners went into convention at Pittsburg on January, to take action on the proposed reduction from 65 cents to 60 cents per ton. Fifty-nine pits were represented. The operators declared that the reduction will have to be made in order to compete with mines now paying as low as 55 cents per ton. They say they will put in new men at once if the reduction is not accepted. On Tuesday the convention declared in favor of the 79-cent rate, but, until matters are in readiness for a national strike, the men are to work for whatever rate they can get.

Forty-Fort Coal Company.—Application has been made for a charter for this company. The incorporators named are: Thomas H. Watkins, Henry P. Simpson, A. F. Lawall and James L. Crawford, of Scranton.

Palton.—This coal mine, in Cambria County, which had been idle for several months, has resumed work.

Robbins Coal Company.—A press dispatch from Pittsburg says that the employees of this company, Mansfield, are at work under the protection of deputy sheriffs. The firm feared the mob, which almost wrecked the pit on January 23d, would return. The riot was caused by Belgian and French miners, who were on a strike for 79 cents per ton. They came from mines where the 55 and 60-cent rate prevailed, and wanted the employees of the Robbins Company to strike for the 79-cent rate. On the latter's refusal the mob proceeded to destroy the works. They caused about $1,500 worth of damage.

Rochester & Pittsburg Coal and Iron Company.—At the annual meeting in Punxsutawney, Pa., last

This is a Match

COAL TRADE REVIEW.

NEW YORK, Friday Evening, Jan. 26.

Statement of shipments of anthracite coal (approximated) for week ending January 20th, 1894, compared with the corresponding period last year:

	1894. Tons.	1893. Tons.	Difference.	
Wyoming region	309,418	415,092	Dec.	105,674
Lehigh region	87,354	92,582	Dec.	5,228
Schuylkill region	184,552	175,367	Inc.	9,185
Totals	581,324	683,041	Dec.	101,717
Total for year to date	1,795,152	1,850,855	Dec.	55, 03

PRODUCTION OF BITUMINOUS COAL, in tons of 2,240 lbs. for week ending January 20th and year from January 1st:

Shipped East and North:	1894. Week.	1894. Year.	1893. Year.
Phila. & Erie R. R.	2,403	3,903	9,917
Cumberland, Md.	59,446	166,736	222,904
Barclay, Pa.	408	1,255	6,707
Broad Top, Pa.	8,709	2,986	60,019
Clearfield, Pa.	64,528	197,950	285,703
Allegheny, Pa.	26,223	78,171	67,765
Beech Creek, Pa.	38,739	123,203	131,912
Pocahontas Flat Top	57,055	145,459	169,143
Kanawha, W. Va.	46,252	149,950	243,727
Totals	303,763	890,653	1,197,917
Shipped West:	**1894. Week.**	**1894. Year.**	**1893 Year.**
Pittsburg, Pa.	24,169	81,310	59,122
Westmoreland, Pa.	31,618	93,449	133,715
Monongahela, Pa.	7,518	19,155	61,940
Totals	63,305	193,914	294,777
Grand totals	367,068	1,084,567	1,492,694

PRODUCTION OF COKE on line of Pennsylvania R. R. for the week ending January 20th, 1894, and year from January 1st, in tons of 2,000 lbs.: Week, 55,311 tons; year, 167,122 tons; to corresponding date in 1892, 292,057 tons.

Anthracite.

The excessive dullness which has characterized the anthracite coal trade during the past few weeks has continued unabated. The week under review shows the same lack of features of any kind whatsoever, for identically the same conditions prevail to-day that were in force at the time of our last report.

The market continues altogether a "weather" market, and the only thing that can bring any relief to the situation is the advent of a really cold snap. The demand for coal, excepting for pea and buckwheat, has been very small. To offset this, coal producers have strictly followed their policy of a greatly reduced output. Shipments of anthracite coal for the week ending January 20th were 581,324 tons, a decrease of 101,717 tons, as compared with the corresponding period of 1893. The salesagents held a meeting in this city on Thursday, at which the situation was discussed. All present agreed that the present curtailment of production was the only possible action in view of the lack of demand, and it was recommended that the output for the month of February be restricted to 50% of October's output, which was 4,525,663 tons, making about 2,250,000 tons to be mined next month. This is exactly the output recommended for the current month. Prices were left unchanged. The restriction has been and is being strictly carried out, many of the collieries working on reduced time and others having suspended operations entirely, as in the case of 11 Philadelphia & Reading collieries in the Schuylkill region.

There is still some talk of cutting of prices in this market. Doubtless, small lots of coal have been, or are being, sold by some individual operators at prices somewhat below the schedule, but it is scarcely likely that the companies are indulging in any "shading"; as a matter of fact, they dare not do it. In the first place, a reduction of, say, 25 cents per ton would not result in business of any consequence, and, secondly, every other company would reduce its prices on the day following a sale at the "shaded" figure. There is certainly no more cutting now than there has been all along for the past few weeks. m

The Reading official circular rates, subject to the usual commissions, are as follows, f. o. b. at its New York harbor shipping ports:

	Broken.	Egg.	Stove.	Chestnut.
Hard white ash	$4.00	$4.25	$4.60	$4.60
Free white ash	3.90	4.15	4.60	4.60
Shamokin	....	4.50	4.80	4 60
Schuylkill red ash	....	4.50	4.95	4.75
Lykens Valley	5.15	5.80	6.25	5.50

Pea, $2.75@$3; No. 1 Buckwheat, $2@$2.25; No. 2 Buckwheat, $1.75@$2.

The Reading Railroad reports that its coal shipment (estimated) for last week, ending January 20th, was 180,000 tons, of which 22,000 tons were sent to Port Richmond and 28,000 tons were sent to New York waters.

Bituminous.

The bituminous coal trade continues as dull as it can be. There are a few small "transient" orders in the market, but they go generally to the party who is able to procure the best rate of freight. This rather has an effect the reverse of that desired by the consumer, as it creates a demand from several quarters for vessels to the same destination and thus stiffens rates.

Coal is still standing all along the line of the main-line roads and many of the producers are having unhappy half-hours with the transportation superintendents of the railroads on this account. The mines are curtailing their shipments to a great extent and small tonnages are the rule with all producers. The transportation from the mines, as above stated, is still greatly impeded by the quantity of coal standing along the lines. Cars are in plentiful supply, but are doled out according to the manner in which the various producers are relieving the loaded cars at shipping ports.

The trade seems to be worse in the far East, and it improves, if so it is called, as it gets nearer to the shipping ports, although it is exceedingly quiet at all points. All-rail trade is dull, but remains better than other lines of the business. Prices are cut to a limited extent and as far as the actual cost of coal permits.

The vessel market, comparatively speaking, is in a very fair condition, and it is difficult to get any rates under those quoted last week. Ocean freight rates are as follows from Philadelphia: To Boston, Salem and Portland, 95c.@$1; Providence, New Bedford, New Haven and Bridgeport, 80@90c.; Portsmouth, $1. From Baltimore, Norfolk and Newport News, rates are from 5 to 10c. higher than the above quotations. This is a shading of the minimum rates named in the last schedule of the Vessel Owners' and Captains' National Association, but considering the market it is a very fair rate for the Association to maintain, orders being so scarce and vessels, especially large ones, asking for orders.

NOTES OF THE WEEK.

The House of Representatives in Committee of the Whole, voted on January 23d to take off the present duty of 75c. per ton on coal, as provided for by the Wilson Bill. Various amendments to this clause were proposed, but lost when voted upon. Among them were: By Mr. Oates (Dem., Ala.), making the duty 40c. per ton on coal and 20c. per ton on slack. By Mr. Wise (Dem., Va.), 50c. per ton on coal. By Mr. McKaig (Dem., Md.), 75c. per ton on coal and 30c. per ton on slack. By Mr. Tucker (Dem., Va.), to retain the coal schedule of the McKinley law, and by Mr. Turpin (Dem., Ala.), provide for a duty of 75c. per ton to be decreased at the rate of 12½c. every year. The duty would thus be removed altogether after the sixth year. All were voted down, however, as stated above.

The annual report of the New Central Coal Company shows the following results: Coal output, 1890, 218,168 tons; 1891, 206,813 tons; 1892, 201,428 tons; 1893, 223,503 tons. The statement of profits for the year ending December 31st shows: Balance to credit of coal account, $535,388; coal on hand, $10,553; total, $545,941; freights, mining and shipping expenses, $505,597; net earnings for the year, $40,344; balance credit profit and loss 1892, $211,061; dividend paid 1893, $50,000; charged to personal property account, $6,935; charged to sundry accounts, $6,205; balance, $147,931; net earnings 1893, $40,344; total, $188,266.

Boston. Jan. 25.

(From our Special Correspondent.)

Business continues very quiet on all kinds of anthracite coal. Up to this writing we have been unable to learn the results of the agents' meeting, held this afternoon. The companies all along have managed to maintain prices very well. The yard people have bought little or no coal of late, but a little cold weather would surely bring them into the market. Companies' prices are f. o. b. net New York: Stove, $4.45; egg, $4; free broken, $3.75; and chestnut, $4.45.

Individuals' white ash coals can be had as follows: $4.15@$4.25; egg, $3.80@$3.85; free broken, $3.75; chestnut, $4.25. Lykens Valley (at Philadelphia): Broken, $4.90; egg, $5.55; stove, $6; and chestnut, $5.25.

Business in bituminous continues very quiet and prices remain steady. We quote on cars here: Cumberland, $3.80; New River and Pocahontas, $3.75@$3.80; and Clearfield, $3.50.

Vessel freights are firmly held as follows: From New York, 70@75c.; from Philadelphia and Hampton Roads, $1; from Baltimore, $1.10; to Sound points less than foregoing.

In a retail way there is very little doing and prices are steady. Boston prices are: Stove, $6.25; nut, $6.25; egg, $6; furnace, $5.75; Franklin, $7.75; Lehigh egg, $6.25; Lehigh furnace, $6.

Buffalo. Jan. 25.

(From our Special Correspondent.)

The anthracite coal trade, in consequence of the continued mildness of the season is very dull. Nearby points seem to have a sufficiency and those far off follow suit. Prices unchanged. Stocks ample. The restriction of production is expected to keep the market steady.

Bituminous coal is also dull; some improvement manifested in orders received for goods; therefore, there is greater activity among manufacturers and they are working more men. Prices low, and, as the saying is: "You can buy at your own figure."

The coal committee of our Merchants' Exchange this year consists of Messrs. Joseph C. Batchelor, Thomas Hodgson, John M. Brinker, Thomas Loomis and Millard S. Burns.

Orders for the manufacture of coal cars are being given out quite freely nowadays. Among the later reports one of 500 for the New York, Ontario & Western Railroad Company, and 200 for the Buffalo, Rochester & Pittsburg Railroad Company.

The result of a raid made on our Polish citizens (!) at East Buffalo last week was the fining of over 30 of them $5 each for stealing coal from the New York Central Railroad Company.

A gas plant, costing $30,000, is nearly completed in our city. It is to manufacture fuel gas from coal. The company introducing the system has a capital of $3,000,000. The field of operations will extend over our city and adjacent towns and villages, as the enterprise develops.

Chicago. Jan. 24.

(From our Special Correspondent.)

At this season in other years coal merchants have usually found themselves overrun with orders, but now the condition is directly opposite and the coal dealers have hardly any business on hand. The mild weather that has been with us for six weeks past has been suddenly broken by a severe cold wave which has caused the thermometer to fail below zero and for 6 in. to 1 ft. of snow to cover the ground generally throughout the Northwest. This cold may create a marked change in this market and therefore dealers are looking forward more hopefully. There has opened up here in the past few weeks a trade in screen coal and the demand has been so heavy and the stocks so low that there are now certain grades that cannot be had. All the mines in Mendota, Ill., closed down last week, throwing 400 men out of work, as the coal operators in Pennsylvania have reduced the price of mining over 15c. per ton and appeals to Ohio and Indiana miners have been made to accept a similar reduction with the hope of avoiding the distress that must follow the shutting down of the mines in said States.

Anthracite.—Prices are quoted as follows: Broken, $5.85; egg, $6.10; range, $6.10; chestnut, $6.10. Retail prices: Egg, range and chestnut, $6.50@$7.25.

Bituminous.—There has been a notable decrease of the number of cars that have been for some time standing on the tracks, and it is expected that under favorable conditions which are bound to occur very soon, another such apparent glut cannot be. Screen coal has been much in demand, but the situation is yet heavy. Quotations are per ton of 2,000 lbs. f. o. b. Chicago: Youghiogheny, $3.35; Pittsburg, $3.35; Hocking Valley, $3.10; Brazil block, $2.70; Raymond, $3.75; Shawnee, $3.10; Cumberland smithing, $3.70; Mt. Olive, $2. Cannel coal quotations are: Pinkney, $4.25; Birdseye, $5.60; Kentucky, $5.60.

Coke is still in small demand and until factories open up the sales will be very moderate. Quotations are: Connellsville furnace, $4.20; crushed, $4.30; Ellsworth, $3.75@$4.25; West Virginia, $3.75@$4.

Pittsburg. Jan. 25.

(From our Special Correspondent.)

Coal.—The coal trade remains in a very unsatisfactory condition. There was sufficient water for barge shipment, but none were sent out with the present prices in the Cincinnati market; there seems to be little use in forwarding any more until better prices can be obtained. Those who favor the cutting process at Cincinnati have been selling coal as low as 4½ cents a bushel, while other shippers maintain that 5 cents is as low as it can be sold at to realize any profit. A movement has been started to arrange a uniform price at which coal should be sold; so far nothing has been agreed on.

The miners' convention had a very exciting time, only good judgment and cool heads preventing a strike at once; 60 cents will be the limit for coal miners' wages. Secretary McBryde spoke against a strike, and advised all to go to work and make the best terms they could; he succeeded in carrying his point. A resolution was adopted declaring that while the miners may be compelled to work for less than 79 cents per ton, they recognize no other rate, and will hold themselves in readiness to join a general national movement for enforcing that rate. The national officers are requested to take such action as will enforce the 79-cent rate at an early date as possible. As 60 cents is the rate which prevails throughout the Wheeling division, the operators who have been paying the 65-cent rate will now drop back to the 60-cent rate. The convention adjourned without arranging for future meetings, and it is hardly probable that any will be held for some time to come.

Connellsville Coke.—The outlook is not as favorable as that of the preceding week; the operators are using every means to avoid stocking coke this season of the year, and are consequently reducing production. The week's region output reached 67,702 tons, a decline of 2,656 tons, compared with the previous week. Fully 700 ovens were blown out. The H. C. Frick Coke Company blew out 400 ovens; the Heckla company blew out 240 ovens; the Cambria company fired up 180 ovens; W. J. Rainey fired up 50 ovens. The Frick company ran its plants in blast five days; the McClure company five days, and the Rainey plant, all five days. The plants of the independents made five days. The demand for coke was fairly maintained. Estimated by the cars sent out from the region shipments amounted to 78,462 tons. The report shows 8,144 ovens in blast and 9,371 idle. The shipments for the week are as follows: To Pittsburg, 1,031 cars; to points East, 1,620 cars; to points West, 1,670 cars; total, 4,321 cars.

The nominal rates are f. o. b. at ovens: Furnace coke, $1; foundry coke, $1.15; crushed coke, $1.40. Freights to Pittsburg are 70c. per ton of 2,000 lbs.

week, the following directors were chosen: George E. Merchant, Rochester, N. Y.; Adrian Iselin, J. J. Lee, Joseph J. Metzgar, Joseph D. Bourne, New York.

Westmoreland Coal Company.—This company, by a system of underground tunnels, has connected its South Side mine, at Larimer station, on the Pennsylvania Railroad, with the workings of James W. Shields' mine, at Osceola, on the Baltimore & Ohio Railroad. The tunnel is 5½ miles in length, running through parts of North Washington and Versailles townships. Westmoreland and Allegheny counties.

Stone.

The sandstone quarries at Hummelstown, along the Lebanon Valley Railroad, which usually employ 700 hands, and were idle for a very long time, resumed on January 20th, with 125 hands, with prospects of more in a few days.

SOUTH DAKOTA.

Clark County.

Garden City Mining Company.—At the annual meeting, January 9th, there was represented 210,000 shares of stock, and the following directors were elected: R. M. Maloney, R. G. McGillis, Ed. Shannon, James Lawler, J. B. Le Beau. At the directors' meeting R. G. McGillis was elected president; R. M. Maloney, vice-president; J. B. Le Beau, treasurer and secretary.

Lawrence County.

St. John Mining and Milling Company.—According to the Deadwood "Times" this company, whose property adjoins the Homestake and Big Missouri mines on the free milling belt, has secured a lease on the Hawkeye mill, located on Whitewood Creek, at the mouth of Gold Run, and will put it in operation at once. A force of men is now at work in the company's mines extracting ore, of which there are several hundred tons now on the dump taken out in the course of previous work. The Hawkeye mill is new.

TENNESSEE.

Rhea County.

(From our Special Correspondent at Chattanooga.)

Fox Coal and Coke Company.—The property owned by this company is on the Cincinnati Southern Railroad, about 35 miles north of Chattanooga, near Grayville. The affairs of this company have been in the courts for the last three years and consequently no work has been done. Now, however, the company, having been relieved of litigation, is doing much development work, and 25 coke ovens are in operation; 50 more will be built in the spring. Machinery for washing the coal before its conversion into coke will also be added in the spring.

TEXAS.

Presidio County.

(Reported for the "Engineering and Mining Journal.")

The production of silver from the mines of this district in 1893 was as follows: Presidio mine (11 months), 11,694 tons ore, yielding 290,501 fine ounces silver; Cibolo mine (1 month), 919 tons of ore, 18,217 oz. silver. The total output was 308,718 oz. silver from 12,613 tons ore, an average of 24·48 oz. to the ton. In 1892 the output was 277,049 oz. silver from 12,339 tons ore, an average of 22·45 oz. per ton. The increase in 1893 was 274 tons ore worked and 31,669 oz. silver produced, the average yield being increased by 2·03 oz. to the ton.

UTAH.

Iron County.

Wood & Jenson.—This coal mine, located in Coal Creek Canyon, has been sold to W. W. Cluff and Salt Lake people. The consideration is not made public.

Salt Lake County.

The shipments of ore and bullion out from Salt Lake City for the week ending January 13th were: 666,333 lbs. bullion; 79,410 lbs. copper matte, and 1,571,710 lbs. silver and lead ores.

The receipts of ore and bullion at Salt Lake City for the week ending January 17th were to the aggregate of $162,874, of which $106,724 was in bullion and $56,150 was in ore. The receipts of Pennsylvania bullion amounted to $15,198; Hanauer bullion, $7,100; base bullion, $30,600; Ontario bullion, $37,326; sulphides, $12,500; gold bars, $4,000. Ore receipts, $76,050 by McCornick & Co., and $20,100 by T. R. Jones & Co.

Tooele County.

Mercur Mining and Milling Company.—The Salt Lake papers report the sale of this company's property to a syndicate of Colorado and English capitalists, headed by Mr. Henry Wolcott, of Denver. According to the Salt Lake "Tribune" the terms are said to be $5,000 down, $20,000 in 30 days, $50,000 in 60 days, $300,000 in 6 months, and the balance, $325,000, in 15 months. This announcement has given a great impetus to the boom in the Camp Floyd district.

WASHINGTON.

Stevens County.

The following items of Boundary mining news are taken from our exchanges:

Josie.—A shipment is being made of 15 tons of ore from the Josie mines, in the Trail Creek district, for the Tacoma smelter.

Mining Exchange.—The building erected for a mining exchange and headquarters for mining men was opened on January 24th at Boundary.

Washington.—Developments in the Washington, Leaders and Flannagan mines are at such a point that ore shipments will soon begin.

(From an Occasional Correspondent.)

Old Dominion Mining and Concentrating Company.—The Old Dominion mine is owned and operated by this company, of Spokane, of which G. B. Dennis is president, and Cyrus Bradley, secretary. The capital stock of the corporation is $1,000,000, fully paid up. The property is 1,500×600 ft., and has upon it a 50-ton concentrator, and an 80-H. P. compressor plant, which operates six Ingersoll drills. There is in development work upon the property fully 5,000 ft. The greatest depth in the mine is in by tunnel 1,400 ft. long, and at a depth of 600 ft. below the apex of the lode. The mine in the past has produced well, having yielded over $600,000 net to its owners. The ore is high grade, silicious ore, carrying an average of 450 oz. of silver to the ton, and 35% lead. The present policy of the company is the development of the property at depth, and this work is being vigorously prosecuted.

WEST VIRGINIA.

Kanawha County.

Elk River Coal Mining Company.—At a recent meeting in Charleston, this company was reorganized by the election of T. J. Mason, president; L. Prichard, secretary and treasurer.

Stevens Coal Company.—This company has bought two electric coal cutters from the Jeffrey Manufacturing Company, at Columbus, O., for its mines at Acme.

Logan County.

Twelve Pole Mining Company.—This company, which owns about 10,000 acres of land, is about to begin development at Dingess, where a 4½-ft. seam of coal is known to exist. Leases will be let on this seam, which is known as the Campbell Creek vein in West Virginia, or the Lower Kittanning, of Pennsylvania.

Marion County.

Saxman Coal Company.—This company, which recently bought a large tract of coal land at Barrackville, is preparing to sink a shaft on the property.

WYOMING.

Johnson County.

The county clerk of Johnson County received no less than 67 oil placer locations, comprising 15,520 acres of land, last week, says the Laramie "Boomerang." Most of these have been filed by Omaha parties, who have become interested in that part of the State. There seems to be little doubt that a branch road from Casper will be run into the district in the near future, in the event of which many wells will be put down and wholesale shipments of oil be made.

Uintah County.

(From our Special Correspondent at Laramie.)

Rocky Mountain Coal and Iron Company.—This company, which has been in constant operation since 1869 at Red Canyon, has closed down. The suspension is reported to be for two weeks only, but there is no assurance that they will start up on February 1st. The towns of Red Canyon and Alma are very near together and have an aggregate population of 3,000, who depend upon the coal mines for a livelihood. Should the fire and suspension continue long there will be much suffering.

Union Pacific Coal Company.—The Alma coal mine No. 7, owned and operated by this company, has been on fire for several weeks. The mine is banked and all work suspended. The closing of No. 7 has thrown out of employment several hundred men, and causes the Union Pacific Railroad to haul the fuel for the western division from Rock Springs. Should the fire continue as in No. 4 it will be a loss to the company of not less than $1,000,000.

FOREIGN MINING NEWS.

GERMANY.

"Kuhlow's German Trade Review" says: The condition of the German coal trade remains difficult; the policy of German coalowners appears to be to force sales abroad, and to stand out for as high rates as possible at home. The production of coal in the following German districts in the first nine months of last year was as follows: Breslau, 15,261,015 tons, as compared with 14,501,167 tons in the corresponding period of 1892; Halle, 7,993 tons, as compared with 14,911 tons; Klausthal, 382,335 tons, as compared with 407,161 tons; Dortmund, 28,346,133 tons, as compared with 26,857,610 tons; and Bonn, 5,677,397 tons, as compared with 6,097,661 tons. The average number of work people employed in each district in the first nine months of this year was as follows: Breslau, 71,670, as compared with 73,140 in the corresponding period of 1892; Halle, 61, as compared with 112; Klausthal, 3,638, as compared with 3,622; Dortmund, 145,094, as compared with 141,487; and Bonn, 36,469, as compared with 38,632.

INDIA.

The returns of the Colar mining district for December shows a production of 17,659 oz. gold, making a total of 207,135 oz. for the year, against 163,140 oz. in 1892; 130,137 oz. in 1891; 104,932 oz. in 1890.

Balaghat Mysore.—A telegram gives the return of gold for the month of December as follows: 400 tons of quartz produced 510 oz. of gold.

Champion Reef.—A telegram has been received from the mine, giving December returns of gold as follows: Crushed, 2,080 tons; obtained, 3,037 oz. of gold.

Mysore.—The return of gold for the month of December is as follows: 4,750 tons of quartz produced 4,114 oz. of gold; also 896 oz. were obtained from tailings, making together a total of 5,010 oz. of gold.

Nundydroog.—The return of gold for the month of December is as follows: 2,335 tons of quartz produced 2,374 oz. of gold; also 151 oz. were obtained from tailings, making together a total of 2,525 oz.

Ooregum.—The December return of gold is as follows: 3,302 tons of quartz produced 5,706 oz. gold; 3,250 tons of tailings produced 871 oz. gold; total production for the month, 6,577 oz. of gold.

MEXICO.

(From our Special Correspondent.)

Outside the United States this country is the greatest producer of silver in the world. Both together produce about 80% of the world's product. For the fiscal year ending June 30th, 1893, this country produced $48,500,000 in silver, based on mintage values, or, in other words, the silver was equivalent to that amount of Mexican dollars, which contain 377¼ grains pure silver. This is the largest product ever reported. The gold value of these dollars during the year has been the lowest in the history of coinage, having sold as low as 56 cents. The silver product of the country has doubled within the past 15 years, the total for 1877-78 being $24,837,000. For the past five fiscal years the yield has regularly exceeded $40,000,000 per annum. The total product for the past 16 years amounts to $552,895,000 silver and $16,514,000 gold, or a grand total of $509,409,000. The gold product for the last fiscal year was $1,400,000, the largest ever reported.

SOUTH AFRICA.

Transvaal.

Witwatersrand.—The output of the district for December, as reported by cable, was 146,357 oz. gold, making a total of 1,478,473 oz. for the year, as compared with 1,210,868 oz. in 1892; 729,238 oz. in 1891; 494,869 oz. in 1890; and 381,958 oz. in 1889.

Ferreira Gold Mining Company.—This company recently declared a dividend of 50% on its stock.

Geldenhuis Estate.—Arrangements have been made to connect the two shafts by an incline at the second level. New pumps and hoisting engines are being put in. A cyanide plant of 20,000 tons monthly capacity is being erected.

Glencairn.—Bids have been asked for the erection of a cyanide plant to treat 6,000 tons per month. The company has 75,000 tons of tailings on hand.

Moodie Gold Mining Company.—The Pelton Water Wheel Company, San Francisco, has recently prepared an extensive water power plant for this company, to be erected near Barberton, on the Queen's River. There are a number of mines situated around the station, within a distance of four miles, and the power will be distributed by electrical wires, dynamos and motors. There will be four wheels of 125 H. P., each under a head of 142 ft. The wheels are 72 in. in diameter, to run at a speed of 150 reveolutions per minute, and are connected by means of rope gearing to the generators.

Roodepoort Deep Level.—The vertical shaft on this property measures 16×15 ft. in the clear, says the South African "Mining Journal," and has been sunk to a greater depth in a shorter time than any other shaft upon the Rand. The actual time during which sinking has been carried on has only been some 11 months, and the fact that in so short a time, in spite of water difficulties, a vertical depth of 665 ft. should have been attained, reflects credit upon the manager. During October the distance sunk amounted to 52 ft. The main reef was cut at a depth of 660 ft., but the assays have not yet been fully completed. As soon as the timbering of the shaft, and the necessary cross-cuts and stations have been completed, driving will be commenced upon both deposits. Unlike the majority of deep level shafts, water has been encountered throughout the whole distance.

Transvaal Coal Trust Company.—At the recent annual meeting the reports showed for the year ending September 30th a production of 223,533 tons of coal, an increase of 40% over the preceding year. Dividends of 6¼% were paid. The workings are at present confined to the Brakpan colliery, Holfontein and Klipfontein having been abandoned as unprofitable. At Brakpan the output is now 1,400 tons per day, and the plant is being enlarged.

Very little can be said in regard to selling prices of iron and steel products in this market at present. The usual quotations given mean very little. All prices are being shaded, and the sales of the next week or two can be relied upon to furnish pretty exact quotations.

Pittsburg. Jan. 25.

(From our Special Correspondent.)

Raw Iron and Steel.—That the iron trade generally is in a very unsatisfactory condition don't admit of argument. The situation has never had a parallel in Pittsburg, or any other place so far as we are informed; prices are so low that no other city seems to be able to compete with this point, hence the demand has been reasonably active, but at prices that were never heard before.

Who makes the cheapest steel billets? In his testimony recently before the Ways and Means Committee, Major George M. Laughlin, of Jones & Laughlin's, emphatically denied that Homestead could produce billets cheaper than any other mill in Pittsburg, and other billet manufacturers have taken the same position in private conversation.

The demand for iron in nearly all its forms shows a slight increase, and it is generally reported, therefore, that the trade is improving. But the improvement is sentimental rather than actual, and is based on expectations and not on a change in conditions. The stock of pig iron is heavy and some of the mills have an ample supply of bar iron and shapes on hand; nevertheless it is undeniable that the inquiry is larger in volume, and the indications seem to be that the remarkably low consumption for December will not be returned to. In pig iron, however, the market has an irregular appearance; prices are unsettled and uncertain.

The last 48 hours show an improved inquiry, more particularly for steel billets and Bessemer pig. Prices show no improvement, but holders are certainly firmer in their views. The volume of transactions shows up fairly well. The reason evidently is that Pittsburg is the leading center of the iron industry, and there seems to be no other point that competes with Pittsburg prices. It certainly looks as if an improvement is close at hand.

Coke Smelted Lake and Native Ore.

Tons.	Cash.
2,000 Bessemer, Feb., March	$10.75
1,200 Bessemer, Jan., Feb.	10.75
1,000 Bessemer, Feb	10 80
1,000 Bessemer, Feb	10.75
1,000 Bessemer, Feb., March	10 60
1,000 Bessemer, Feb	10.65
500 Bessemer, prompt	11.00
500 Bessemer, Feb	11.75
500 Gray Forge	9 75
500 Gray Forge	9.80
500 Gray Forge	9.85
350 Gray Forge	9 75
300 Gray Forge	9 80
200 Gray Forge, spot	10 00
100 No. 1 Foundry	12 00
100 No. 2 Foundry	11.00
100 No. 1 Foundry	12 00
50 No. 1 Foundry, extra	12.25
50 Mill Iron	10.00
50 Bessemer, spot	11.00
50 No. 1 Silvery	15.25

Blooms, Billets and Slabs.

2,500 Billets, Feb., March, April, at mill	15.65
2,000 Billets, Jan., Feb., at mill	15 80
1,000 Billets and Slabs, Feb., March, at mill	15.85
1,000 Billets, Feb., March at mill	15.80
500 Billets, at mill	15 75

Charcoal.

Tons.	Cash.
50 No. 2 Foundry	17.50
50 No. 1 Foundry	18 00
50 Cold Blast	25.50
50 Cold Blast	24 50

Skelp Iron.

500 Sheared	1 40 4 m.
450 Wide gr'ved	1·25 4 m.
330 Nar. gr'ved	1·25 4 m.

Skelp Steel.

360 Wide gr'ved	1·05 4 m.

Ferro-Manganese.

300 80% delivered	$52.00

Muck Bar.

1,000 Neutral	20.80
500 Neutral	20.50
500 Neutral	20.00

Sheet Bars.

200 At mill	21.20

Steel Wire Rods.

500 5 gauge American at works	23.00

Blooms, Billets, Bar Ends.

800 Feb. delivered	10.60
300 March delivered	10.75

Champlain Billets.

50 Champlain billets	45.00

Spelter.

125 per 100 lbs	3.50

Old Rails.

500 Iron	14.00
300 Steel short pieces	10.50 4 m.

METAL MARKET.

NEW YORK, Friday Evening, Jan. 26, 1894.

Prices of Silver per Ounce Troy.

Jan.	St. Ex.	London Pence.	N.Y. Cts.	Value of sil. in $1.	Jan.	St. Ex.	London Pence	N. Y. Cts.	Value of sil. in $1
20	1·86	31	67	·518	24	1·86⅜	31	67½	·522
22	1·86	30⅛	66¼	·512	25	1·86⅜	31	67½	·522
23	1·86¼	30¾	66¾	·516	26	1·86½	30⅞	67	·518

The declared policy of the Indian Government not to put on import tax on silver is in line with the Gladstonian idea to open the ports wide to all and to everything free. Its effect on silver has been to take off the load which made buyers of bullion timid and to steady the price of the metal, which now stands more on its merits. The tendency, however, is toward lower prices for the present.

The United States Assay Office at New York reports the total deposits of silver for the week to be 125,000 oz.

Gold and Silver Exports and Imports at New York, Week Ending January 20th, 1894, and for Years from January 1st, 1894, 1893, 1892.

	Gold.		Silver.		Excess of Ex. or Imp.
	Exports.	Imports.	Exports.	Imports.	
Week	$721,150	$15,668	$829,006	$10,605	E $1,523,883
1894...	959,296	158,819	2,557,202	85,392	E 3,252,287
1893...	6,449,295	45,740	1,695,434	39,770	E 8,114,819
1892...	90,246	392,112	1,456,600	102,205	E 1,072,629

For the week the gold exported went chiefly to the West Indies; the silver to London. Both the gold and silver imported came from the West Indies and Central America.

During the five days ending January 25th the exports and imports of gold and silver have been as follows: Exports, gold, none; silver, $582,222; imports, gold, $23,700; silver, $28,289. Of the silver exported $13,700 was in Mexican coin and all the rest was in American coin and bullion and went to London.

NOTES OF THE WEEK.

Not very much that is new can be said of the general condition of business. There is a gradual revival, shown by the reopening of some of the factories and workshops and the employment of increased numbers at others, but it is still slow, and that the period of liquidation and doubt is not yet over is shown by the failure of some concerns which have managed to keep up through the worst of the depression, but have been unable to stand the prolonged strain. It is now generally considered probable that the new tariff bill will pass the House without material change, but the anticipation of prolonged discussion and uncertainty in the Senate is exerting a very unfavorable effect.

Among the better symptoms is the fact that the Lake Superior iron mines are gradually opening up and their owners are preparing for the coming season in anticipation of a better demand. On the other hand there are in several quarters threatening labor troubles, and the struggles which always follow a period of depression and falling wages have begun or are beginning to take form. In many cases reductions have been accepted as inevitable, but in others, as with the Ohio coal miners, they will be resisted and trouble will follow.

As noted last week, the applications for the new United States bonds have been numerous, and they will all be placed at a price a little above that fixed by the Treasury. There is a considerable demand for the smaller denominations which the Department is preparing.

It was stated recently that the President had notified the different powers taking part in the International Silver Conference that the United States was not prepared to ask for the reassembling of the Conference. This action was taken, it is understood, because there did not appear to be any hope of securing benefit from the Conference until the United States should be prepared to submit some definite plan for consideration, and no such plan was ready. The Indian financial troubles have drawn attention again to the silver question, however, and it is already intimated that the request for a new conference may come from abroad. Some more experience is needed to prepare the way for a general opinion in favor of an intelligent bimetallism and the admission of silver to its proper place in the world's monetary system, and the International Conference may be able to accomplish more if the meeting is delayed until England learns more fully the injury her monometallism is doing her and the losses her experiments in Indian monetary matters are bound to bring.

The Berlin correspondent of the London "Standard" reports another experimental plan drawn up by German bankers, who are not named. The correspondent says: A new monetary conference is no longer regarded as a utopian project. The movers have drawn up a plan for the conference, and they propose to submit it to the countries concerned. The leading principles are about as follows: The United States, France, Great Britain and Germany are to form a monetary union. The United States is to buy and use for currency purposes $10,000,000 worth of silver yearly. France, in behalf of the Latin Union, is to purchase 20,000,000 francs' worth of silver. Great Britain and Germany are to withdraw all gold and paper below the denomination of the sovereign, buying meantime £75,000 worth of silver annually, and issuing notes below the denomination of sovereigns against full equivalent deposits of silver coinage. India is to resume the unlimited coinage of silver. The union is to fix the price of silver several pence per ounce above the rupee price, and the fixed price is to be alterable only at the beginning of each year. If the average London price of silver fall 10% below the convention price, the members are to be allowed to withdraw from the union, thus dissolving it.

This scheme has all the inherent defects of the old plans, and is not worthy of consideration—nothing is that does not aim at a permanent solution; we have had enough of temporary experiments.

The gold exports for the week were larger than for some time past, amounting to over $720,000. None of this went to Europe, the export being chiefly to Cuba in settlement of balances. The silver exports continue large, and there seems to be no cessation in the demand from London.

The statement of the New York banks for the week ending January 20th show increases of $10,170,775 in reserve; $1,500,400 in loans; $5,326,400 in specie; $8,442,500 in legal tenders; $14,392,500 in deposits; a decrease of $235,300 in circulation. There was an increase in loans, instead of a decrease as shown in the preceding week, but it was small in comparison with the continued increases in deposits. The total reserves amounted to $233,831,000, being $102,754,450 above the legal requirement.

The statement of the United States Treasury on Thursday, January 25th, shows total balance in excess of outstanding certificates amounting to $80,547,858, of which there was in gold $67,657,114; silver, $7,846,832; legal tenders, $3,005,489; treasury notes, etc., $2,038,428. The total balance showed a decrease of $5,285,530 during the week, and the gold balance a decrease of $2,100,712.

The customs receipts at the port of New York for the first 20 days of the month aggregated $5,494,000, as against $10,337,000 last year. The customs receipts were paid as follows: Gold coin, 25·5%; silver coin, 0·1%; gold certificates, 0·7%; silver certificates, 62·3%, and United States Treasury notes, 6·3%. Those figures show a decline in the percentage of gold coin paid for customs duties and an increase in the percentage of silver certificates.

An order from the Treasury Department requiring duties to be paid in cash and prohibiting the acceptance of checks has caused some reduction in customs receipts for the past few days, as it has been resented by the importers generally. It is probable that the order will be modified.

The Bank of England on January 25th reported its total gold holdings at £27,384,931; an increase of £1,601,065 as compared with the corresponding week in 1893.

The specie holdings of the Bank of France on January 25th were, in sterling, £67,882,000 gold and £50,480,393 silver; an increase of £3,287,200 gold and of £461,363 silver, as compared with the corresponding date of 1893. During the week the Bank lost £108,000 gold and gained £145,000 silver.

The Imperial Bank of Germany on January 18th held, in sterling, £42,904,000 in gold and silver coin and bullion, a decrease of £1,106,000 from the corresponding date last year.

The London "Economist" gives the total amount of new capital issues, for foreign States, home and foreign companies in 1893 at £49,141,188, against £81,137,177 in 1892; £104,594,910 in 1891; £142,565,000 in 1890, and £207,037,000 in 1889. The issue last year was thus less than one-fourth that of 1889.

The Vienna correspondent of the London "Economist" says that the Austrian and Hungarian Finance Ministers have agreed that they will take the necessary measures for the realization of the currency and standard reform in the following manner: More than one-half of all the new money necessary for the reform being already coined, the total amount of 200,000,000fl. notes of the State to be withdrawn and destroyed in 1894 and 1895. This amount is made up by 67,000,000 of 1-florin notes, still in circulation; by 70,000,000fl. of 5-florin notes, and by 63,000,000fl. 50-florin notes. This measure will no doubt be followed by the withdrawal of the 98,000,000 florins' worth of 50-florin notes which will then be still in circulation. There will be 80,000,000fl. in 5-florin notes left, but these will not be touched until experience has shown how the 10-crown gold pieces will be received, which are to replace the 5-florin notes. It is possible that for the transmission of small sums in money, the Post Office checks, which have lately become immensely popular, will be used. The circulation of notes of the State was as follows at the end of 1893: Of 1-florin notes, 67,040,250fl.; of 5-florin notes, 143,788,455fl.; of 50-florin notes, 161,769,550fl.; the total amount being 372,098,255fl. Of this total amount 312,000,000fl. are common to both halves of the Empire, whilst 60,098,255fl. are represented by the bills mortgaged by the State Salt Mines, the "Salinenscheine," of which not more than 40,000,000fl. are at present in the hands of investors. For the 200,000,000fl. to be redeemed in two years, 100,000,000fl. worth of gold coin will be given each year to the Bank as a return for silver florins and notes, so that after two years the Bank will be rid of its stock of silver, and will, with the gold it owns already, have 316,000,000fl. gold coins in its coffers. The notes of the State which are withdrawn are to be replaced by silver florins, and by 40,000,000fl. in crowns and banknotes. The government has yet to make the trial how the public, which is accustomed to small notes, will get used to the silver, and the withdrawal of the rest of the notes of the State will be regulated according to the results of this experience. With a view to changing the Bank from its present provisional state, in which it has no right to acquire gold bills with its notes, to the solvent state of gold payments, it is to be authorized, even before the new privileges are carried into effect, to buy gold bills with its own notes, and to sell them again for notes.

A Washington dispatch says that the report of the Chief of the Bureau of Statistics, Mr. Worthington C. Ford, which has just been issued, comprises statistics of the foreign commerce of the United States for the year ended June 30th, 1893, and discusses the causes of the gold movement. The report says: The noticeable features of these figures are: The values of imports of merchandise attained the highest mark in the commercial history of the country, and the exports of gold reached a higher figure than ever before attained in a single year since the foundation of the government. In 1864 the exports of gold reached the figure $100,661,634, and this has been the high-water mark of gold exports until the last year. In 1893 the net exports of gold were less than the net exports in 1864, being

IRON MARKET REVIEW.

NEW YORK, Friday Evening, Jan. 26, 1894.

Pig Iron Production and Furnaces in Blast.

Fuel used.	Week ending Jan. 27, 1893.		Week ending Jan. 26, 1894.		From Jan., '93.	From Jan., '94.
	F'ces.	Tons.	F'ces.	Tons.	Tons.	Tons.
Anthracite.	70	31,969	29	14,192	127,876	56,768
Coke.....	139	133,610	81	82,967	534,440	331,868
Charcoal...	39	8,955	20	3,884	35,820	15,536
Totals....	248	174,534	130	101,043	698,136	404,172

Pig Iron.—There is rather a more cheerful feeling in this market, brought about by the greater number of both inquiries and orders which have been received during the week. It is believed here that the iron trade has seen its worst days, and that an improvement in business will manifest itself shortly. Present conditions help this belief. Stocks in consumers' hands are light, and there are signs that the consumption is increasing, although at so slow a pace as to render improbable any advance in prices for some time to come. Quotations are still more or less unsettled, especially in the case of Southern irons, certain brands of which have sold within the past fortnight at figures as low as any that have ever been made. Thus, while the improvement in the demand is encouraging, the weakness of values is not, however. The continuance of the former condition will naturally better the latter. Quotations are nominally as follows: Northern brands: No. 1, $13@$14; No. 2, $12.50; gray forge, $12. For Southern iron we quote: No. 1, $13@$13.75; No. 2 F., $12@$12.50; No. 1 soft F., $12@$13; gray forge, $11@$12—all at tidewater. Scotch irons are quoted: Coltness, $21.50@$22; Eglinton, $19.50@$20; Summerlee, $20.50@$21.

The American Pig Iron Storage Warrant Company reports as follows:

Stock in yard January 10th, 1894, tons.....	87,000
Put in yard for 10 days ending January 20th.....	500
Total.....	87,500
Withdrawn 10 days ending January 20th, 1894.....	100
Net stock in yard January 20th, 1894, tons.....	87,400

Billets and Rods.—We do not hear of any business doing in this market. Reports from other quarters are to the effect that very low prices for billets are still being named by mills to capture business. Quotations for domestic billets are nominally $18@$18.50, but doubtless these prices would be shaved for desirable orders, since the mills are selling in Pittsburg at $16. Wire rods, domestic, $26@$27.

Manufactured Iron and Steel.—This market continues quiet, although there has been a slightly improved inquiry, and several fair sized contracts are to be placed soon. Prices are still low. We quote nominally: Angles, 1·60@1·75c.; axles, scrap, 1·70@2c. delivered; steel, 1·70@2c.; bars, common, 1·35@1·50c.; refined, 1·45@2c. on dock; beams, up to 15 in., 1·65@1·75c.; 20 in., 1·85@2c.; car truck channels, 1·95@2c.; channels, 1·65@2c. on dock; steel hoops, 1·75@1·9c., delivered; links and pins, 1·70@1·80c.; plates, flange, 1·90@2·10c.; firebox, 2·3@2·8c.; flange, 2·10@2·25c.; marine, 2·50@2·75c.; sheared, 1·80c.; shell, 1·60@1·90c.; tank, 1·50@1·60c.; universal mill, 1·50@1·75c.; tees, 1·75@2c., all on dock.

Merchant Steel.—This market continues quiet and without any change of importance from last week. We quote tool steel, $6@$6.50; tire steel, $1.90@$2; toe calk, $2.10@$2.20; Bessemer machinery, $2@$2.10; open hearth machinery, $2.10@$2.20; open hearth carriage spring, $2@$2.10; crucible spring, $2@$2.10.

Old Material.—There is not much doing in old materials, and prices continue low. We hear of a sale of 150 tons of old iron tee rails, standard sections, at $12.50, New York delivery, but offers at $12 have been refused by buyers. A lot of 300 tons of wrought turnings, delivered at mill, at $9, and 300 tons of railroad scrap, also delivered at mill, at $12. Other quotations are nominally as follows: No. 1 wrought scrap at $9.50@$10, and No. 1 machinery cast scrap, $10@$10.50, delivered to vessels at this port; old steel rails, $9@$10; old wrought tubes and pipe, $7.50@$8.50; wrought turnings at $9@$9.25 delivered at mill; old car wheel, $11@$12 New York; cast borings, $6@$7 delivered at mill.

Rail Fastenings.—This market continues lifeless. Quotations are nominally: Fish and angle plates, 1·30@1·50c. at mill; spikes, 1·75@1·90c.; bolts and square nuts, 2·15@2·40c.; hexagonal nuts, 2·30@2·50c., delivered.

Spiegeleisen and Ferromanganese.—We do not hear of any business of consequence doing in this market in either spiegel or ferro. Prices are nominally: Spiegeleisen, 10@12%, $21@$22; 20%, $25@$26. Ferromanganese, $55@$56.

Steel Rails.—A few sales of steel rails are reported this week, but on the whole the rail market continues quiet and without features of especial interest. The price for standard sections is still $24.80 tidewater.

NOTES OF THE WEEK.

The Dayton (Tenn.) Coal and Iron Company has blown out its furnaces and closed its mines because of a strike of from 800 to 1,000 employees, who demanded the reinstatement of three men who had been discharged by the manager.

Notices have been posted at the Spearman, Alice and Mabel furnaces, Sharpsville, Pa., of 10% reduction, commencing February 1st. This will make the wages at $1.05 per day for labor and $1.25 for turnwork. The men will accept the reduction.

Buffalo. Jan. 25.

(Special Report of Rogers, Brown & Co.)

Quite a noticeable improvement in demand has sprung up during the week. Some good sized orders have been placed and inquiry is increasing. The trade generally is waiting, however, for something more definitely indicating that the tide has turned. None of the purchases or inquiries received are of a speculative nature. The orders are given by those who know. Those who don't know are not buying. We quote for cash f. o. b. cars Buffalo: No. 1 X foundry strong coke iron, Lake Superior ore, $13.00; No. 2 X foundry strong coke iron, Lake Superior ore, $12.50; Ohio strong softener No. 1, $13.00; Ohio strong softener No. 2, $12.50; Jackson County silvery No. 1, $16.80@$17.30; Jackson County silvery No. 2, $16.30@$16.80; Lake Superior charcoal, $15.75; Tennessee charcoal, $15.75; Southern soft No. 1, $12.75; Alabama car wheel, $16.50@$17.50; Hanging Rock charcoal, $18.50@$20.

Chicago. Jan. 24.

(From our Special Correspondent)

But little improvement during the week has appeared. Small orders continue to come in. The Northern coke furnaces report some increase of business, and the Southern coke furnaces say that their condition is practically unchanged. Prices are ruling lower than was ever known. There is a disposition to hold to the present low prices and not to go lower. The discrimination in rail and water rates in all branches of the iron and steel industry has driven Chicago out of many markets, and limited its sales to a radius of 300 miles. The Pennsylvania and Ohio mills reach Northwestern points from 25 to 50% cheaper than Chicago in the matter of freights. The rate from Chicago to St. Paul and Duluth is now $4 per ton. From the mills in Ohio and Pennsylvania, 500 miles farther away, it is but $2.25 per ton. The same conditions are true of far Western points, iron and steel products of Eastern mills being sent west 35% below the cost of shipping from Chicago. Chicago has no association to protect her in this matter, but there is some talk of forming one this year, and thereby give her an opening into the surrounding territory.

Pig Iron.—There has been some improvement in the local situation, as stocks have got low everywhere. Orders continue for small lots, but no tendency is shown toward buying in large lots. Consumers are finding an increased demand for their products, and consequently an increase in orders may soon be expected, as the stocks on the average must be very low. Prices continue to be shaded a trifle, but there is a feeling toward holding firm to the present lists, quotations being per gross ton f. o. b. Chicago: Southern coke, foundry, No. 1, $13.00; No. 2, $12.00; No. 3, $11.00. Southern coke, foundry, soft, No. 1, $12.40; No. 2, $11.65; Lake Superior charcoal, $15@$15.50. Lake Superior coke No. 1, $13.50; No. 2, $12.25@$12.50; No. 3, $12.00@$12.25. Lake Superior Bessemer, $14; Lake Superior Scotch, $13.75@$14.25; American Scotch, $15.50@$16. Ohio silveries No. 1, $16.50; No. 2, $16. Ohio strong softeners No. 1, $16; No. 2, $15.75; Tennessee charcoal No. 1, $16.50; No. 2, $16. Standard Southern car wheel, $18.25@$18.75.

Structural Iron and Steel.—No change for the better is apparent in this market. There is nothing of importance in sight, save the erection of a large warehouse and a few buildings. Quotations are as follows: Chicago delivery: Angles, 1·70@1·80c.; tees, 1·95@2·00c.; universal plates, 1·70@1·80c.; sheared plates, 1·70@1·80c.; beams and channels, 1·75@1·85c.

Plates.—The market for plates is still in its inactive state. Prices are: Flange steel, 2·30@2·50c.; best firebox steel, 4·00@4·50c.; tank steel, 1·70@1·80c.; shell steel, 2·15@2·35c.; iron or steel sheets from No. 10 to 14, 2·10@2·25c.

Merchant Steel.—Orders are a trifle more numerous and somewhat larger than for many weeks past, but the general situation is yet far from bright. Prices remain unchanged, which are: Smooth finished machinery steel, $2·10@$2·30; open hearth tire steel, 1·90@2·10c.; ordinary Bessemer bars, 1·55@1·65c.; toe calks, 2·20@2·30c.; ordinary tool steel, 6·50@7·00c.; special brand tool steel, ·12@20c.; crucible spring, 3·50@3·75.

Galvanized Sheet Iron.—Conditions are unchanged, the market being what may be termed flat. Quotations on Juniata are 70, 10 and 5% off for mill shipments. Job quotations are selling at 75% discount.

Black Sheet Iron.—There is a little inquiry springing up from the jobbers' trade. Prices are now as low as they will reach and the reason assigned is that there are far more sellers than buyers. Prices for small lots from stock are, f. o. b. Chicago: No. 24, 2·50c.; No. 26, 2·60c.; No. 27, 2·65c. Same gauges and steel sheets are 3·10@3·20c. less 10c. per 100 lbs. for large lots.

Bar Iron.—Inquirers have been numerous but the few sales that are now being made in this market are in small quantities and just enough for immediate wants. People must soon recognize the fact that their stocks are very light and as prices are nominally low, they ought to buy. For small lots from stock, prices are 1·60@1·70c. for iron and 1·65@1·75c. for soft steel bars. Mill prices are f. o. b. Chicago, 1·30c. for bar iron, and 1·40c. for soft steel bars.

Billets.—The Illinois Steel Company has received an order from one of the big railroad companies for 100,000 tons of steel billets. It is said that manufacture of these will be delayed until the tariff question is settled, but the Joliet mills of the company started up Monday with a force of 1,000 men who are said to be working at greatly reduced wages. Three weeks is the time given for this run and the production will be soft steel. Quotations are $18@$18.50 Joliet. Rods are nominal at $25.

Steel Rails.—The same railroad company that ordered the 100,000 tons of billets from the Illinois Steel Company likewise gave this concern an order for 150,000 tons of steel rails. The orders are said to be from the receivers of the Union Pacific or the Atchison railways. The contract price is not known. Regular prices are $25@$27.

Nails remain in an inactive state, and prospects are that they will for some time to come. Jobbing quantities are, per keg: Cut nails, $1.25@$1.30. Wire nails, $1.25@$1.30.

Scrap.—No inquiry of importance nor no sales worth noticing. Prices are: Railroad, $10.75; No. 1 forge, $10; cast borings, $4.50; wrought turnings, $6.50; axle turnings, $3; leaf steel, $14; mixed steel, $7; tires, $13.00; iron axles, $14.50@$15.00.

Old Rails and Wheels.—Nothing worthy of improvement is noted, although one large company reports an order of 1,000 tons of old car wheels, the price being $9.75 Chicago. Old rails are not in demand, the quotation being for old steel rails $7.50@$10, and old iron rails $12.50.

Philadelphia. Jan. 25.

(From our Special Correspondent.)

Pig Iron.—The week's business has been disappointing, because it did not come up to the expectations growing out of inquiries of last week. Brokers and pig iron makers all agree that the outlook is improving, and their belief is that both founders and mill men will be heavy buyers just as soon as they can muster a little courage. There is no upward movement in prices, and there is a general purpose among consumers to contract for three or four months' supplies before the present depression is over. Every one feels that we are nearing the turning point. Bar mill resumption is not very general yet, and scarcely any forge iron has been bought; but inquiries to-day point to considerable business in this line before long, at about $11@$11.50. No. 1 is taken at $13.50@$14. The resumption of stove works is expected to bring in a good deal of business in No. 2 iron; but there is so much iron ready for immediate delivery that buyers feel altogether indifferent about ordering ahead.

Steel Billets.—Parties using steel billets throughout the East have been warned against letting time slip past, and are told that an upward tendency is very near at hand. Quotations have receded 25c. per ton this week, and in this condition of things large orders cannot be secured. It is intimated that billets can be delivered here, or will be, in large lots, at $17.50; but the average quotations given are $18@18.25.

Merchant Iron.—The bar mills are all ready to resume, and manufactures are canvassing for business. Some orders have been taken at as low as $1.25; city prices, $1.40@$1.50. Four or five miles, it is announced to-day, will resume next Monday.

Skelp Iron.—To-day's rumor is, that a big order for skelp will be placed in eastern Pennsylvania very soon.

Merchant Steel.—The merchant steel makers are in receipt of quite an influx of small orders.

Sheet Iron.—A further improvement has taken place in orders for galvanized. Part of these orders are from storekeepers whose stocks have run out.

Plate Iron.—The mill owners report more inquiry and better prospects for big business. There are several enterprises now under way, for which steel tank will be wanted. All the indications are much better than for several weeks. Quotations have dropped, under sharp competition growing out of inquiries; but until sales are actually closed it will be impossible to give selling prices.

Structural Material.—The latest news from manufacturers is, that railroad requirements are going to show themselves in a short time. In this city only small orders are coming in for buildings under way. Some big orders are talked of in Eastern markets by which our mills expect to profit. The mills are with difficulty kept running.

Steel Rails.—Steel rail orders are backward. Railroad managers talk more hopefully of a good spring repairing season. They admit that a great deal of repairing ought to be pushed through, and besides this, the managements of many corporations have decided upon short extensions and branches, which will probably be pushed along by the opening of spring. All these little requirements will aggregate enough to make a good demand, as soon as confidence is established. In railroad circles, there is a good deal of talk about the more favorable prospects of a moderate revival in railway work this year.

Old Rails.—Negotiations for large quantities of old rails have fallen through, as the sale for them is too restricted at this time to warrant a speculative movement on a large scale, such as was contemplated two or three months ago.

Once, trading in mining shares was a pursuit and vocation with many people; to-day, it is merely an incident—and, we may add, an incident of small importance to anybody. The investing public exhibits no interest in such securities, and to the speculator they offer little for his peculiar talents. Thus, even as a form of gambling the buying of mining stocks has become unpopular.

The official lists of the Consolidated Stock and Petroleum Exchange report the total sales from last Saturday to the close to-day, to have been 4,400 shares. There was no feature whatever. So spiritless has trading become, and so small are the sales that whenever a few hundred shares of some low-priced stock change brokers report "quite a demand" for that particular stock. They cannot report such "demand" this week, because all the sales were small and devoid of any significance.

The Comstocks have been very quiet; Consolidated California & Virginia shows sales of 200 shares, at $2.95@$3. There was a sale of 200 shares of Crown Point, at 55c, and 100 shares of Ophir at 65c. Other sales were as follows: 100 shares of Yellow Jacket, at 85c.; 200 shares of Best & Belcher, at $1.75@$2; 200 shares of Bullion, at 20c.; 200 shares of Chollar, at 50@55c.; 300 shares of Mexican, at $1@$1.20; 200 shares of Potosi, at 60c.; and 100 shares of Union Consolidated, at 80c.

Of the California stocks we note sales of 300 shares of Bodie Consolidated, at 25c. There was a transaction of 500 shares of Brunswick Consolidated, at 5c. The superintendent of the Brunswick Consolidated Gold Mining Company writes as follows from Grass Valley, under date of January 15th: We took down the ledge in the 700 drift to-day. It is 16 in. wide, solid and full of mineral. It shows quite well in free gold and looks as though it ought to last. The stope is showing a ledge from 6 to 8 in. wide of good ore which I am sure will pay $12 to $15 per ton.

Of the Colorado shares the only one to show sales this week was Lacrosse, of which 1,100 shares changed hands at 4c.

We note sales of 200 shares of Horn Silver, at $2.75.

There was a sale of 500 shares of Phoenix of Arizona, at 29c.

NOTES OF THE WEEK.

The following Bodie mining companies report having had balances on hand December 30th, 1893: Bodie Consolidated, $8,805; Mono, $4,600. The Bulwer Consolidated Mining Company had an indebtedness of $3,487, not including the month's expenses.

The Virginia City "Enterprise" says: The total ore product of the Comstock lode during the first three-quarters of 1893 was 46,365 tons. The bullion yield of this ore was $683,162; total cost of extraction, transportation and reduction was $9[illegible]. The returns from the Savage include only the first quarter of 1893 and the Hale & Norcross has made no statement. The yield of the lode was divided as follows among the ore-producing mines:

Belcher.—Ore yield, 2,230 tons; gross bullion, $53,573; cost of extraction, $80,763; cost of reduction, $11,160; total cost, $94,156.

Challenge.—Ore yield, 421 tons; gross bullion product, $4,801; cost of extraction, $6,522; cost of reduction, $2,111; total cost, $9,066.

Confidence.—Ore yield, 268 tons; gross bullion product, $3,173; cost of extraction, $4,453; cost of reduction, $1,299; total cost, $6,065.

Consolidated California & Virginia.—Ore yield, 14,347 tons; gross bullion product, $261,895; cost of extraction, $201,964; cost of reduction, $73,522; total cost, $276,018.

Crown Point.—Ore yield, 1,430 tons; gross bullion product, $12,380; cost of extraction, $35,603; cost of reduction, $6,818; total cost, $42,423.

Imperial.—Ore yield, 151 tons; gross bullion product, $1,634; cost of extraction, $1,323; cost of reduction, $757; total cost, $2,232.

Justice.—Ore yield, 1,209 tons; gross bullion product, $15,029; cost of extraction, $16,822; cost of reduction, $7,680; total cost, $24,482.

Kentuck.—Ore yield, 2,183 tons; gross bullion product, $14,859; cost of extraction, $11,459; cost of reduction, $5,125; total cost, $18,767.

Overman.—Ore yield, 813 tons; gross bullion product, $9,060; cost of extraction, $16,331; cost of reduction, $4,068; total cost, $20,567.

Potosi.—Ore yield, 17,579 tons; gross bullion product, $254,143; cost of extraction, $157,890; cost of reduction, $105,574; total cost, $263,364.

Savage (first quarter ended March 31st).—Ore yield, 4,672 tons; gross bullion product, $73,160; cost of extraction, $50,836; cost of reduction, $28,035; total cost, $78,871.

Yellow Jacket.—Ore yield, 5,821 tons; gross bullion product, $58,548; cost of extraction, $85,333; cost of reduction, $25,516; total cost, $116,328.

When the statement for the last quarter is received it will probably swell the total bullion yield for the year 1893 to $800,000. This is a marked falling off below the product of any year since 1884. Of the total bullion yield last year nearly $300,000 was in gold. It is estimated that of the $550,000,000 in bullion produced from Comstock mines that $250,000,000 was gold. Before the bonanza in the Consolidated California & Virginia mines was developed, the ore extracted from the upper workings of the lode was nearly one-half gold, and in the early history of the Comstock gold largely predominated in the surface workings. The ore extracted from the Consolidated California & Virginia during the past two years has produced nearly 50% of its value in gold bullion.

Boston. Jan. 26.

(From our Special Correspondent.)

There is but little change to note in regard to the market for copper stocks the past week. Transactions continue light and prices barely hold their own with a tendency to lower figures. There is some demand for the high-price, dividend-paying stocks, but the speculative list is dull, with no indications of activity in the near future. The Montana stocks furnished the greater part of the dealings and have been fairly steady. Boston & Montana sold up to $25½, declined to $24¾, and recovered to $25. Butte & Boston declined to $8½, with later sales at $8¾. Calumet & Hecla sold at $297 to $300, closing at $298; only 20 shares changed hands for the week. Quincy sold at $120, same as last week. Tamarack advanced from $155 to $158, closing at the highest price. Osceola was a fraction firmer with small sales at $26¼@$26½.

Franklin sold at $9¾ for 15 shares only, and Kearsarge at $7, same as last sale. There was a little more activity in Centennial, which advanced to $4⅞, declining to $4½ on later sales. It is reported that the new works just begun on the mine is to determine whether the Osceola lode on its propery contains copper in paying quantities or not.

Atlantic declined from $11 to $9¾, with recovery to $10. Tamarack, Jr., declined from $18⅞ to $16 for a small lot.

The mine is reported to be taking out 125 tons copper per month, which will more than pay operating expenses.

Wolverine declined $¼, to $1¾.

San Francisco. Jan. 26.

(From our Special Correspondent.)

San Francisco, Jan. 26 (By telegraph).—The opening quotations to-day are as follows: Best & Belcher, $1.75; Bodie, 15c.; Bulwer, 10c.; Chollar, 45c.; Consolidated California & Virginia, $2.80; Gould & Curry, 65c.; Hale & Norcross, 55c.; Mexican, 95c.; Mono, 10c.; Ophir, $1.70; Savage, 60c.; Sierra Nevada, 70c.; Union Consolidated, 70c.; Yellow Jacket, 70c.

London. Jan. 9.

(From our Special Correspondent.)

The United Mexican Mining Company has decided to acquire a copper property in Mexico in addition to the silver mine. The decreased price of silver has placed the company in a non-paying position and it is hoped that the new step will help to restore the company to a more profitable basis. The terms on which the new property is acquired are most favorable, for no purchase money is to be paid, but the vendors are to receive a royalty on the metal obtained as long as the price of copper is over £30 a ton. The company is to be allowed in the first place, three months to inspect the property, and then if this inspection is satisfactory, a further 12 months is to be allowed for further exploration. If at the end of that time everything is proved to be all right the company is to be given a lease of the property renewable in perpetuity. The year's exploration will probably cost 20,000 Mexican dollars, or £2,500 of English money. The articles of association are being altered, but no more capital is being raised.

The Panulcillo Company (Chile) went into voluntary liquidation two months ago, because under the present circumstances of capital and the state of the copper market, it was impossible to work the property profitably. A new company is being formed called the New Panulcillo Company. This is to have a capital of £50,000, of which £22,000 is to be paid to the old company as purchase price and £28,000 is to be used as working capital. The old company had a capital of £225,000, of which £187,000 was spent in acquiring the property and erecting the smelting works, mining plant, etc., while the amount paid in interest and dividends has totaled £181,675. It is felt that with the present plant and capital—£225,000—it was impossible to carry on the business successfully, and by this reconstruction the capital is reduced and money provided for more economical machinery.

The New Gold Hill Company held its annual meeting on December 28th. The report announced that matters had been stationary for more than a year, owing to the absence of workable ore. Recently Mr. Tamblyn and Mr. Selby had been sent out to examine the mine and suggest a future course. Both recommended the sinking of the Barnhardt and Randolph shafts. This work would necessitate the raising of additional capital. The shareholders, however, thought that nothing could be done at present, for it would be quite impossible to raise additional capital in these times of depression. They therefore decided to adopt a waiting policy and in the meantime to keep the property in good order.

The report of the Emma Company for the year ending June 30th, 1893, is not at all encouraging. Most of the work performed has been done on the new mine, the Grizzly, purchased in 1892, but the manager soon found that the property was not nearly so valuable as represented by the vendors. The directors have therefore decided to shut down during this winter and to let the Grizzly to tributors for the following six months at a royalty of 20% to the company. The manager had urged the directors to purchase other properties, but this would necessitate the raising of additional capital, an attempt at which, in these days of depression, was not to be thought of for a moment.

A statement of the position of the North Mexican Mining and Milling Company has been made by the official receiver in bankruptcy. It will be remembered that this company had a winding up order granted against it in July last. According to the official statement the total liabilities are £22,385. The company was formed in 1888, with a capital of £200,000, to take over the property from another company. The total income of the company has been £25,687 and the expenditure £64,157. The unpaid calls of capital are of no value. The insolvency of the company is attributed to want of capital, to a change in the character of the ore, to the failure of the local bankers and to depreciation in the price of silver. It is not probable that a new company will be formed to buy the property from the official receiver.

The Bear Creek Gold Mining Company, Limited, is the name of a company which is being privately floated in Scotland, or at least an attempt is being made to do so. The property to be worked is in Idaho. All the shares valued at £65,000 are to be given to the vendors and people are asked to subscribe for £16,000 of debentures; rather a novel proposal. The mine has been reported on favorably by Mr. C. F. Lange, of the Atlanta mine, Idaho.

The Kohinoor & Donaldson Consolidated Mining Company is another of the silver properties in Colorado which are in a state of collapse. The ore has proved to contain only $6 to $7 a ton. The expenditure at the mine during the past working year was £4,737, and the amount obtained for the ore was only £1,553. The debt of the company is unpleasant to think of, being made up of £18,000 advanced by the directors and others, £65,000 unpaid interest on debentures and loans, £1,222 due to creditors at the mines, £1,162 due to creditors in London and £4.750 due to the directors for 9½ years' services. There does not seem any hope for this company.

At the meeting of the Sapphire and Ruby Company, of Montana, held on December 18th, a pretty complete exposure of the great scheme was made. This company was floated with great eclat two years ago, with a lord as chairman and Mr. Streeter as gem expert. Nothing was heard of it after the money was raised; no gems were brought to market and no reports were issued. At the meeting held the other day Lord Chelmsford, the chairman, made a clearly clean breast of it, by telling shareholders of the true financial position of the company. It appears that only £50,000 were subscribed by the general public, while underwriters took up the remaining £370,000 of shares. As, however, the vendors had made misrepresentations the underwriters repudiated these shares and refused to guarantee anything. Eventually, Mr, Spratt and the other vendors agreed to accept all the underwriters' shares on payment for the property instead of cash, and Mr. Spratt undertook to provide working capital sufficient to carry on the mine. During 1893 he spent some £2,600 in this way and promised to provide more for the coming year. On the announcement of these facts the meeting resolved itself into a pandemonium, but all motions expressing wrath or dissent were useless, as Mr. Spratt, by accepting the tremendous block of underwriters' shares, had an immensely preponderating vote in his favor. The chairman finally acquiesced in the proposal to nominate a shareholders' committee to investigate the methods of working of the company, but that cannot do any good, and the poor public is fairly in a corner. Mr. Streeter, the gem expert, states that he has as great faith in the property as ever!

DIVIDENDS.

Fulton Coal Company, dividend of 7%, payable January 31st, at the office of the company, in New York City.

Huntingdon & Broad Top Mountain Railroad and Coal Company, dividend of 3½% on the preferred stock and a semi-annual dividend of 2½% on the common stock, payable on and after January 25th, at the office of the company, Walnut and Fourth streets, Philadelphia, Pa.

Sloss Iron and Steel Company, the coupons due on February 1st, 1894, on the first mortgage, 6% bonds of this company, will be paid on and after that date by the Central Trust Company, of New York.

MEETINGS.

Butler Coal Company, at the office of the company, No. 125 South Fifth street, Philadelphia, Pa., January 31st, at 12 o'clock noon.

Huntington & Broad Top Mt. Railroad and Coal Company, at the office of the company, southeast corner of Walnut and Fourth streets, Philadelphia, Pa., February 6th, at 12 o'clock noon.

Maryland Coal Company, annual meeting, at the office of the company, No. 1 Broadway, New York, February 6th, at 11 a. m. The transfer books closed January 20th.

$87,506,463 as compared with $89,484,865 in 1864. The exports of 1864 were due to a pressure resulting from years of war and consequent derangement of commerce and industry, and to a general displacement of gold and silver from circulation by issues of bank and government paper. An outward movement of gold of nearly the same amount, occurring in a time of peace, and apparently in defiance of commercial laws, will make the year 1893 notable for this single item in its financial and commercial experience. It is true the country in 1893 was better able to lose $87,500,000 in gold than it was in 1864. An import and export trade of $1,714,066,000 is good evidence of an economic standing and capacity, immeasurably superior to the situation that prevailed in 1864, when the trade of the country was only about one-fourth as great as in 1893, viz., $475,285,000.

There are other features worthy of mention The imports as well as the exports of silver coin and bullion attained an amount greater than is recorded in any one year in the history of the country. In 1873, which will be remembered as the year of panic and important monetary legislation, the exports of silver reached $39,751,859, a point that had never been attained in previous years, and has never been touched or exceeded in subsequent years until 1893, when the exports were $40,737,319. In 1890 the imports of silver touched the high level of $21,032,984, a movement probably due to anticipated legislation on silver. In 1893 the imports were $23,193,252, thus making a new record in the imports of silver.

While the year 1892 gave the highest figures for exports of merchandise, commercially and financially the year 1893 will be the more notable because of the larger number of achievements, surpassing previous performances in no less than four items. The year 1893 also marked one step down in the relative importance of the American merchant marine in the foreign carrying trade of the country. Low as was the percentage of imports and exports carried in American vessels in 1892, so low as to give foundation to a belief that no lower point could be reached, there was an actual decrease in 1893, and 12·2 per cent. must be recorded as the lowest point this feature of our commercial history has touched.

A number of circumstances combine to make the trade of the year 1893 an interesting study in the general laws governing international commerce. The previous two years were noteworthy through the enormous grain crop gathered in 1891 in the United States, and a partial failure of the similar crop in European countries, thus giving this country a natural command over European markets. The prevalence of good prices for these grain products reacted greatly in favor of the American farmer. An abnormally large cotton crop, coupled with an unusually low price, would seem to have discriminated against the cotton grower in favor of the cotton manufacturer. While a market was found for the increased production of food and raw material, the benefit was directly reaped by the farmer and manufacturer. Exports were largely increased and imports favored, with a result that the export trade figures for 1892 were larger than have ever before been attained in the commercial experience of the country.

The influence of such an exceptional year was not confined to the 12 months of that year. It made itself felt in the succeeding year, but with constantly decreasing effect. An average crop of European cereals narrowed the market for the American product and sent the price of wheat to a point below which it would seem as if continued production could no longer be profitable—80 cents a bushel exported, as compared with $1.03 a bushel in 1892. A large decrease in the cotton crop was not met by a corresponding increase in price. Thus internal influences were by no means so favorable to producer or manufacturer in this or other countries in the last year as in the year previous. The situation was further aggravated by a widespread and in some senses contradictory financial situation.

The chief cause of the movement of gold, the report says, was the withdrawal of large sums of foreign capital invested in this country, the foreigner finding it cheaper to export American securities to this country than to liquidate his indebtedness by an export of commodities or specie. The import movement of American securities the report estimates at from $90,000,000 to $125,000,000, and the extent of the entire movement from June, 1892, to June, 1893, at upward of $200,000,000. Against this return of American securities must be set the amounts purchased on foreign account, whether for speculation or for actual investments, which, for the entire year, is estimated at between $90,000,000 and $100,000,000. Thus the balance of this movement was upward of $100,000,000 on the side of the imports of American securities.

Domestic and Foreign Coins.

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

	Bid.	Asked.
Mexican dollars	$.54	$.55
Peruvian soles and Chilian pesos	.52	.54
Victoria sovereigns	4.87	4.89
Twenty francs	3.87	3.90
Twenty marks	4.74	4.78
Spanish 25 pesetas	4.80	4.85

Other Metals.

Copper.—The market is flat, all things considered. Ten cents for Lake seems to have been shaded, but as the demand is better than it was, although that is not saying much, there seems to be no good reason for cutting prices, unless it is that producers have accumulated stocks. Lake, however, does not occupy the position it once did, as the electrolytic product is gradually supplanting it, first for one perpose and then for another, being able to do so because of the very high standard of quality now reached and the fact that it can be had cheaper than the Michigan product. Electrolytic copper has been sold at 9½ delivered at buyer's works, and it is not certain that even this price has not been shaded.

The foreign market has been declining, little by little, all the week, and, at the close, spot metal shows a loss from last week of 7s. 6d., and futures of about 5s., the respective quotations being £41 7s. 6d. and £41 17s. 6d. with refined and manufactured quoted as below: English tough, £44@£44 5s; best selected, £45 5s.@£45 15s.; strong sheets, £52@£52 5s.; India sheets, £50@£50 5s.; yellow metal, 4⅝d. The demand for fine copper is very limited, plenty of the American copper, bought some months ago, still being in sight, and besides, while producers have remained out of the market as sellers they have accumulated some stocks which will prevent any improvement in the near future.

The exports of copper from the port of New York during the week ending January 26th, as reported by the New York Metal Exchange, were as follows:

Copper:			
Havre—La Champagne	Ingots	25	tons
" "	Bars	287	"
" "	Pigs	53	"
" —State of Georgia	Pigs	45	"
Swansea—Llandaff City	Bars	113	"
" "	Pigs	126	"
Antwerp—Noordland	Ingots	30	"
Rotterdam—Loch Maree	Ingots	50	"
" "	Bars	50	"
" —Amsterdam	Plates	221	"
" "	Ingots	300	"
Liverpool—Aurania	Pigs	53	"
Matte:			
Liverpool—Bovic		107	tons
" —Teutonic		13	"
" —Aurania		70	"

The exports of copper from Baltimore for the week ending January 25th, as reported by our special correspondents, were as follows:

Copper:				
Jan. 18.	Rotterdam—Chicago	2,850 ingots	44,800	lbs.
"	Bristol—Dago	5,999 plates	112,000	"
Jan. 20.	Havre—Endeavour	5,280 bars	448.056	"
"	" "	3,450 ingots	56,000	"
"	" "	2,244 plates	44,828	"

Other metal exports reported were: 1,007 cakes spelter, 56,390 lbs., to Glasgow, per "Indrani."

Tin has been rather inactive because of the unsettled condition of the silver market, which most people wish to see less disturbed before doing anything more than necessary in the baser metal, the price for which has been higher, then lower, according to the range of the silver price, and closes at 19·95 for spot, January and February and at 20 for March and April delivery.

At the close the market abroad is practically unchanged from a week ago, as spot is now quoted £71 10s. and futures a little better, at £72 10s.

Lead is somewhat firmer, not so much because of an improvement in the demand, as because of the lower prices for silver which are likely to result in a curtailment of supplies of raw material, causing lead producers to hesitate about selling. We quote 3·25 to 3·30 New York.

The foreign market is unchanged as we have still to quote soft Spanish lead at £9 6s. 3d. and English at £9 8s. 9d.

St. Louis Lead Market.—The John Wahl Commission Company telegraph us as follows:

The position of pig lead since our last report shows little change, and on the whole values remain practically steady. Consumers in general complain of dull trade, and at the moment do not feel like anticipating their requirements even though given an opportunity to do so. On the other hand, refiners are well sold up and seem to look upon present prices as phenomenally low, and on this account offer their product only in a hand to mouth way. Transactions have been very light; a few cars of argentiferous refined sold at 3·05c., but the general price at the close for both common and refined is 3c. per lb.

Spelter is quiet, generally speaking, but there are a few more orders in the market than there has been at any given time of late. They are all eagerly competed for, however, which prevents an enhancement of values. We quote 3⅜ East St. Louis and 3·62½ New York.

Abroad G. m. b. spelter is quoted £16 2s. 6d. and specials at £16 5s

Quicksilver.—There is nothing new to report of this market. Quotations continue: New York, $32.50; London, £5 17s. 6d.

Aluminum.—The prices, as at present fixed by the manufacturers, are: 65c. per lb. for 96% pure and 75c. per lb. for 98% pure metal. The Neuhausen Company is quoting the metal at $1 per kilo. (45c. per lb.) at the works at Neuhausen in Switzerland.

Magnesium.—The Aluminum und Magnesium Fabrik, Hemelingen, Germany, quotes prices as follows: Ingots and cubes, $6.48 per kilogram; bars, $6.24; powder, $8.64; ribbon and wire, $9.12 per kilo. These prices are at the works and for orders of over 10 kilos.; for less than 10 kilos. 24c. per kilo. must be added for ingots and bars, and 48c. for powder or wire.

Antimony is dull at last week's quotations, 9@9¼c., according to make.

Sodium.—Prices, as quoted by the manufacturers in Germany and England, are 90c.@$1 per lb.

Nickel.—Quotations are 45@55c. per lb., according to grade. A large order from the Greek government was lately placed in France at 88 fr. per kilo., equivalent to 33·8c. per lb.; the metal is for coinage purposes.

CHEMICALS AND MINERALS.

NEW YORK, Friday Evening, Jan. .

Heavy Chemicals.—Some improvement is to be noted in the heavy chemical market this week, a better demand being reported for most of the articles on the list. Considerable business for delivery during the present year, has been done in caustic soda and bleaching powder. Several sales of alkali are reported, but carbonated soda ash has been rather quiet. We quote nominally as follows: Caustic soda, 69%, 3·05@3·20c.; 70%, 2·80@3c.; 74%, 2·82½@3·05c.; 76%, 3@3·10c. Carbonated soda ash, 48%, 1·15@1·25c.; 58%, 1·10@1·20c. Alkali, 48%, $1.10@$1.20; 58%, $1.05@$1.15, according to package. Sal soda, English, 1@1·05c.; American, 90@92½c. Bleaching powder, 2·25@2·50.

Acids.—There is nothing new to report of the acid market. A fair amount of business for delivery this year and prices, although not any higher than last week, are rather firmer. We quote: Acids, per 100 lbs. in New York and vicinity, in lots of 50 carboys or more: Acetic, in barrels, $1.62½@$1.75; muriatic, 18°, 80c.@$1; 20°, 90c.@$1.10; 22°, $1@$1.25; nitric, 40°, $4; 42°, $4.50@$4.75; sulphuric, 75c.@$1. Mixed acids according to mixture, oxalic, $6.30@$7. Blue vitriol is quoted all the way from $3.37½ to $3.75; glycerine for nitro-glycerine, 11½@12½c., according to quality and quantity.

Brimstone.—There is nothing new to report of the market for Silician brimstone. Quotations for best unmixed seconds are: On the spot, $20; shipments, $17.50. Thirds are 75c.@$1 less.

Fertilizing Chemicals.—There is no change whatever in the fertilizer market from last week. The same conditions prevail. The market continues quiet with prices unchanged. Our quotations this week are: Sulphate of ammonia, gas liquor, $3.45@$3.50; bone, $3.30@$3.35; dried blood, $2.55@$2.60 per unit for high grade and $2.30@$2.40 for low grade. Azotine, $2.50@$2.60. Concentrated phosphate (30% available phosphoric acid), 75c. per unit. Acid phosphate, 13% to 15%, av. P_2O_5, 60c. per unit at seller's works in bulk. Dissolved boneblack, 17% to 18% P_2O_5, 92½c. per unit. Acidulated fish scrap, $15@$16, and dried scrap nominally $25 f. o. b. fish factory; wet scrap, $15 f. o. b. fish factory. Tankage, high grade, $25.50@$26.50; low grade, $22@$22.50. Bone tankage, $23@$24; bone meal, $24@$25.50.

In lots of 50 tons on contracts closed prior to January 31st, we quote: Double manure salts, 48-53% (basis 48%); New York and Boston, $1.10; Philadelphia, $1.12½; Charleston, Savannah, Wilmington, N. C., and New Orleans, $1.15. High grade manure salts, 90-95% and 96-99% (basis 90%) respectively: New York and Boston, $2.05@$2.09; Philadelphia, $2.07½@$2.11½; Charleston, Savannah, Wilmington, N. C., and New Orleans, $2.10@$2.14.

Phosphates.—Quotations are as follows: Land rock, 60% bone phosphate of lime, $5 f. o. b. vessel Charleston; 62%, $5.25; river rock, 58%, $6; all kiln-dried.

Muriate of Potash.—In lots of 50 tons, prices on contracts closed prior to January 31st are as follows for muriate of potash, 80-85% and minimum 95% (basis 80%), respectively: New York and Boston, $1.75@$1.78; Philadelphia, $1.77½@$1.80½; Charleston, Savannah, Wilmington, N. C., and New Orleans, $1.80@$1.83.

Kainit.—Prices for kainit (minimum, 23%) in cargo lots for 1894 delivery contracted prior to January 31st are as follows for invoice and actual weights respectively: New York, Boston and Philadelphia, $8.75@$9; Charleston, Savannah, Wilmington, N. C., and New Orleans, $9.50@$9.75. For sylvinit, 27-35%, prices are as follows per per cent. per gross ton, invoice weights: New York, Boston and Philadelphia, 36½c.; Charleston, Savannah, Wilmington, N. C., and New Orleans, 40c. Actual weights, 1c. more per cent.

Nitrate of Soda.—Owing to light stocks on the spote nitrate continues firm and high. We quote: Spot, $1.97½@$2.

Cibolo Creek Mining and Milling Company, at the office of the company, Nevada Block, No. 309 Montgomery Street, San Francisco, Cal., February 5th, at 12 o'clock noon.

MINING STOCKS.

NEW YORK, Friday Evening, Jan. 26.

[For complete quotations of shares listed in New York, Boston, San Francisco, Aspen, Colo.; Baltimore, Pittsburg, St. Louis, London and Paris, see pages 91 and 93.]

It is almost making use of an euphemistic expression to speak of the mining stock market in New York to-day, as though there was such a thing.

NEW YORK MINING STOCK QUOTATIONS.

DIVIDEND-PAYING MINES.

NAME AND LOCATION OF COMPANY.	Jan. 20.		Jan. 22.		Jan. 23.		Jan. 24		Jan. 25.		Jan. 26.		SALES.
	H.	L.	H.	L.	H.	L.	H.	L.	H.	L.	H.	L.	
Belcher, Nev.													
Belle Isle, Nev.													
Bodie Cons., Cal.									.23				300
Bulwer, Cal.													
Chrysolite, Colo.													
Comstock T. bonds, Nev.													
" scrip., Nev.													
Cons. Cal. & Va., Nev.							2.95				3 00		200
Crown Point, Nev.											53		200
Deadwood, Dak.													
Eureka Cons., Nev.													
Father de Smet, Dak.													
Gould & Curry, Nev.													
Hale & Norcross, Nev.													
Homestake, Dak.													
Horn-Silver, Utah.							2.75				2.75		200
Kentuck, Nev.													
Leadville Cons., Colo.													
Little Chief, Colo.													
Moulton, Mont.													
Mt. Diablo, Nev.													
Navajo, Nev.													
N. Belle Isle, Nev.													
Ontario, Utah.													
Ophir, Nev.					.65								100
Plymouth, Cal.													
Quicksilver, Pref., Cal.													
" Com., Cal.													
Robinson, Colo.													
Sierra Nevada, Nev.													
Silver King, Ariz.													
Standard Cons., Cal.													
Yellow Jacket, Nev.			85										100

NON-DIVIDEND-PAYING MINES.

NAME AND LOCATION OF COMPANY.	Jan. 20.		Jan. 22.		Jan. 23.		Jan. 24.		Jan. 25.		Jan. 26.		SALES
	H.	L.	H.	L.	H.	L.	H.	L.	H.	L.	H.	L.	
Alpha, Nev.													
Alta, Nev													
Andes, Cal.													
Barcelona, Nev.													
Belmont, Cal.													
Best & Belcher, Nev.					1.75				2 00				300
Brunswick, Cal.									.03				500
Bullion, Nev.										.20			200
Challar, Nev.										.50		.55	200
Comstock T., Nev.													
Con. Imperial, Nev.													
El Cristo, Rep. of Col.													
Exchequer, Nev.													
Independence, Nev.													
Julia, Nev.													
Justice, Nev													
King & Pembroke.													
Lacrosse, Colo.							.04		.04				100
Mexican, Nev					1.20				1.00				300
Middle Bar, Cal.													
Minnesota Iron													
Nevada Queen, Nev.													
N. Standard, Cal.													
N. Commonwealth, Nev													
Overman, Nev.													
Oriental & Miller, Nev.													
Phœnix of Ariz.					.29								500
Potosi, Nev.										.60			200
Scorpion, Nev.													
Seg. Belcher, Nev.													
Union Cons., Nev.													
Utah, Nev.												.80	100

*Ex-dividend. †Dealt in at New York Stock Ex. Unlisted securities. ‡Assessment paid. §Assessment unpaid. Dividend shares sold, 1,100. Non-dividend shares sold, 3,300. Total shares sold, 4,400.

BOSTON MINING STOCK QUOTATIONS.

NAME OF COMPANY.	Jan. 19.		Jan. 20.		Jan 22.		Jan. 23.		Jan. 24.		Jan. 25.		SALES.
Atlantic, Mich.									10.00	9.75			100
Breece, Colo													
Bost. & Mont., Mont.	25.25	24.50	25.75	25.00	25.25	24.75	25.00	24.75	25.00	24.75			2,120
Bonanza Development													
Calumet & Hecla, Mich.			238		300		297		300		298		30
Central, Mich.													
Coeur d'Alene, Id.													
Franklin, Mich.	9.75												15
Honorine, Utah.													
Horn Silver, Utah.													
Kearsarge, Mich.	7.00												50
Lake Superior, Iron.													
Minnesota Iron, Minn.													
Napa, Cal.													
Osceola, Mich.	27.50		28.25	26.00	26.25		26 50	26 25					277
Quincy, Mich.	120		120		120				120		120		84
Ridge, Mich.													
Silver King, Ariz.													
Tamarack, Mich.	158		157		158						158		35
Tecumseh, Mich.													

Dividend shares sold, 2,701. Non-dividend shares sold, 1,852.

NAME OF COMPANY.	Jan. 19.		Jan. 20.		Jan. 22.		Jan. 23.		Jan. 24.		Jan. 25.		SALES.
Allouez, Mich.													
Arnold, Mich.													
Aztec, Mich.													
Brunswick, Cal.													
Butte & Boston, Mont.	8.50								9.00		8.75	8.50	852
Centennial, Mich.	4 75	4.25	4.63	4.50					4.88	4.50			785
Colchis, N. Mex.											4 50		
Copper Falls, Mich.													
Hanover, Mich.													
Humboldt, Mich.													
Huron, Mich.													
Mesnard, Mich.													
National, Mich.													
Native, Mich.													
Oriental & M., Nev.													
Phœnix, Ariz.													
Pontiac, Mich.													
Tamarack, Jr., Mich.											18.00		5
Washington, Mich.													
Wolverine, Mich.	2.50									2.00		1 75	210

Dividend shares sold, 2,701. Non-dividend shares sold, 1,852. Total shares sold, 4,553.

CURRENT PRICES.

These quotations are for wholesale lots in New York unless otherwise specified.

Acid—Acetic, chem. pure .17@.19
Commercial, in bbls. and cbys. .01¾@.02
Carbonic, liquefied, ℔ lb. .18@.25
Chromic, chem. pure, ℔ lb. 1.00
for batteries .40
Hydrobromic, dilute, U. S. P. .25@.30
Hydrocyanic, U. S. P. .45@.50
Hydrofluoric .20@.30
Alcohol—95%, ℔ gall. $2.30@$2.40
Absolute $3.80
Ammoniated $2.80
Alum—Lump, ℔ cwt. $1.75@$1.85
Ground, ℔ cwt. $1.85@$1.90
Powdered, ℔ lb. .04½@.05
Lump ℔ ton, Liverpool £5
Aluminum Chloride—Pure, ℔ lb. $1.25
Amalgamating solution, ℔ lb. .60
Sulphate, ℔ cwt $1.90@$2.50
Ammonia—Sal., in bbl. lots, ℔ lb. .07½@.08
Carbonate, ℔ lb., English and German, .07½@.08
Muriate, white, in bbls., ℔ lb. .08½
Aqua Ammonia—(in cbys) 3° ℔ lb. .03@.04
20°, ℔ lb. .04@.05
26°, ℔ lb. .04¾@.05
Antimony—Oxymur, ℔ lb. .04@.06
Regulus, ℔ lb. .10@.11½
Argols—Red, powdered, ℔ lb. .15
Arsenic—White, powdered ℔ lb. .03@.03¾
Red ℔ lb. .065@.07
Yellow .08@.09
White at Plymouth, ℔ ton £12 2 6
Asbestos—Canadian, ℔ ton $50@$300
Italian, ℔ ton, c. i. f. L'pool £18@£60
Ashes—Pot, 1st sorts, ℔ lb. 4.75@5
Pearl .05¾@.06¼
Asphaltum—
Prime Cuban, ℔ lb. .04@.05
Hard Cuban, ℔ ton $28.00@$30.00
Trinidad, refined, ℔ ton $30.00@$35.00
Egyptian and Syrian, ℔ lb. .05@.07½
Californian, at mine, ℔ ton $12.00@$26.00
at San Francisco, ℔ ton, $15.00@$29.00
Barium—Carbonate, pure, ℔ lb. .45
Carbonate, commercial, ℔ lb. .05@.10
Chlorate, crystal, ℔ lb. .75
Chloride, commercial, ℔ lb. .05@.10
pure, ℔ lb. .16
Iodide, ℔ oz. .40
Nitrate, ℔ lb. .06½@.07
Sulph., Am. prime white, ℔ ton $17.50@$19
Sulph., foreign, floated, ℔ ton $21@$24
Sulph., off color, ℔ ton $11.50@$15.00
Carb., lump, f. o. b. L'pool, ℔ ton £3
No. 1, Casks, Runcorn, " " £4 10 0
No. 2, bags, Runcorn, " " £3 15 0
Bauxite—℔ ton $10.00
Bichromate of Potash—Scotch, ℔ lb. .11@.12
American, ℔ lb. .11@.12
Bichromate of Soda—℔ lb. .09½@.10
Borax—Refined, ℔ lb., in car lots .08@.09
San Francisco .08@.08¼
Concentrated, in car lots .07½@.08
Refined, Liverpool ℔ ton £2
Bromine—℔ lb. .25@.35
Cadmium Minion—℔ lb. $2.00
Cadmium Iodide—℔ lb. $5.50
Chalk—℔ ton $1.50@$2.25
Precipitated, ℔ lb. .04@.06
China Clay—English, ℔ ton $13@$18.00
Domestic, ℔ ton $9@$11
Chlorine Water—℔ lb. .10
Chrome Yellow—℔ lb. .10@.25
Chrome Iron Ore—℔ ton, San Francisco $10.00
Chromalum—Pure, ℔ lb. .35@.40
Commercial, ℔ lb. .02½
Cobalt—Oxide, ℔ lb. $1.60@$1.70
Copper—Sulph. English Wks. ton £20@£21
Vitriol (blue), ordinary, ℔ lb. .03¼@.03¾
" extra .04½
Nitrate, ℔ lb. .40
Copperas—Common, ℔ 100 lbs. .85@.95
Best, ℔ 100 lbs. $1.35@$1.50
Liverpool, ℔ ton, in casks £2@£2 10s.
Corundum—Powdered, ℔ lb. .04½@.09
Flour, ℔ lb. .03
Cryolite—Pow., ℔ lb., bbl. lots .07@.08
Emery—Grain, ℔ lb. (℔ kg.) .04½@.05
Flour, ℔ lb. .02½@.04
Epsom Salt—℔ lb. .01@.01½
Feldspar—Ground, ℔ ton .$6.00@$10.00
Crude $2.00@$3.00
Fluorspar—Powdrd, No. 1, ℔ ton $20@$30
Lump, at mine $6@$8
French Chalk—
Fuller's Earth—Lump, ℔ ton, $16@$20
Glauber's Salt—in bbls., ℔ lb. .01@.01¼
Glass—Ground, ℔ lb .09@.10
Gold—Chloride, pure, crystals, ℔ oz. $12.00
pure, 15 gr., c. v., ℔ doz. $5.40
liquid, 15 gr., g. s. v., ℔ doz. $5.50
Chloride and sodium, ℔ oz. $6.00
15 gr., c. v., ℔ doz. $2.75
Oxide, ℔ oz. $27.25
Gypsum—Calcined, ℔ bbl. $1.25@$1.50
Land Plaster
Iodine—Resublimed, ℔ oz. .30@.33
Iridium—Oxide ℔ lb. $90
Iron—Nitrate, 40°, ℔ lb. .01@.01½
47°, ℔ lb. .02@.02½
Kaolin—*See China Clay.*
Kieserite—℔ ton $9@$10
Lead—Red, American, ℔ lb. .06¾@.07½
White, American, in oil, ℔ lb. .06½@.07½
White, English, ℔ lb., in oil .08¼@.08¾
Acetate, or sugar of, white .06@.06½
Granulated
Nitrate .09@.12
Lime Acetate—Am. Brown .90@.95
" Gray $1.75@$1.87½
Litharge—Powdered, ℔ lb. .05½@.07¼
English flake, ℔ lb. .06@.09½
Magnesite—Crude, ℔ ton of 1,015 kilos $14.75
Calcined, ℔ ton of 2,240 lbs. $22.00
Brick, ℔ ton of 2,240 lbs. $47.50
Manganese—Ore, per unit .23@.28
Oxide, ground, ℔ lb. .02¼@.06¼
Mercuric Chloride—(*Corrosive Sublimate*) ℔ lb. .62@.64
Powdered ℔ lb.
Marble Dust—℔ bbl $1.25@$1.50
Metallic Paint—Brown ℔ ton. $20@$25
Red $20@$25
Mica—In sheets according to size.
1st quality, ℔ lb. .25@$6.00
Mineral Wool—Ordinary slag .01½
Ordinary rock .02½
Ground, ℔ ton
Naphtha—Black
Nitre Cake—℔ ton $10.00
Ochre—Rochelle, ℔ lb. .01¼@$01¾
Washed Nat Oxf'rd, Lump, ℔ lb. .06½@.06¾
Washed Nat Oxf'rd, Powder, ℔ lb. .07@.07½
Golden, ℔ lb. .03@.05
Domestic, ℔ ton $12@$20
Oils, Mineral—
Cylinder, light filtered, ℔ gal. .14@.16
Dark filtered, ℔ gal. .10@.13
Extra cold test, ℔ gal. .26@.24
Dark steam refined, ℔ gal. .07½@.12
Phosphorus—℔ lb. .50@.55
Precip., red, ℔ lb. .80@.85
white, ℔ lb. .85@.90
Platinic Chloride—Dry, ℔ oz. $7
Plumbago—Ceylon, ℔ lb. .04@.05
American, ℔ lb. .05@ 07
Potassium—Cyanide, ℔ lb., C. P. 65%, ℔ lb. .52
mining .28@.3
Bromide, domestic, ℔ lb. .28@.32
Chlorate, English, ℔ lb. .18@.18¼
Chlorate, powdered, English, ℔ lb. .18½@.19
Carbonate, ℔ lb., by casks, 82% .04½@.05
Caustic, ℔ lb., pure slick .05½@.06
Iodide, ℔ lb. $2.58@$2.80
Nitrate, refined, ℔ lb. .06@.08
Bichromate, ℔ lb. .10@.11½
Yellow Prussiate, ℔ lb. .21½@.22½
Red Prussiate, ℔ lb. .39@.42
Pumice Stone—Select lumps, ℔ lb. .03½@.15
Original cks., ℔ lb. .01½@.02
Powdered, pure, ℔ lb. .01¼@.01¾
Pyrites—Non-cupreous, p. units .10@.11
Quartz—Ground, ℔ ton $6.00@$10.00
Rotten Stone, Powdered, ℔ lb. .03¼@.03¾
Lump, ℔ lb. .06@.07
Original cks, ℔ lb. .04½@.05½
Rubbing stone, ℔ lb. .03¼@.04
Sal Ammoniac—lump, in bbls., ℔ lb. .80½
Salt—Liverpool, ground, ℔ sack .70
Domestic, fine, ℔ ton $7@$7.50
Common, fine, ℔ ton $4.50@$5
Turk's Island, ℔ bush .26@.28
Salt Cake—℔ ton $10.00@$15.00
Saltpeter—Crude, ℔ lb. .03¼@.04
Soapstone—Ground, ℔ ton $8@$
Block and slab according to size.
Sodium—Prussiate, ℔ lb. .22@.24
Phosphate, ℔ lb. .04@.05
Stannate, ℔ lb. .06@.12
Tungstate, ℔ lb. .30@.35
Hyposulphite, ℔ cwt., in casks $1.70@$1.80
Strontium—Nitrate, ℔ lb. .05½@.06
Sulphur—Roll, ℔ lb. .01¼@.02½
Flour, ℔ lb. .01½@.02
Sylvinit, 27@35%, S.O.P., per unit, 3.75
Talc—Ground French, ℔ lb. .01¼@.01¾
American No. 1, ℔ lb. .01¼@.01¾
American No 2 .006
Terra Alba—French, ℔ lb. .65@.80
English, ℔ lb. .65@.80
American, No. 1, ℔ lb. .60@.80
American, No. 2, ℔ lb. .40@.50
Tin—Crystals, in kegs or bbls. .14@.15
feathered or flossed. .16
Muriate, single .07@.12
Double or strong, 54° B. .10@.15
Oxymur, or nitro .19
Vermilion—Imp. English, ℔ lb. .80
Am. quicksilver, bulk .57 @.59
Am. quicksilver, bags .58 @ .60
Chinese .85 @$1.00
Trieste .90 @ .95
American .11¼@ .12
Zinc White—Am., Dry, ℔ lb. .04½@ .06
Antwerp, Red Seal, ℔ lb. .06¼@.07
Paris, Red Seal, ℔ lb. .07½@.08
Muriate solution .06
Sulphate crystals, in bbls., ℔ lb. .03@.03½

THE RARER METALS.

The prices given below are the prices in Germany, and are per gramme except where otherwise stated:

Arsenic (metallic), per kilo $0.25
Barium (ex amalgam) 2.12
" (per electrol.) 7.75
Bismuth (metallic), per kilo 6.25
Cadmium (metallic), " 2.75
Calcium (per electrol.) 5.25
Cerium (pulv.) 2.25
" (fusum in globulis) 5.50
Chromium (fus.) .40
" (cryst.) .75
Cobalt (metallic), per kilo 10.00
" (pure), per kilo 40.00
Didymium (pulv.) 5.50
Erbium-Yttrium (oxydat.) 10.00
Gallium (cryst.) 100.00
Germanium (fus.) 37.50
" (pulv.) 35.00
Glucinum (pulv.) 7.00
" (cryst) 10.75
Indium 5.00
Iridium (fusum) 1.25
Lanthanum (pulv.) 6.00
" (per electrol.) 11.00
Lithium (in glob.) 5.00
" (wire) 6.25
Manganese (fusum) .25
Molybdenum (pulv.) .12½
Niobium (pulv.) 4.25
Osmium 1.00
Paliadium (wire) 1.06
" (pulv.) 1.00
Potassium (metal), per kilo 27.50
Rhodium 1.63
Ruthenium 2.50
Rubidium 6.25
Selenium (cryst.) .50
" (precipitates) .62½
Strontium (per electrol.) 7.25
" (ex amalgam) 3.25
Tantalum 4.75
Tellurium (fusum) .50
" (precipitates) .22½
Thallium .03¾
Titanium 1.13
Tungsten (pure) .05
Uranium 1.00
Vanadium 4.00

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 & amount of last.		
1	Adams, s. l. c.	Colo.	$1,500,000	150,000	$10	*				$687,500	Jan.	1892	.05
2	Alaska-Treadwell, g.	Al'ska	5,000,000	200,000	25	*				1,900,000	Oct.	1893	.37½
3	Alice, s.	Mont.	10,000,000	400,000	25	*				975,000	Nov.	1891	.06¼
4	Amador, g.	Cal.	1,250,000	250,000	5	*				31,250	Aug.	1890	.12½
5	American, g.	Colo.	3,000,000	300,000	10	*				225,000	Mar.	1892	.05
6	American Belle, s.g.c	Colo.	2,000,000	400,000	5	*				50,000	April	1891	.12½
7	Americ'n & Nettie, g.s	Colo.		300,000						175,000	Mar.	1892	.05
8	Atlantic, c.	Mich.	1,000,000	40,000	25	280,000	April	1875	$1.00	700,000	Feb.	1891	.00
9	Argyle, g.	Colo.	1,000,000	1,000,000	1	*				20,000	Mar.	1892	.01
10	Aspen Mg. & S., s. l.	Colo.	2,000,000	200,000	10	*				860,000	Dec.	1893	.10
11	Aurora, i.	Mich.	2,500,000	100,000	25					650,000	Feb.	1893	2.00
12	Badger, s	Ont.	250,000	50,000	5					37,500	Mar.	1890	.25
13	Bald Butte	Mont.	250,000	250,000	1	*				120,000	Dec.	1893	.02
14	Bates Hunter, s. g.	Colo.	1,000,000	1,000,000	1					67,500	Dec.	1891	.00¾
15	Belle Isle, s.	Nev.	10,000,000	100,000	100	230,271	Sept	1893	.10	300,000	Dec.	1879	.25
16	Belcher, s. g.	Nev.	10,400,000	104,000	100	3,262,930	Nov.	1893	.20	15,397,000	April	1876	1.00
17	Bellevue, Idaho, s. l.	Idaho	1,250,000	125,000	10	120,000	Dec.	1889	.25	200,000	Jan.	1890	.10
18	Best Friend	Colo.	1,000,000	1,000,000	1	*				90,000	Feb.	1892	.01
19	Bi-Metallic, s. g.	Mont.	5,000,000	200,000	25					1,630,000	June	1893	.10
20	Bodie Con., g. i.	Cal.	10,000,000	100,000	100	714,990	July	1893	.15	1,602,572	April	1885	.50
21	Boston & Mont., g.	Mont.	2,500,000	250,000	10	*				520,000	June	1886	.15
22	Boston & Mont., c. s.	Mont.	3,125,000	125,000	25	*				2,075,000	Nov.	1891	1.00
23	Brotherton, i.	Mich.	2,000,000	80,000	25	*				120,000	Mar.	1893	.50
24	Bulwer, g.	Cal.	10,000,000	100,000	10	155,000	July	1893	.15	190,000	Oct.	1892	.05⅛
25	Bunker Hill & S., s. l.	Idaho	3,000,000	300,000	10	*				150,000	Oct.	1888	.06
26	Caledonia, g.	Dak.	10,000,000	100,000	100	505,000	May	1885	.15	192,000	Oct.	1890	.08½
27	Calliope, s.	Colo.	1,000,000	1,000,000						140,000	Jan.	1891	.00
28	Calumet & Hecla c	Mich.	2,500,000	100,000	25	1,200,000				39,850,000	Sept.	1893	5.00
29	Centen'l-Eureka, s.l.	Utah	1,500,000	30,000	50	30,000	Mar.	1888	1.00	765,000	Dec.	1893	1.00
30	Central, c.	Mich.	500,000	20,000	25	100,000	Oct.	1861	.65	1,970,000	Feb.	1891	1.00
31	Champion, g	Cal.	340,000	34,000	10					139,700	July	1893	.10
32	Chrysolite, s. l.	Colo.	10,000,000	200,000	50	*				1,650,000	Dec.	1884	.25
33	Clay County, g.	Colo.	200,000	200,000	1	*				56,000	Nov.	1891	.02
34	Clinton Con, g	Cal.	5,000,000	100,000	5					80,000	Nov.	1891	.10
35	Cœur D'Alene, s. l.	Idaho	5,000,000	500,000	10					340,000	June	1893	.03
36	Colorado Central, s.l.	Colo.	2,750,000	275,000	10	*				502,661	April	1893	.05
37	Commonwealth, s.	Nev.	10,000,000	100,000	100	200,000	Nov.	1893	.10	20,000	Nov.	1890	.20
38	Confidence, s. l.	Nev.	2,496,000	24,960	100	1,589,550	Aug.	1892	.50	199,680	April	1889	1.00
39	‡Cons. Cal. & Va., s.g	Nev.	21,600,000	216,000	100	216,000	Dec.	1892	.50	3,682,800	Aug.	1891	.50
40	Contention, s.	Ariz.	12,500,000	250,000	50					2,637,500	Aug.	1892	.20
41	Cook's Peak, s.	N. M.	2,000,000	200,000	10					119,532	Nov.	1892	.05
42	‖Cop. Queen Con., c.	Ariz.	2,000,000	200,000	10					1,560,000	Nov.	1893	.25
43	Coptis	Nev.	10,000,000	100,000	100	*				67,000	July	1892	.12
44	Cortez, s.	Nev.	1,500,000	300,000	05	*				687,000	Mar.	1892	.50
45	Crescent, s. l. g.	Utah	15,000,000	600,000	25	60,000	Oct	1892	.10	238,000	Oct.	1888	.03
46	Crown Point, g. s.	Nev.	10,000,000	100,000	100	2,750,000	June	1893	.25	11,898,000	Jan.	1875	.00
47	Daly, s. l.	Utah	3,000,000	150,000	20					2,850,000	May	1893	.25
48	†Deadwood-Terra, g	Dak.	5,000,000	200,000	25					1,140,000	Sept.	1892	.05
49	DeLamar, g s	Idaho	2,000,000	400,000	25					1,050,000	Oct.	1893	.25
50	Derbee B. Grav., g	Cal.	10,000,000	100,000	100	100,000	Sept.	1892	.10	60,000	Aug.	[illegible]	.10
51	Dexter, g. s	Nev.	1,000,000	100,000	10					105,000	July	1893	.25
52	Elkhorn, s.	Mont.	1,000,000	200,000	5	*				1,225,000	Sept.	1893	1.00
53	Enterprise, s.	Colo.	2,500,000	500,000	5	*				850,000	June	1893	.25
54	Eureka Con., s. l. g.	Nev.	1,000,000	50,000	100	550,000	June	1885	.50	5,112,500	Jan	1892	.25
55	Evening Star, s. l.	Colo.	500,000	50,000	10	*				1,437,500	Dec.	1889	.25
56	Father de Smet, g.	Dak.	10,000,000	100,000	100	200,000	Nov.	1878	1.00	1,125,000	Dec.	1885	.20
57	Franklin, c.	Mich.	1,000,000	40,000	25	220,000	June	1871		1,240,000	Dec.	1893	2.00
58	Glengarry	Mont.	1,000,000	100,000	10					10,000	June	1891	.10
59	Golden Reward	S.Dak	1,250,000	250,000	5					85,000	April	1893	.02
60	Gould & Curry, s. g.	Nev.	10,800,000	108,000	100	4,688,400	Oct.	1893	.10	3,826,800	Oct.	1870	10.00
61	Grand Prize, s.	Nev.	10,000,000	100,000	100	785,000	Jan.	1890	.20	495,000	Mar.	1884	.25
62	Granite Mountain, s.	Mont.	10,000,000	400,000	25					12,120,000	July	1892	.20
63	Great Western, l. q.	Cal.	5,000,000	50,000	100					388,366	Nov.	1893	.25
64	Hale & Norcross, g. s.	Nev.	11,200,000	112,000	100	5,646,800	June	1893	.50	1,822,000	Aug.	1888	.50
65	Hecla Con., s. g. l. c.	Mont.	1,500,000	30,000	50					2,055,000	Sept.	1893	.50
66	Hel'a Mg. & Red, s.l.g.	Mont.	3,315,000	663,000	5	*				197,970	July	1886	.06
67	Helena & Frisco, s.l.	Idaho	2,500,000	500,000	5					170,000	July	1891	.02
68	Helena & Victor	Mont.	1,000,000	200,000	5					80,000	May	1892	.05
69	¶Holmes, s.	Nev.	10,000,000	100,000	100	345,000	Mar.	1890	.25	75,000	Apr.	1892	.25
70	Homestake, g.	Dak.	12,500,000	125,000	100	200,000	July	1878	1.00	5,068,750	Nov.	1893	.10
71	Hope, s.	Mont.	1,000,000	100,000	10	*				508,252	Oct.	1893	.25
72	Horn-Silver, s. l.	Utah	10,000,000	400,000	25	*				4,880,000	Dec.	1893	.12½
73	Idaho, g.	Cal.	310,000	3,100	100					5,489,000	Sept.	1893	2.50
74	Illinois, s.	N. M.	100,000	100,000	1	*				45,000	April	1889	.20
75	Iron Mountain, s.	Mont.	5,000,000	500,000	10	*				245,000	July	1893	.03
76	Iron-Silver, s. l.	Colo.	10,000,000	500,000	20	*				2,500,000	April	1889	.20
77	Jack Rabbit, g.	Cal.	10,000,000	100,000	100	100,000	Sept.	1892	.10	260,000	Aug.	1891	.10
78	Jackson, g. s.	Nev.	5,000,000	50,000	100	247,500	Mar.	1893	.20	60,000	Jan.	1891	.10
79	Kearsarge, c.	Mich.	1,000,000	40,000	25	190,000	Oct.	1887	1.00	80,000	Jan.	1890	2.00
80	Kennedy	Cal.	10,000,000	100,000	100					1,072,000	Dec.	1893	.45
81	Kentuck, s. g.	Nev.	3,000,000	30,000	100	454,180	Oct.	1891	.15	1,350,000	Dec.	1886	.10
82	Leadville Con., s. l.	Colo.	4,000,000	400,000	10	*				516,000	Feb.	1892	.03
83	Lexington, g. s.	Mont.	4,000,000	40,000	100	*				652,200	July	1893	.90
84	Little Chief, s. l.	Colo.	10,000,000	200,000	50	*				820,000	Dec.	1890	.05
85	Maid of Erin	Colo.	3,000,000	600,000	5					708,900	April	1893	.25
86	Mammoth, s. l. c.	Utah	10,000,000	400,000	50	110,000		1882	.25	1,040,000	Dec.	1891	.10
87	Maxfield	Utah	3,000,000	300,000	10					117,000	April	1892	.03
88	Mayflower, D. gravel	Cal.	1,200,000	60,000	20					129,000	Nov.	1893	.10
89	May Mazeppa, s. l.	Colo.	1,000,000	100,000	1					205,000	Oct.	1891	.03¾
90	Minas Prietas, g. s.	Mex.	1,000,000	100,000	10	*				350,000	Dec.	1890	.50
91	Minnesota, c.	Mich.	1,000,000	40,000	25	420,000	April	1886	1.00	1,820,000	Mar	1876	
92	Minnesota Iron, i.	Minn.	16,500,000	165,000	100					2,745,000	April	1893	1.50
93	Mollie Gibson, s.	Colo.	5,000,000	1,000,000	5	*				3,930,000	Dec.	1893	.05
94	Monitor, g.	S.Dak	2,500,000	250,000	10					45,000	Oct.	1890	.03
95	Mono, g.	Cal.	5,000,000	50,000	100	197,500	Feb.	1893	.25	12,500	Mar	1886	.25
96	Montana, Lt., g. s.	Mont.	3,300,000	660,000	5	*				9,619,075	June	1891	.12½
97	Morning Star, s. l.	Colo.	1,000,000	100,000	10					1,025,000	Dec.	1891	.25
98	Morning Star Drift, g	Cal.	240,000	2,400	100					140,800	April	1893	3.00
99	Moulton, s. g.	Mont.	2,000,000	400,000	5	*				410,000	Nov.	1892	.07½
100	Mt. Diablo, s.	Nev.	5,000,000	50,000	100	137,500	June	1880	2.00	225,000	Nov	1893	.30
101	Napa, q.	Cal.	700,000	100,000	7					590,000	Oct.	1893	.10
102	Navajo, g. s.	Nev.	10,000,000	100,000	100	538,714	Sept.	1893	.10	226,111	April	1889	.10
103	New Guston, s.	Colo.	550,000	110,000	5					1,877,500	April	1892	.75
104	North Banner Con.	Cal.	1,000,000	100,000	10					20,000	July	1891	.05
105	North Commonw'th	Nev.	10,000,000	100,000	10	90,000	Jan.	1893	.10	25,000	June	1891	.25
106	N. Hoover Hill, g. s.	N. C.	300,000	120,000	2½	*				30,000	Dec.	1885	.06¼
107	North Belle Isle, s.	Nev.	10,000,000	100,000	100	513,075	April	1893	.10	280,000	May	1888	.50
108	North Star, g.	Cal.	1,000,000	100,000	10	20,000		1885	.02	450,000	June	1893	.50
109	Omaha Cons., g.	Cal.	2,400,000	24,000	100					30,000	May	1892	.15
110	Ontario, s. l.	Utah	15,000,000	150,000	100					13,175,000	Oct.	1892	.50
111	Ophir, g. s.	Nev.	10,000,000	100,000	100	4,391,040	July	1893	.25	1,595,800	Jan.	1880	1.00
112	Original, s. c.	Mont.	1,500,000	60,000	25	*				138,000	Jan.	1889	.05
113	Oro, s. l. g.	Colo.	500,000	100,000	5					95,000	July	1890	.20
115	Osceola, c.	Mich.	1,250,000	50,000	25	480,000	April	1876	1.60	1,847,500	Dec.	1893	1.00
115	Pacific Coast, b.	Cal.	1,500,000	15,000	100					422,500	July	1893	1.00
116	Parrot, c.	Mont.	1,800,000	180,000	10					1,569,000	June	1893	.10
117	Petro	Utah	10,000,000	10,025	100					17,500	July	1891	.75
118	Plumas Eureka, g.	Cal.	1,406,250	140,600	10					2,696,295	Oct.	1893	.18
119	Plymouth Con., g.	Cal.	5,000,000	100,000	50	*				2,280,000	Feb.	1888	.40
120	Poorman, g. s.	Idaho	375,000	300,000	25	*				68,260	Sept.	1892	
121	Quicksilver, pref., q.	Cal.	4,300,000	43,000	100					1,823,911	June	1891	1.25
122	" com., q.	Cal.	5,700,000	57,000	100					643,867	July	1882	.40
123	Quincy, c.	Mich.	1,250,000	50,000	25	200,000	Dec.	1862		6,670,000	Aug.	1893	3.00
124	Red Cloud	Idaho	1,000,000	200,000	5					153,000	Dec.	1892	.10
125	Reed National, s. g.	Colo.	500,000	500,000	1	*				50,000	Dec.	1890	.01
126	Retriever, l.	S.Dak	1,250,000	250,000	5					20,000	Aug.	1891	.03
127	Rialto, g.	Colo.	300,000	300,000	1	*				50,250	April	1892	.01½
128	Richmond, s. l.	Nev.	1,350,000	54,000	25	*				4,359,887	Oct.	1893	.25
129	Rico-Aspen	Colo.	5,000,000	1,000,000	5					75,000	Jan.	1894	.02½
130	Ridge, c.	Mich.	1,250,000	50,000	25	219,939	Mar.	1886	50	99,785	Feb.	1880	50
131	Robinson Con., s. l.	Colo.	10,000,000	200,000	50	*				585,000	Mar.	1886	.05
132	Savage, s.	Nev.	11,200,000	112,000	100	6,966,000	June	1893	.25	4,460,000	June	1869	3.00
133	Sierra Buttes, g.	Cal.	2,225,000	122,500	10					1,559,933	Oct.	1893	.12½
134	Sierra Nevada, s. g.	Nev.	10,000,000	100,000	100	6,521,910	Aug	1893	.20	102,000	Jan.	1871	1.00
135	Silver Cord, s. l. g.	Colo.	4,500,000	450,000	10					265,000	April	1889	.10
136	Silver King, s.	Ariz.	10,000,000	100,000	100	97,479	Aug.	1892	.25	1,950,000	July	1887	.25
137	Silver Mg. of L.V., s.l.	N. M.	500,000	500,000	1					300,000	Dec.	1891	4.05
138	Small Hopes Con., s.	Colo.	5,000,000	250,000	20	*				3,225,000	Oct.	1893	.10
139	Standard, g. s.	Cal.	10,000,000	100,000	100	100,000	June	1890	.50	3,711,159	July	1893	.10
140	Swansea, g. s.	Colo.	600,000	60,000	10					39,060	Sept.	1893	.10
141	Tamarack, c.	Mich.	1,250,000	50,000	25	520,000	April	1885	3.00	3,670,000	Dec.	1893	4.00
142	Tombstone, g. s. l.	Ariz.	12,500,000	500,000	25	*				1,250,000	April	1882	.10
143	Trinity Riv'r Hydr., g	Colo.	500,000	500,000	1	*				15,000	July	1893	.00½
144	United Verde, c.	Ariz.	3,000,000	300,000	10	*				207,500	Jan.	1892	.10
145	Victor, g	Colo.	1,000,000	200,000	5					120,000	Dec.	1893	.07½
146	Ward Con., s.	Colo.	2,000,000	200,000	10					20,000	Dec.	1889	.05
147	W. Y. O. D.	Cal.	60,000	30,000	2	22,500	May	1891	.10	48,000	Nov.	1893	.10
148	Yankee Girl, s.	Colo.	1,300,000	260,000	5					1,405,000	Sept.	1893	1.50
149	Yellow Jacket, g. s.	Nev.	12,000,000	120,000	100	5,556,000	July	1893	.25	2,184,000	Aug.	1871	1.50

NON-DIVIDEND-PAYING MINES.

	Name and Location of Company.		Capital Stock.	Shares. No.	Par	Assessments. Total levied.	Date and am't of last		
1	Alliance, s. g.	Utah	$100,000	100,000	$1	$120,000	Feb.	1891	.20
2	Allouez, c.	Mich.	2,000,000	80,000	25	1,424,937	Oct.	1891	.50
3	Alpha Con., g. s.	Nev.	3,000,000	30,000	100	209,000	Sept.	1892	.1
4	Alta, s.	Nev.	10,080,000	100,800	100	3,369,880	Jan.	1892	.10
5	American Flag, s.	Colo.	1,250,000	125,000	1	200,000	June	1887	
6	Anchor, s. l. g.	Utah	3,000,000	150,000	5	560,000	July	1893	.20
7	Barcelona, g.	Nev.	5,000,000	200,000	5	*			
8	Belmont, g.	Cal.	500,000	500,000	100	*			
9	Belmont, s.	Nev.	5,000,000	50,000	100	785,000	April	1886	.10
10	Best & Belcher, s. g.	Nev.	10,080,000	100,800	10	2,405,275	Aug.	1892	.25
11	Black Oak, g.	Cal.	3,000,000	300,000	100	*			
12	Brownlow, g.	Colo.	250,000	250,000	5				
13	Brunswick, g.	Cal.	2,000,000	400,000	2				
14	Bullion, s. g.	Nev.	10,000,000	100,000	100	2,890,000	Aug.	1892	.25
15	Butte & Boston, c. s.	Mont.	5,000,000	200,000	10				
16	Butte Queen, g.	Cal.	1,000,000	100,000	1	6,000	Jan.	1892	.04
17	Calaveras, g.	Cal.	500,000	500,000	5				
18	Calaveras Con., g.	Cal.	800,000	160,000	10				
19	California, s.	Cal.	1,000,000	100,000	5	9,000	Mar.	1892	.08
20	California Con. i. q.	Cal.	2,250,000	450,000	10				
21	Challenge Con., g. s.	Nev.	5,000,000	50,000	10				
22	Chollar, s. g.	Nev.	11,200,000	112,000	2	1,820,000	May	1892	.50
23	Colchis, s. g.	N. M.	500,000	150,000	5				
24	Colorado, s.	Colo.	1,625,000	325,000	1				
25	Comstock, s.	Utah	1,250,000	250,000	100				
26	Comstock Tun.	Nev.	10,000,000	100,000	100	35,000	Mar.	1887	[illegible]
27	Con. Imperial, g. s	Nev.	5,000,000	50,000	50	2,062,500	Jan.	1892	.25
28	Con. New York, s. g.	Nev.	5,000,000	100,000	100	110,000	Mar.	1892	.10
29	Con. Pacific, g.	Cal.	6,000,000	60,000	10	198,000	June	1890	10
30	Crescent, s. l.	Colo.	3,000,000	300,000	100	*			
31	Crocker, s.	Ariz.	10,000,000	100,000	1	165,000	Aug	1892	.05
32	Crowell, g.	N. C	500,000	500,000	1				
33	Dahlonega, g	Ga	250,000	250,000	10	*			
34	Decatur, s	Colo	1,500,000	300,000					
35	Denver City s.	Colo.	5,000,000	500,000	11	*			
36	Denver Gold, g.	Colo.	300,000	60,000	5				
37	Dickens-Custer, s.	Idaho	2,100,000	420,000	5				
38	Durango, g.	Colo.	500,000	500,000	1	*			
39	El Dorado, g.	Cal.	1,000,000	250,000	4	*			
40	Emma, s	Utah	625,000	500,000	125				
41	Emmons, s. l.	Colo.	2,000,000	2,000,000	1				
42	Empire, s.	Utah	10,000,000	100,000	100				
43	Eureka Tunnel, s. l.	Nev.	10,000,000	100,000	100	*			
44	Exchequer, s. g.	Nev.	10,000,000	100,000	100	940,000	Jan.	1892	.25
45	Found Treasure, g. s.	Nev.	10,000,000	100,000	100	130,500	Jan.	1892	.50
46	Gogebic I. Syn., i.	Wis.	5,600,000	200,000	25	*			
47	Gold Cup, s.	Colo.	500,000	500,000	1	*			
48	Golden Era, s	Mont.	1,000,000	200,000	10	*			
49	Gold Flat, g.	Cal.	1,000,000	100,000	10	5,000	Mar.	1892	.05
50	Gold Rock, g.	Cal.	1,000,000	500,000	2				
51	Golden Feather Co., g	Cal.	900,000	180,000	5				
52	Goodyear g. s. l	Mont.	1,000,000	200,000	5	13,000	Feb.	1892	.01
53	Grand Duke, s.	Colo.	800,000	80,000	10				
54	Gregory Con., g.	Mont.	3,000,000	300,000	10				
55	Harlem M. & M. Co., g.	Cal.	1,000,000	200,000	5				
56	Hartery Con., g.	Cal.	1,000,000	100,000	10	22,000	Oct.	1890	.05
57	Hartshorn, g s. l.	S.Dak	1,250,000	250,000	5	8,750	Sept.	1891	.00½
58	Head Cent. & Tr., s. g	Ariz.	10,000,000	100,000	100	16,981	Mar.	1892	.03
59	Hector, g.	Cal.	1,500,000	300,000	5	45,000	Jan.	1888	[illegible]
60	Himalaya, g. s l	Utah	1,800,000	80,000	10	12,800	Oct.	1892	.00½
61	Holywood	Cal.	200,000	100,000	2				
62	Huron, c.	Mich.	[illegible],000,000	40,000	25	280,000	May	1887	3.00
63	Idaho, g. s	Idaho	1,250,000	250,000	5				
64	Ingalls, g	Colo.	100,000	20,000	5				
65	Ironton, i.	Wis.	1,000,000	40,000	25				
66	Iroquois, c.	Mich.	1,250,000	50,000	25				
67	Kentuck Con.	Nev.	10,500,000	105,000	00	57,750	July	1892	.10
68	Julia Con., g. s.	Nev.	11,000,000	110,000	100	1,463,000	Jan.	1889	.10
69	Justice, g. s. c.	Colo.	500,000	500,000	1	*			
70	Lacrosse, g.	Colo.	1,000,000	100,000	10	*			
71	Little Josephine, s.	Colo.	250,000	50,000	5				
72	Lone Star Cons., g.	Cal.	500,000	500,000	1	10,000	April	1892	.00½
73	Madeleine, g. s. l.	Colo.	750,000	50,000	1	4,500	Feb.	1892	.00½
74	Mammoth Gold, g.	Ariz.	2,500,000	500,000	5	*			
75	Mayflower Gravel, g.	Cal.	1,000,000	100,000	10	*			
76	Mexican, g. s.	Nev.	10,000,000	100,000	100	2,917,560	Oct.	1892	.50
77	Michigan, g s	Mich.	2,500,000	100,000	25	40,000	Mar.	1892	
78	Mike & Starr, s. c.	Colo.	1,000,000	200,000	5	*			
79	Milwaukee, s.	Mont.	500,000	500,000	1	*			
80	Modoc Chief, l. s. g.	Idaho	1,000,000	200,000	5	5,000	Jan.	1892	.00½
81	Monitor, g.	Colo.	100,000	100,000	1	12,500	May	1891	.01
82	Montreal, g. s. l.	Utah	750,000	150,000	5	4,500	Feb.	1892	.00½
83	Mutual Mg. & Sm.	W'sh.	100,000	100,000	1	*			
84	Neath, g.	Colo.	1,000,000	100,000	10				
85	Nelson	Cal.	50,000	10,000	5				
86	Nevada Queen, s.	Nev.	10,000,000	100,000	100	200,000	Oct.	1889	.25
87	New Gold Hill	N. C.	1,750,000	350,000	5				
88	New Pittsburg, s. l.	Colo.	[illegible],000,000	200,000	10	*			
89	North Standard, g.	Cal.	10,000,000	100,000	100	20,000	Nov.		
90	Occidental Con., g.s		10,000,000	100,000	100	245,000	April	1892	.25
91	Oneida Chief, g.	Cal.	500,000	125,000	100	*			
92	Oriental & Miller, s.	Nev.	10,000,000	400,000	100				
93	Original Keystone, s.	Nev.	10,000,000	100,000	100	250,000	Mar.	1892	.10
94	Osceola, g.	Nev.	5,000,000	500,000	10	*			
95	Overman, g. s.	Nev.	11,520,000	115,200	100	4,001,840	May	1892	.10
96	Pay Rock, s.	Colo.	1,000,000	200,000	5				
97	Peer, s.	Ariz.	10,000,000	100,000	100	190,000	Feb.	1892	.10
98	Peerless, s.	Ariz.	10,000,000	100,000	100	405,000	Oct.	1890	.15
99	Pennsylva'a Cons., g	Cal.	5,150,000	515,000	10	36,050	Feb.	1892	.10
100	Phœnix, g.	Ariz.	500,000	500,000	1	*			
101	Phœnix Lead, s. l.	Colo.	100,000	100,000	1	*			
102	Pilgrim, g	Cal.	600,000	300,000	2	*			
103	Pioche M. & R., s.g.l.	Utah	20,000,000	000,000	10				
104	Poorman, Ltd., s. l.	Idaho	250,000	50,000	5				
105	Potosi, s.	Nev.	11,200,000	112,000	100	1,573,000	Mar.	1890	.50
106	Proustite, s.	Idaho	250,000	250,000	1	*			
107	Puritan, s. g.	Colo.	1,500,000	150,000	10	*			
108	Quincy, c	Colo.	3,000,000	300,000	10				
109	Rainbow, g.	S.Dak	1,250,000	250,000	5	4,250	July	1892	.00½
110	Rappahannock, g. s.	Va.	250,000	250,000	1	*			
111	Red Mountain, s.	Colo.	300,000	60,000	5				
112	Ropes, g. s.	Mich.	2,000,000	80,000	25	167,200	Feb.		.54
113	Ruby & Dun., s. l. g.	Nev.	25,300	506	50	*			
114	Russell, g.	N. C.	1,500,000	300,000	5				
115	Sampson, g. s. l.	Utah	[illegible]0,000,000	100,000	100	288,15[illegible]	July	1888	1.08
116	Silver Age, s. l. g.	Colo.	2,000,000	200,000	10	*			
117	Silver Bell, s.	Ariz.	850,000	170,000	5				
118	Silver King, s.	Cal	2,000,000	400,000	5				
119	Silver Queen, c.	Ariz.	5,000,000	200,000	25	*			
120	Silverton, s	Colo.	300,000	60,000	5				
121	Siskiyou Con., l.	Cal.	2,000,000	200,000	10	13,000	May	1892	.01½
122	South Bulwer, g	Cal.	10,000,000	100,000	100	100,000	May	1881	.25
123	South Hite, g.	Cal.	10,000,000	100,000	100	195,000	Jan.	1888	.05
124	Stanislaus, g.	Cal.	2,000,000	200,000	10				
125	St. Kevin, s. g.	Colo.	100,000	100,000	1	*			
126	St. Louis & Mex., s.	Mex.	,000,000	500,000	10	*			
127	St. Louis & St. Elmo.	Colo.	000,000	200,000	10				
128	St. L. & Sonora, g. s.	Ariz.	3,000,000	300,000	10	*			
129	Stemwinder, l. s.	Idaho	500,000	500,000	1				
130	Sunday Lake, i.	Mich.	250,000	50,000	25				
131	Sullivan Con., g.	Dak.	600,000	200,000	3	*			
132	Sylvanite, s.	Colo.	5,000,000	500,000	10	*			
133	Taylor-Plumas, g.	Cal.	[illegible]5,000	65,000	5	3,575	Mar.	1892	.01½
134	Telegraph, g. s.	Cal.	325,000	65,000	5	3,575	Mar.	1892	.01½
135	Telegraph, g. s.	Mex.	[illegible]00,000	100,000	1	70,000	Feb.	1892	.10
136	Teresa, g. s.	Cal.	,000,000	200,000	5	10,000	Feb.	1888	[illegible]
137	Tioga Con., g.	Nev.	[illegible]	100,000	10	295,000	May	1888	25
138	Tornado Con., g. s.	Nev.	100,000	100,000	1	*			
139	Tuscarora, s.	Nev.	0,000,000	500,000	20	385,000	Jan	1892	25
140	Union Con., g. s.	Nev.	10,000,000	100,000	100	370,000	June	1892	25
141	Utah, s.	Nev.	10,000,000	100,000	100	245,000	Aug.	1890	.25
142	Ute & Ulay, s. l.	Colo.	1,000,000	500,000	2	1,500	Mar.	1892	001
143	Valley, g.	Cal.	575,000	460,000	125				
144	Washington, c.	Mich.	1,000,000	40,000	5				
145	West Argentine, s.	Colo.	750,000	150,000	5				
146	West Granite Mt., s.	Mont.	500,000	100,000	5				
147	Whale, s.	Mont.	5,000,000	500,000	10	*			
148	Wood River, g.	Idaho	2,000,000	200,000	10	3,000	Aug.	1891	.00½
149	Yuma, c. s. g.	Ariz.	10,000,000	400,000	2				

G., Gold. S., Silver. L., Lead. C., Copper. B., Borax. * Non-assessable. † The Deadwood previously paid $275,000 in eleven dividends and the Terra $75,000. ‡ Previous to the consolidation in August, 1884, the California had paid $31,320,000 in dividends, and the Cons. Virginia $12,390,000. ‖ Previous to the consolidation of the Copper Queen with the Atlanta. August, 1885, the Copper Queen had paid $1,350,000 in dividends. ¶ Previous to this company's acquiring Northern Belle, that mine paid $2,400,000 in dividends against $425,000 in assessments.

COAL AND COAL RAILROAD STOCKS.

NAMES OF STOCKS.	Jan. 20.		Jan. 22.		Jan. 23.		Jan. 24.		Jan. 25.		Jan. 26.		Sales.
	H.	L.	H.	L.	H.	L.	H.	L.	H.	L.	H.	L.	
Am. Coal													
Balt. & Ohio													
do. pref													
Buff., R. & P.													
do. pref.													
Cambria Iron													
Ches. & Ohio	18⅜	18⅛	18¼		18⅜		17⅞	17⅝	18		18	17⅝	2,553
do. 1st pref.													
Col. C. & I.			19								10¾	10½	300
Col. Coal													
Colorado Fuel	24½	24	26	25	25		25				26		1,437
do. pref	62		64½										105
Col., H. V. & Tol.					30½	30	19½		19¾	19⅝			1,100
do. pfd													
Col. & H. Coal					8	7			6¾				175
do. pfd													
Cons. Coal	30												35
Del. & Hud. C.	134½	130	134		134	133	133¾	133	133¾	133	132½		2,034
Del., L. & West.			169¼	169	168¾		166		164		168	167⅜	730
Hunt. & B. Top.			31⅜										100
do. pref	50¼		50½				50½						64
Lake Erie & Wes	15⅝	15	15⅝	15			15¾		15¼	15	15⅛		2,535
do. pref	67⅜	66⅛	67⅜		66½				67½				575
Lehigh C. & N.	53	52⅜	53	52⅜	52⅝	52⅜	52⅜	52⅛	52⅜				810
Lehigh Valley	39¾	39¼	39⅝	39¼	39⅝	39	39⅜	38⅝	39⅜	39¼			1,727
Maryland Coal													
do. pref													
Morris & Essex	149⅝	149¼			149¼		149½		149⅜				470
New Cent. Coal									8				200
N. J. Central	116	115	115		115½				114¾	114⅜			859
N. Y., L. & W.									111½				
N. Y., L. E. & W	15⅜		15¼	15¼			15⅛	15⅛	15⅛	15	15¼	15	2,235
do. pref							32¼						100
N. Y., Susq. & W	15⅛		15⅝	15¼	15⅛		15		16		15¾		1,180
do. pref			43¾	43¼	42⅝				43	42⅝			925
N. & West													
do. pref			19¼		19½		19½		19⅝				4.0
Penn. Coal													
Penn. R. R.	43⅝	43½	43⅞	43⅝	43¾	43⅝	43⅞	43¾	43⅞	43¾			3,695
Phil. & Reading	21	20¾	20⅜	20⅛	20¼	19⅞	20⅛	19⅞	20¼	19⅝	20⅛	19¾	16,565
Tenn. C. & I.	16¼	16	16⅜	16⅛	16⅜	16	16¼	16	16⅛	16⅜	17	16¼	4,930
do. pref	70				65	63¾							305
Wheel. & L. E.	12¾		13⅞	12¾	13⅛	12¾	13		13	12⅝	12⅞	12½	1,770
do. pref	49½	47⅜	49¾	49	49½		49½		49¾		49⅝	43¼	1,438

Total shares sold, 49,272.

INDUSTRIAL AND TRUST STOCKS.

NAME OF STOCKS.	Jan. 20.		Jan. 22.		Jan. 23.		Jan. 24.		Jan. 25.		Jan. 26.		SALES.
	H.	L.	H.	L.	H.	L.	H.	L.	H.	L.	H.	L.	
Adams Express													
Am. Cotton Oil	29		29	28¾	29¾		28¾		28¾		29	28¾	2,700
do. pref	68		68	67¾	68½				68		67		616
Am. Dist. Tel.													
Am. Express			110½		111½	110¼	111¼	110					162
Am. Sugar Ref.	84½	82⅜	81⅞	80¾	79⅝	76	77⅞		78¼	77¼	79½	78	330,143
do. pref	85¾		84	83¼	83⅜	80	81⅜	80¼	81¼	80⅜	82¼	81¼	9,934
Edison E. Ill. Co.									95⅝				50
Edison Gen. El.	36¾	36	36⅛	35¾	36	35⅝	35⅜	34⅛	35⅝	35⅛	35⅛	34⅛	18,603
Nat. Cord. Co.	20	19	19		18½	17⅝	18¼		17¼				1,063
do. pref			35		39		42						165
Nat. Lead Co.	28¾	27¾	28¼	27⅜	27⅝	26⅛	26⅞	26¼	26⅝	26¼	26⅛	26¼	12,347
do. pref	74	73¼	74⅜	73¾	73				72¼	71	71		2,458
Nat. Linseed Oil					23	22½					22½		400
U. S. Express	52		55		54½		54½	53¾	55				114
U. S. Rubber			38				38	36	38	35¾			930
do. pref	85				83		80						111
Wells, Fargo Ex			124						126				190
Western Union	85⅛	85⅜	86	85¼	85¾	84¾	85⅝	84½	85⅛	84⅛	85¼	83⅝	110,642

Total shares sold, 540,628.

CALIFORNIA.

San Francisco.

NAMES OF STOCKS.	CLOSING QUOTATIONS.					
	Jan. 19.	Jan. 20.	Jan. 22.	Jan. 23.	Jan. 24.	Jan. 25.
Alpha						
Alta	.15	.15	.15	.10	.10	.10
Belcher						
Belle Isle						
B. & Belch	2.10	2.10	1.85	1.70	1.85	1.75
Bodie	.20	.15	.20	.20	.20	.20
Bulwer			.10	.10	.10	.10
Challar	.50	.55	.45	.40	.45	.45
Com'w'lth						
Con. C. & V.	3.55	3.45	3.00	2.75	2.95	2.90
Con. Pac.						
Crown Pt.	.55	.55	.50	.40	.50	.50
Del Monte						
E'reka Con						
G'ld & C'y	.90	.80	.75	.70	.70	.65
Hale & N.	.70	.65	.60	.60	.60	.60
M. White						
Mexican	1.15	1.05	.95	.95	.95	.95
Mono			.10	.10	.10	.10
Mt. Diablo						
Navajo						
Nev. Qu'n						
N. P'ific						
N. Co'w'th						
Ophir	1.60	1.80	1.65	1.75	1.75	1.75
Potosi	.60	.60	.60	.50	.50	.50
Savage	.75	.70	.70	.60	.60	.60
Sierra Nev	.90	.95	.75	.75	.75	.75
Un'n Con	.80	.85	.70	.70	.70	.75
Utah	.05	.05	.05	.05	.05	.05
Yel. Jack	.80	.85	.65	.70	.75	.65

COLORADO.

Aspen. Jan. 16.

	Price.
Argentum Juniata	$0.28
Aspen Contact	.50
Aspen Deep Mining	
Best Friend	
Bi-Metallic	.08
Bushwacker	.10
Delia S.	1.00
Gold Valley Placer	
Little Annie	.06
Mollie Gibson	2.50
Pontiac	.04½
Smuggler	2.50
St. Joe & Mineral Farm	.05½
U. S. Paymaster	

Colorado Springs. Jan. 20.

(Specially reported by W. H. McIntyre).

	Bid.	Asked
Alamo	$.01⅛	$.01¼
Anaconda	.39	.40
Anchoria-Leland	.04⅞	.05
Aola	.02¾	.03
Argentum-Juniata	.60	.65
Blue Bell	.02¾	.03
Bankers	.04	.04¼
Calumet	.04⅛	.04¼
Cleopatra	.04¾	.05⅛
Creede & Crip. Crk	.00 9/16	.01
Cripple Creek Con	.01⅝	.01¾
Elcorado		.05
Fannie Rawlings	.13¼	.14
Free Coinage	.02⅛	.03
Gold King		.09
Golden Dale	.00 9/16	.01⅛
Golden Eagle	.00 9/16	.01
Isabella	.22½	.23
Jack Pot	.01¾	.01⅛
Lemhi		.25
Lottie Gibson	.01⅛	.01¾
Mollie Gibson	1.15	1.20
Mt. Rosa	.02¼	.02½
Orphan Bell	.03	.03¼
Pharmacist	.12½	
Summit	.18½	.18¾
Victor		3.00
Work	.02¾	.03
World	.01⅛	.01¾

Market fairly active. Sales for the week ending Jan. 20, 1,750,000 shares, largely of the cheaper Cripple Creek stocks.

Denver.

Prices and sales for the five days ending Jan. 22, 1894:

	High.	Low.	Sales.
Alamo	.01⅛	.01¼	35,500
Anaconda	.40⅛	.38¾	4,400
Argentum	.52	.45	200
Bangkok	.03	.02¾	16,100
Bankers	.04¼	.04	11,500
Big Six	.002		800
Calumet	.04¾	.04¼	11,000
Creede & Cripple C.	.01	.00 9/16	23,000
Golden D	.01	.00 9/16	436,000
Gold Standard	.05⅛	.05	5,500
Isabella	.23½	.22½	3,400
Jack Pot	.01⅝	.01⅝	21,000
Mollie Gibson	1.20	1.12½	3,100
Nancy Hanks	.06		1,000
Summit	.18¾		500
Union P	.06½	.05¾	32,000
Victor	3.00		500
Work	.03⅛	.02⅞	54,000
World	.01⅝		10,000
Western M	.21		3,000

Total shares sold 662,500

MARYLAND.

Baltimore. Jan. 25.

COMPANY.	Bid.	Asked.
Balt. & N. C.		$0.10
Conrad Hill		.10
Cons. Coal	$0.23	
Diamond Tunnel		14.00
George's Creek Coal.	.90	1.03
Howard C. & C.	1.10	
Lake Chrome	.01@.02	
Silver Valley	.13	.30
Vernon Mining Co		.45

MINNESOTA.

Duluth. Jan. 20.

LISTED STOCKS.	Par.	Bid.	Asked.
Biwabik M. Iron Co	100	$20.00	$21.00
Cincinnatt Iron Co	25	.25	.30
Clark Iron Co	100		.60
Cosmopolitan Iron Co			
Great Northern Min. Co.	100	2.75	3.50
Kanawha Iron Co	100	.10	.20
Keystone Iron Co			.40
Lake Superior Iron Co	25		2.50
Lincoln Iron Co			.50
Little Mesaba Iron Co	100		
Mesaba Moun. Iron Co.	100	14.00	17.00
Minneapolis Iron Co	100	.02	.15
Mountain Iron Co	100	50.00	65.00
Shaw Iron Co	100	2.50	3.00
Security Land & Exp. Co.	10	10.00	15.00
Washington Iron Co.	100		
UNLISTED STOCKS.			
Adams Iron Co	10	$7.00	$9.00
Agate Copper Mining Co.	10		
Allegheny Iron Co	10		
Ashland Iron Co	25		40.00
Aurora Iron Co			
Buckeye Iron Co	100		2.50
Buffalo Land & Exp. Co.	1		.50
Camden Iron Co			
Chandler Iron Co	25	20.00	26.00
Charleston Iron Co	100	.15	.90
Champion Iron Co	100		
Cleveland Cliffs Iron Co.	100	20.00	40.00
Chicago Iron Co	100	.20	.30
Cleveland Iron Co			
Columbia Iron Co	100		
Commodore Mining Co.	100		
Comstock Iron Co	100		
Dayton Iron Co	100		
Detroit Iron Co	25	.01	.02
Elmira Land & Iron Co.	100	.05	.25
Great Western Mining Co.	100	1.90	2.25
Hall Iron Co	100		
Homestead Iron Co	25	.00½	.02
Horton Mining Co	10		
Imp. Iron Mt. Mining Co.	100		
Internat'l Development	10		22.50
Jackson Iron Co	25		60.00
Kakina Iron Co	25		
Kentucky Iron Co.	100		
Lackawanna Iron Co.		.40	.50
Lake Supr. (Marquette)	25	20.00	27.00
Macomber Mining Co.	10		
McCaskill Mining Co.	10	.01	.03
McKinley Iron Co	100		
Mesaba C., L. & Ex. Co.	10		6.00
Mesaba Chief Iron Co.	100	1.75	2.00
Mesaba Iron Co.	30		.20
Mesaba Mineral Co			
Metropolitan L. & L. Co.	25	50.00	70.00
Minnesota Iron Co	100		
Myrna Iron Co	10		
Northern Light Iron Co.	100		.25
New England Iron Co.	100		
Ohio Mining Co.	100	5.00	8.00
Oneota Iron Co	100		
Ophir, gold	10		1.00
Penn. Iron & Steel Co.	100	.04	.10
Pioneer Iron Co	25		1.00
Pittsburg & Lake A. Co.	100	110.00	125.00
Putnam Iron Co	100		.80
Red Hematite Iron Co.	100		.15
Republic Iron Co	25		.50
Rouchleau Iron Co.	100	.40	.55
Standard Ore Co		.30	
Syndicate Gold	10		.20
Towanda Iron Co	100	1.50	2.00
Ver. & Mes. Iron Land Co.	25		.05
Zenith Iron Co	25	.50	1.25

PENNSYLVANIA.

Philadelphia. Jan. 25.

	Bid.	Asked.
Bloomington C. & C.		
Buck Mountain C.		
Cambria		$ .53
Central Coal & Coke		.90
Connellsville Gas Co.		
Edison E. Light Co.	$122	125
Penn. Salt	.95	1.00
Penn. Steel	19.50	
Penn. Gas Coal		41
Royal Gas		
Washington, D. C., Gas	4¾	
Westmoreland C	.53	.55

Pittsburg. Jan. 24.

	Bid.	Asked.
Bridgewater Gas	$40	$50
Chartiers Valley Gas	9½	
Manufacturers' Gas	27	
Nat. Gas Co. of W. Va.	25	
Olive Valley Gas	23	
People's Nat. Gas	22	
Penn. Gas	10	10¼
Philadelphia Co.	21¾	22
Wheeling Gas	17	19
Fisher Oil		53
Chartiers Block Coal	35	
Luster Mining Co.	13	13¼
Westinghouse Air Brake	130	135

MISSOURI.

St. Louis. Jan. 24.

Closing quotations:	Bid.	Asked.
Adams	$0.40	
American & Nettie, Colo.	.25	$0.30
Bi-Metallic, Mont.	2.40	3.00
Elizabeth, Mont.	.15	.20
Granite Mountain, Mont.	1.25	1.75
Hope		2.50
Leo	.01½	.02
Small Hopes		.50

London Quotations.

	Jan. 16, 1894. Buyer. £ s. d.	Seller. £ s. d.
Alaska Treadwell,		
Alaska Ter	2 13 9	2 13 3
Almada & Tirito, Mex.	3	9
American Belle, Colo.	2 3	2 6
De Lamar, Idaho	1 2 6	1 3 6
Elkhorn, Mont	10 0	11 0
Emma, Utah	1½	4½
Golden Feather, Cal.	6 6	7 0
Golden Gate, Cal	4 0	5 0
Golden Leaf, Mont. & N. M	1 3	1 9
Harqua Hala, Ariz.	14 6	15 6
Holcomb Valley, Cal.	9	1 0
Idaho Exploring, Ida.	3	6
Jay Hawk & Lone Pine, Mont	7 6	8 0
Mesquital del Oro, Mex., P	1 0 0	1 10 0
Mesquital del Oro, Mex., D	5 0	10 0
New Guston, Colo.	8 0	10 0
New Montana, Mont.	6 6	7 0
Palmarejo, Mex.	1 0	1 6
Pinos Altos, Mex.	1 0	1 6
Poorman Cons., Idaho	3 6	4 0
Rajah Gold, Can.	1 0	2 0
Richmond Con., Nev.	6 3	8 9
Sierra Buttes, Cal.	8 0	9 0
Springdale Gold, Colo.	2 6	3 6
United Mexican, Mex.	6	1 6

Paris. Jan. 12.

	Francs.
Belmez, Spain	665.00
Golden River, Cal.	130.00
" parts	30.00
Laurium, Greece	580.00
Lexington, Mont	47.50
" parts	1.75
Nickel, New Caledonia	640.00
Rio Tinto, Spain	373.75

New York Mining Stocks.

(Latest quotations.) Jan. 26.

	Bid.	Asked.
Alice	$0.20	$0.25
Alta	0.10	
Best & Belcher	2.00	2.25
Bodie	0.20	
Breece	0.14	0.17
Brunswick	0.05	0.07
Bulwer	0.10	
Caledonia, B. H.	0.25	
Castle Creek		0.03
Challar	0.50	0.75
Chrysolite	0.14	0.18
Colo. Cent. Consol.		.60
Comstock Tunnel		.08
Con. C. & Va	3.00	3.25
Crown Point	0.45	0.65
Deadwood	0.40	
El Cristo		0.19
Enterprise		.75
Father De Smet	0.12	0.15
Gould & Curry	0.75	1.00
Hale & Nor	0.70	0.95
Holyoke		0.03
Horn Silver	2.65	2.70
Iron Silver		0.25
Kingston & Pem.	0.20	
La Crosse	0.03	0.05
Leadville	0.12	
Little Chief	0.12	
Mexican	0.80	1.05
Mono	0.15	
Ophir	1.40	1.75
Phœnix Trust Co.	0.21	0.23
Plymouth Con.		0.90
Potosi	0.80	
Savage	0.50	
Sierra Nevada	1.00	1.25
Union Cons	0.75	0.95
Utah	0.10	
Yellow Jacket	1.10	1.35

ASSESSMENTS.

COMPANY.	No.	Dlnqt. in office.	Day of sale.	Amt. per sh're.
Alta, Nev	44	Jan. 4	Jan. 28	.10
Challar, Nev	37	Jan. 15	Feb. 6	.10
C'nfidence, Nev	24	Jan. 30	Feb. 20	.25
Conlon, G., Cal	1	Feb. 16	Mar. 7	.05
Con. Wyoming, Cal	3	Jan. 12	Feb. 1	.55
Crown P't, Nev	63	Jan. 16	Feb. 6	.20
Dora, Cal	2	Jan. 27	Feb. 27	.05
E. Sierre Nev., Nev	3	Feb. 23	Mar. 16	.05
Eclipse, Cal	6	Jan. 20	Feb. 6	.02
Gover, Cal	4	Feb. 1	Feb. 28	.25
Gray Eagle, Cal	35	Feb. 10	Mar. 7	.03
Kentuck Con., Nev	8	Jan. 24	Feb. 15	.10
Martin White, Nev	29	Feb. 24	Mar. 31	.25
Mexican, Nev.	49	Jan. 19	Feb. 13	.25
N. Gld&Cy, Nev	5	Jan. 12	Jan. 29	.10
Occ'd'nt'l Con., Nev	15	Feb. 19	Mar. 14	.10
Ophir, Nev	61	Jan. 23	Feb. 12	.25
Pine Hill, Cal.	3	Feb. 13	Mar. 13	.05
San Vuente, Mex	1	Jan. 10	Jan. 31	.20
S. Eureka, Cal.	8	Jan. 22	Feb. 15	.01
Stanard G. S., Cal	1	Feb. 17	Feb. 17	.05
Yellow Jacket, Nev	56	Dec. 21	Jan. 27	.25

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Hasensahl, W.
Ingersoll-Sergeant Rock Drill Co.
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(See Machinery.

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1312 WANTED.—MAN TO SUPPLY PLAN and take charge of erecting and starting a reverberatory furnace of about one ton capacity, for the reduction of solder and tin dross. Address, giving references, and stating experience, salary required, etc., REVERBERATORY, ENGINEERING AND MINING JOURNAL.

1313 WANTED. — TRAVELING SALESman—Manufacturers of a first-class line of hot air furnaces desire to engage an experienced man, well acquainted with and commanding an established trade, to represent them for the coming year; must be thoroughly capable in every respect; we are able to offer to the right party a steady position, good salary, and an excellent future. Address, with references and experience, FOUNDRY CO., ENGINEERING AND MINING JOURNAL.

1314 WANTED.—A SKILLED AND PRACtical superintendent for copper and silver smelter in Mexico. Must be well posted in the treatment of ores. Address, giving qualifications, experience, references, and salary expected for term of years, SONORA, ENGINEERING AND MINING JOURNAL.

1315 WANTED — AN EXPERIENCED and energetic assistant mine superintendent and accountant; state age, experience and salary expected; first-class references. Address ABILITY, ENGINEERING AND MINING JOURNAL.

1316 WANTED — A RECENT GRADUate of Boston School of Technology or other technical school, course mining or mechanical engineering, good surveyor, assayer and machinist, with a knowledge of bookkeeping, as assistant to manager at a Southern gold property. Salary moderate, but chance of increase good. Address, with references, salary expected and experience, ARANOS, ENGINEERING AND MINING JOURNAL.

1317 WANTED—A GENERAL MANAGER for a railroad in South America; must speak Spanish and be well recommended. A thorough knowledge of the operation and organization of a railroad absolutely necessary. Apply by letter to RAILROAD, ENGINEERING AND MINING JOURNAL.

Situations Wanted.

Advertisements for SITUATIONS WANTED will be Charged only 10 cents a line.

A MECHANICAL ENGINEER, 36 YEARS' of age, German, designer and builder of high-grade engines and general machinery, good manager of work and men, desires suitable position. Address ENGINEER, ENGINEERING AND MINING JOURNAL. No. 15,930, Feb. 3.

GOLD MINING SUPERINTENDENT DEsires position; experienced in mining and treating free and refractory gold ores; speaks Spanish; highest references; salary moderate. Address WM. F. KETT, 3552 Prairie avenue, Chicago, Ill. No. 15,910, Feb. 3.

POSITION AS ASSISTANT TO GENERAL manager or to superintendent of manufacturing concern. Thoroughly posted in modern cost, accounting and indexing, and experienced in factory office work. First-class draughtsman and graduate M. E. (age 29 years). Address ASSISTANT, ENGINEERING AND MINING JOURNAL. No. 15,943, Feb. 10.

TOOLMAKER, ON DIES, TOOLS, PUNCHES, wants position. New York or vicinity preferred. Address TOOLS, care ENGINEERING AND MINING JOURNAL. No. 15,934, Feb. 10.

A PRACTICAL MILLMAN, WITH TWELVE years' experience in managing and working both wet and dry gold and siver chloridizing and amalgamating mills, wishes a position as foreman. Good assayer; has some experience with cyanide process; would be willing to go to Mexico. Unquestionable reference as to character and ability. Address MILLMAN, ENGINEERING AND MINING JOURNAL.

BY GRADUATED CHEMIST, EXPERIenced in blast furnace and steel works analysis. Best references, moderate salary. Address GRADUATE ENGINEERING AND MINING JOURNAL. No. 15,928, Feb. 3.

ADVERTISER IS OPEN TO RE-ENGAGEment as chief steam engineer on steam plant where from 100 to 1,500 I. H. P. is used. Owns a complete set of testing apparatus. Good references. Address PAUL EVANS, 256 Methuen street, Lawrence, Mass. No. 15,914, Feb. 3.

MECHANICAL ENGINEER AND draughtsman is open to engagement. Address R., ENGINEERING AND MINING JOURNAL. No. 15,913, Feb. 3.

AN ANALYTICAL CHEMIST, A YOUNG man who has had charge of a general analytical laboratory for the last four years, desires a change; present relations not satisfactory. An expert on phosphate work and thoroughly familiar with the manufacture of sulphuric acid from brimstone and pyrites. State location and salary. S. F. C., ENGINEERING AND MINING JOURNAL. No. 15,883, Feb. 3.

ASSAYER AND CHEMIST, GRADUATE, with experience in the assay and analysis of gold, silver and copper ores and mill products, would like a position. References former employers. Address ASSISTANT SUPERINTENDENT, ENGINEERING AND MINING JOURNAL. No 15,887, Feb. 3.

WANTED—POSITION AS SUPERINTENDent or foreman of a gravel or quartz mine. Twenty years' practical experience. Address MONTANA, ENGINEERING AND MINING JOURNAL. No. 15,761, Feb. 3.

WANTED—BY AN EXPERIENCED MINing Engineer, a position as Superintendent; is competent to open up, lay out and manage everything in connection with a first-class coal mine. Address L., ENGINEERING AND MINING JOURNAL. No. 15,906, Feb. 10.

A GENTLEMAN, LATE PARTNER IN ONE of the largest iron foundries in England, is desirous of corresponding with a firm of iron founders. He has a thorough practical experience in the manufacture of special light and annealed castings; is also a thorough business man and well connected. Address FOUNDRY, ENGINEERING AND MINING JOURNAL. No. 15,907, Feb. 10.

METALLURGIST DESIRES POSITION with smelting company. Have had several years' experience with refractory ores in the West. Good references. Address M. W., ENGINEERING AND MINING JOURNAL. No. 15,888, Feb. 17.

WANTED—Positions by two young mining engineers as superintendents, manager, analyst, assayer or mining engineers to mining, milling, metallurgical or chemical works in southeastern States; first-class references furnished if required. Advertisers would prefer to work together. Address S. and H., ENGINEERING AND MINING JOURNAL. No 15,931. Feb. 17

CHEMIST AND ASSAYER, AT PRESENT engaged in the West, desires position with milling or smelting company. Best references. Address G., ENGINEERING AND MINING JOURNAL. No. 15,885, Feb. 17.

WANTED—SITUATION IN CHARGE OF designing and manufacturing steam, hydraulic or mining machinery. Address M. E., ENGINEERING AND MINING JOURNAL. No. 15,912, Feb. 24.

GRADUATED CHEMIST, IN CHARGE large laboratory, 3½ years' experience, wants position; general analytical work, assaying or organic chemistry; expert in iron and steel and phosphates; best references. A. C., ENGINEERING AND MINING JOURNAL. No. 15,929, March 3.

AN ACTIVE AND ENERGETIC MINE Superintendent, graduated Mining Engineer, with an extensive practice in Europe and the United States, desires to change his present position. Specialties: Mining, Milling and Chlorination of Gold Ores. Will accept a position as Superintendent or Manager of a mining company with good standing. Highest references. Address ENERGETIC, ENGINEERING AND MINING JOURNAL. tf

WANTED—POSITION AS FOREMAN IN a quartz mine. Experience in working men underground. Capable of assaying ores and sharpening tools. Had public assay office for a number of years. Address IDAHO, ENGINEERING AND MINING JOURNAL. No. 15,948, Feb. 3.

A MINING ENGINEER, NOW IN CHARGE coal and coke operations of a large Southern company, seeks engagement this spring, North or South. Cause for change. References from present officers furnished. Address COAL AND COKE, ENGINEERING AND MINING JOURNAL. No. 15,949, Feb. 24.

A MINING SUPERINTENDENT, GRADUated Civil Engineer, with successful experience in difficult and dangerous mines, will engage to manage mines, or to examine and report upon mining properties, and furnish mining plans for safe and successful extraction of ores; satisfactory references. Address C. E., ENGINEERING AND MINING JOURNAL. No. 15,916-tf.

FURNACE FIREBRICK LAYER—A YOUNG man wishes a position. Steady and experienced in building and repairing all kinds of furnaces; ten years' experience in having charge of plants. Will guarantee good working furnaces. Address FURNACE, ENGINEERING AND MINING JOURNAL.

Contracts Open.

WATER-WORKS.—Sealed proposals will be received by the city of Pana, Ill., until February 12th, 1894, and opened at that time, for furnishing the materials and constructing a system of water-works for said city. There will be required about 754 tons of cast iron pipe, 13 tons of special castings, 75 fire hydrants, brick pumping station, two (2) pumps having a combined capacity of one and one-half million gallons per day, steel stand-pipe 20 ft. × 100 ft., the necessary valves, valve boxes, etc. Bids will be received for furnishing materials above or for constructing the works complete. Proposals must be addressed to the Mayor, indorsed "Proposal" on outside of envelope, and must contain a certified check or its equivalent, made payable to the City Treasurer of Pana, Ill., in an amount equal to two (2) per cent. of the amount of the bid. Plans may be seen and specifications and blank form of proposal procured at the office of the Mayor, Pana, Ill., or at the office of the engineers, Voorhees & Witmer, Rooms 65 and 66 Chapin Block, Buffalo, N. Y. W. E. HAYWARD, Mayor. A. B. McMILLEN, City Clerk.

WATER FRANCHISE.—The city of Ottawa, Illinois, will receive sealed proposals until February 13, 1894, for furnishing the city with water. A franchise is to be given for a term of thirty (30) years. The council reserves the right to reject any or all bids of said proposals. By order of the city council. JASON F. RICHARDSON, JR., City Clerk. For further information address N. E. STUCKER, City Civil Engineer.

WATER MAINS, ETC.—Sealed bids will be received by the City Clerk of the city of Boone, Ia., until February 7th, 1894, for furnishing of material and labor for an addition to water mains, together with hydrants and appurtenances, as shown by the plans and specifications therefor, which may be seen at the office of the undersigned. To be completed by June 1st, 1894, and payment to be made in cash when contract is completed and accepted by the city council. The right to reject any or all bids is reserved. JESSE L. HULL, City Clerk.

TREASURY DEPARTMENT, OFFICE SUPERvising Architect, Washington, D. C., January 19th, 1894.—Sealed proposals will be received at this office until 2 o'clock P. M. on the 15th day of February, 1894, and opened immediately thereafter, for all the labor and materials required for the steel and iron work of superstructure of the United States Court House, Custom House and Post Office, Omaha, Neb., including iron columns, floor, ceiling and roof construction, skylight framing, etc., in accordance with drawings and specification, copies of which may be had at this office, or the office of the Superintendent at Omaha, Neb. Each bid must be accompanied by a certified check for a sum not less than 2 per cent. of the amount of proposal The right is reserved to reject any or all bids, and to waive any defect or informality in any bid, should it be deemed in the interest of the Government to do so. All proposals received after the time stated will be returned to the bidders. Proposals must be inclosed in envelopes, sealed and marked "Proposal for Steel and Iron Work of Superstructure of the United States Court House, Custom House and Post Office at Omaha, Neb.," and addressed to JEREMIAH O'ROURKE, Supervising Architect.

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A MINING INVESTMENT OF MERIT

THE BLACK WONDER GOLD AND SILVER MINING CO.,
Of Sherman, Hinsdale County, Col.,

Mine thoroughly developed, four levels, a total depth of 240 feet, over 1,400 feet of shafts and tunnels, from which regular shipments of high-grade ore are made, worth from $50 to $100 per ton. Stock selling at **7½ cents** per share (par value $1.00); soon to be advanced. Monthly dividends paid since July, netting investors at rate of 17 per cent. per annum on present selling price. For stock and full particulars address

The Black Wonder Gold and Silver Mining Co.,
Hon. ANDREW J. WATERMAN (ex-Attorney General of Massachusetts), President.
244 Washington St., Boston, Mass.

FOR SALE.

GROUP OF THREE GOLD LODES;

Mill Site and Placer of Thirty-five Acres, all patented, 300 feet of drifts in ore. Would prefer to retain an interest.

A. W. CARTER, Copper Rock, Colo.

For Sale During Next 30 Days.

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Spar inexhaustible. Said to be best in United States. Situated 4½ miles from R. R. depot at Marion, Crittenden County, Kentucky.

For other information address

S. HODGE, Princeton, Ky.

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35 Cents per share.
Surely to be worth one dollar.

Send orders for stock or free prospectus, giving full details, to

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(ex-Lieut.-Gov. of R. I.), President,
244 Washington St., Boston, Mass.

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AT REASONABLE PRICE.

Favorably located. Sufficiently developed to prove value. Promises quick and large returns. Reasons for sale, lack of capital.

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1. **NICKEL MINE** on Spanish River (navigable) near Canadian Pacific Railway, partly developed; large deposit of good ore.

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The proprietor will put in these properties as stock and make liberal arrangements with capitalists to develop and work. None but principals dealt with. Address

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A fully developed **GOLD MINE** in Virginia is for sale, in part or whole, at **one-fourth** the sum for which a property of the same value could be purchased in a Western State, present controllers not having sufficient capital to put down a chlorination plant and operate it. There are eight to ten true fissure veins assaying $10 to $275 per ton. Mill of 10 stamps, engine, boiler, etc.; miners' wages, $1 per diem; 274 acres of land, over ha under cultivation; plenty of wood and water; good residence and all necessary outhouses. A rich **magnetic** iron ore vein, **free from sulphur,** crosses the property for three-quarters of a mile; five miles from railroad station. Mining can be done 12 months in the year. No snow blockades; no blizzards. Address

FRANK SMYTH, 904 12th St. N. W., Washington, D. C.

MINE AND SMELTING WORKS FOR SALE.

IN GERMANY.

The works are in first-class order and have been in operation for centuries. The supply of ores is inexhaustible. Present production, about 1,500 tons of lead and 7,000 kilos of silver yearly; can easily be increased. High profits guaranteed.

The amount necessary for buying the property and providing working capital is one and a third million marks ($320,000). Address

SMELTING WORKS, "Engineering and Mining Journal."

THE GOLD AND SILVER EXTRACTION COMPANY,

of America, Limited.

(MacARTHUR-FOREST CYANIDE PROCESS.)

Capital, £110,000 Sterling.

TO MINE OWNERS and others having Refractory Gold and Silver ores hitherto untreatable at a profit, the **MacArthur-Forest Cyanide (Patent) Process** of gold and silver extraction offers a solution of the difficulty.

The chief features of this Process are Simplicity, Economy in Working, and Small Cost of Plant.

OFFICE:

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AN AGENT AND PROMOTER WITH unquestionable references and 25 years' business experience in Chicago is especially qualified to act as agent and to promote the interests of manufacturers desiring such services. Address G. D. GREGORY, Room 513, 218 La Salle street, Chicago, Ill.

SPANISH SPEAKING

Civil Engineer, at present **Second Chief,** on heavy mountain work, experienced in **Exploring, Preliminary, Location** and **Construction,** will entertain offers. Am acclimated and familiar with the customs of the tropics. Temperate and can give present employers as ref. F. E., 650 Drexel Bldg., Philadelphia, Pa.

A COMPANY MANUFACTURING FINE grades of tool and other steel by a new process will give liberal commission to man traveling for hardware house or any other line of goods that call him among users of steel, to introduce steel as a side issue. A good man can make money selling this steel, as it is warranted to do all that is claimed for it and thirty days is allowed to try it in. Manufacturers will guarantee the steel to equal anything in the market, imported or domestic. Further information can be had of FRED JULIAN, 29 Broadway, Rooms 71 and 72, or of R. J. WATTERS, Emporium, Pa.

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FOR SALE CHEAP

A Good Instrument for a German Engineer.

1 German Mining Theodolite, with extra level for short level work.
1 Eccentric Telescope.
1 Metric Sliding Leveling Rod.
1 Lantern for same (in case).
1 box with metre reel and 6 screws for spreizenaufleitung of theodolite, and set plate for theodolite on tripod.

Manufactured by LINGKE, of Freiberg, Germany.

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Any time you are in the market to buy

STEEL RAILS,

either New or Second-Hand, write to us. We can furnish any weight of New Rails. We own and have for immediate delivery 400 tons of Second-Hand 60 lb. Steel Rails, guaranteed in good condition to relay, which we will sell cheap.

ROBINSON & ORR,
No. 419 Wood Street, Pittsburg, Pa.

FOR SALE, CHEAP.

One pair of Greene Cut-Off Engines, 250 H. P. (125 H. P. each), 18 × 48 in., 14 ft. × 30 in. flywheel. All in good condition. Have been running up to date. Address

WINCHESTER REPEATING ARMS CO.,
NEW HAVEN, CONN.

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SALT LAKE CITY, Utah Territory, U. S. A.

General attorneys for these leading corporations, viz.: The Ontario Silver Mining Co.; Daly Mining Co.; Eureka Hill Mining Co.; Centennial Eureka Mining Co.; Mammoth Mining Co.; Gemini (Keystone) Mining Co.; Old Jordan & Galena Mining Co.; Pleasant Valley Coal Co.; Corinne Mill, Canal & Stock Co.; Utah Title Ins. & Trust Co. and others, and attorneys (in and for Utah Territory) for the Rio Grande Western Ry. Co., Rio Grande Construction Co., the Emma Co (Ltd.) of London and others.

C. W. BENNETT, JOHN A. MARSHALL & W. M. BRADLEY
Successors to BENNETT, HARKNESS & KIRKPATRICK.

MEETINGS.

THE REGULAR ANNUAL MEETING OF the Stockholders of the COLORADO SMELTING COMPANY will be held at its office at PUEBLO, COLORADO, on Monday, February 12th, 1894, for the purpose of electing directors for the ensuing year and for the transaction of any other business that may properly come before the meeting.

The Transfer Books will be closed February 2d, and reopened February 26th.

H. SUHR, Secretary.

DIVIDENDS.

MOLLIE GIBSON CONSOLIDATED MINING AND MILLING COMPANY.
COLORADO SPRINGS, Colo., December 1st, 1893.
DIVIDEND NO. 41.

A dividend of five cents per share ($50,000) has been declared, payable December 15th, 1893, to stockholders of record on December 8th. Transfer books close December 8th, and reopen December 16th, 1893.

PERCY HAGERMAN, Sec'y-Treas.

WE BEG TO ANNOUNCE THAT OUR Mr. Ede, M. E., leaves here early in April to examine mineral properties in NEW MEXICO, UTAH, Colorado, Oregon and South Dakota. He will undertake other work for private parties or companies. Twenty years' experience. Reference exchanged.

EDE & BURWELL, Mining Engineers,
21 QUINCY STREET, CHICAGO.

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Lands or Mineral Property to Sell

AND WANT TO REACH INVESTORS

The Best Medium to put you in communication with them is the

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A las personas que necesiten maquinaria ó accesorios mecánicos y á bien tengan dar de ello aviso á la administración de THE ENGINEERING AND MINING JOURNAL, se les comunicará la dirección de los fabricantes más acreditados en los respectivos ramos.

Y á cuantos deseen comprar mercancías ó productos Americanos para el extranjero, les ofrecemos de igual manera nuestros servicios para el pronto envío de catálogos, con informes completos sobre los diversos artículos, indicación de precios y descuentos de los fabricantes, etc.

Estos servicios se prestan gratuitamente y sólo en obsequio y beneficio de nuestros suscriptores y avisadores, pues los editores-propietarios de THE ENGINEERING AND MINING JOURNAL ni somos corredores ni exportadores, ni nos ocupamos en la compra ó venta de mercancías de clase alguna.