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WE are informed that the gold production of Nova Scotia for 1893, which was given in the ENGINEERING AND MINING JOURNAL for January 20th at 18,730 ounces, was really 19,900 ounces. The error occurred in making up the statement sent us and was due to a change in the government fiscal year causing some confusion.

OUR latest report from the Joplin ore market shows an improvement in prices over those which have ruled for several weeks past. Zinc ores were in demand and the rates ruled from \$18 to \$18.50 per ton, the latter price bringing out some accumulations from the ore bins. Lead ore sold freely also at from \$17.50 to \$18 per thousand pounds.

IN spite of the low price of silver, some of the Montana producers seem to be earning a profit. The Iron Mountain Company, whose mine is mainly a silver property, paid its first dividend in January, and has followed it up by a second for February, while the Moulton, also a silver producer, has a dividend recorded this week. These payments show some confidence in the future, and perhaps also exceptionally favorable working conditions.

THE Tasmanian Exposition, some account of which is given in another column, will afford our makers of mining machinery an excellent opportunity to extend their relations with the Australasian colonies, which offer so promising a field for their trade. Our machinery is already favorably known in Australia, and as the attendance from all the colonies at the Exposition will probably be large, a still better acquaintance with it can be promoted. It is to be hoped that there will be a good representation of this country.

THE blast furnace reports for February show but little change from the January statements. There was a decrease during the month of five furnaces in blast, but an increase of about 2,200 tons in the weekly capacity, the changes being caused by some large furnaces going into blast, while several smaller ones have blown out. The fact is that the older and smaller furnaces are hardly able to keep going at the present prices, while the larger and better equipped ones may be able to run at a moderate profit. While February shows no change of moment, however, there are indications of a much better demand for iron at various points, and we believe that March will show a marked improvement.

THE tin mining industry of Cornwall is just now in a very doubtful condition, owing to the low price of the metal, and perhaps also to the slowness in adopting improvements and adherence to old methods which have generally characterized Cornish mining, and which have not permitted reductions in mining costs to meet in some degree the fall in prices. The Dolcoath, the largest mine in Cornwall, which paid a dividend of 40 shillings per share last February, this year pays 5 shillings only, and its stock, the highest price of which in 1893 was 101, has fallen to 70½. Other leading companies also show heavy reductions in the stock quotations, Wheal Grenville, for instance, falling from 20 to 14½; Carn Brea from 19½ to 13, and Tincroft from 16½ to 11½. A number of companies have passed dividends for the present, with no immediate prospect of resuming.

THE railroad statistics for the year ending June 30th, 1893, have been partially collected by the Interstate Commerce Commission and some general statements are given out. Reports have been received from 479 companies, operating in all 145,870 miles of railroad. Their gross earnings were \$1,085,685,281, or \$7,443 per mile of road; the expenses were \$735,427,532, or 67.7 per cent. of the gross earnings, leaving as net earnings \$350,257,749, or \$2,401 per mile. These net earnings were nearly 3.5 per cent. on the entire capitalization; but as many deductions have to be made for rental and other charges, and as a large part of the capital is in bonds bearing higher rates of interest, the returns in dividends on the stock were very much less. The gross earnings per mile of road showed an increase of \$230 over the previous year, but the expenses increased largely, so that there was a decrease of \$3 per mile in net earnings. On the whole, however, it was a fairly prosperous year for the railroads.

ACCORDING to Mr. FRED. SLOSS, of Birmingham, as quoted in the Southern Journal of Commerce, the reason Southern pig iron cannot be used to manufacture basic steel is because it is too low in phosphorus. Mr. SLOSS has hit upon a happy idea by which he proposes to overcome this difficulty. Florida possesses numerous and rich beds of phosphate rock, and it is here he proposes to go for his phosphorus. The material costs \$10 per ton delivered in Birmingham, but as only a small proportion will be required, it is estimated that the actual cost per ton of pig iron will be about 65 cents. While such a scheme is not wholly impracticable, it presents somewhat greater difficulties than have apparently been considered, and the most serious of these is in the relatively large percentage of silicon in Southern pig. As yet no furnace in the South has succeeded in making an iron continuously and economically low enough or regular enough in silicon to be suitable for basic converter use, even disregarding the question of phosphorus.

We find in a recent number of the "Financial Times," of London, a report of a suit brought in the Court of Queen's Bench to recover damages from certain parties engaged in promoting a mining company, one of the defendants in the case being a Mr. EDWARD WALKER, a member of the firm of Arthur Wilson & Co., of London. We desire to state that the gentleman mentioned is not, and is in no way connected with, the Mr. EDWARD WALKER who acts as representative of the ENGINEERING AND MINING JOURNAL in London. It is scarcely necessary to say that the representative of the ENGINEERING AND MINING JOURNAL is not and cannot be interested in any way in the formation or promotion of companies. The JOURNAL and its representatives occupy an absolutely independent and disinterested position always, so that they may be able to speak with entire freedom from any motive of self-interest concerning any project in the field we represent, whether old or new, that may come before the public.

THE production of salt in the United States for the year 1893, as shown by the statistics collected for the new volume of the "Mineral Industry," which is now nearly completed, was as follows, in barrels of 280 lbs., comparison being made with the returns for 1892:

	1892—bb's.	1893—bb's.
New York.....	4,400,000	4,413,181
Ohio, West Virginia and Pennsylvania.....	738,000	925,320
Michigan.....	3,812,054	3,183,341
Illinois.....	60,000	70,000
Louisiana.....	192,850	172,500
Texas.....	120,000	144,435
Kansas.....	1,232,850	1,070,000
Utah.....	90,000	155,900
Nevada.....	2,000	10,000
California.....	23,000	312,850
Other States.....	75,000	100,000
Total.....	11,783,754	11,435,487

The production last year showed a slight decrease of 250,267 barrels, or 3 per cent., from 1892. This was due to a smaller demand for manufacturing purposes, since the household use of salt will, of course, vary from year to year very slightly. The production was affected to a considerable extent from local causes. In Utah, for instance, the great decrease shown was the result of a cessation of the demand from the mills and reduction works, which also caused the falling off in the comparatively small output of Nevada.

New York in 1893 retained the leading place, Michigan followed and Kansas remaining third. These three States furnished 83 per cent. of the total production last year, a somewhat larger proportion than in 1892.

Full information concerning the salt industry will be found in the forthcoming volume of the "Mineral Industry."

THE attention of investors in England and of our London contemporaries is called to an American mining enterprise called the Poorman Consolidated Mining Company, whose shares are being industriously worked up on the London market by certain promoters.

Dividends are being paid on the stock, but not only are they not earned by the mines, but the mines are scarcely producers, having, as we are advised by well-informed and what we esteem reliable parties, but few men at work, so that the entire output is insignificant.

The London stockholders are told that a new mill has just been completed by the company at its mines in Idaho, but our "special artist on the spot" cannot find it; in fact he says it does not exist.

The company has recently undergone a transformation, being now, we are told, a New Jersey organization, and the stockholders of the English company, who are exchanging their stock into shares of the New Jersey company, may find when the bubble bursts that the cunning promoters have evaded responsibility.

In brief, the Poorman Consolidated is an excellent concern to avoid. Had our attention being called to the enterprise sooner, this warning might have done more good. It is certainly a safe precaution for English investors in mining shares to read the ENGINEERING AND MINING JOURNAL and, before parting with their money, to make a few inquiries concerning the properties and promoters, from responsible persons who are in a position to know or to ascertain the facts. The columns of the ENGINEERING AND MINING JOURNAL are always open to its subscribers for such inquiries, and no dangerous enterprise can be perpetrated when this searchlight sweeps the field.

BIMETALLISM IN ENGLAND.

There are from time to time signs that English manufacturers and business men are realizing the injury done them by the present monetary policy of their country, and especially by the disastrous experiment of the Indian government. In his recent inaugural address Mr. Daniel, the newly elected president of the Manchester Association of Engineers, a body whose members are likely to be especially affected by the state of export trade, took as his text the relation between bimetallicism and trade and called attention to the present bad condition of the English iron and allied trades and to the almost entire absence of export orders which had so seriously affected business. The de-

mand from British India had ceased altogether for the time, and nearly the same condition existed with other silver using countries. In short, his conclusion was that the business of the world was in a disorganized state, and England, as the chief manufacturing and exporting country, was necessarily the chief sufferer. The remedy he proposed was a return to bimetallicism and an endeavor by Great Britain to establish some form of international agreement. His remarks, we are told, met with general approval from his hearers.

There is nothing especially new about this, and Mr. Daniel's conclusions probably do not differ materially from those formed by careful observers elsewhere, but they are of interest as showing the drift of public opinion, and the fact that there is a growing sentiment in England against the policy which has been so closely followed by the government and in favor of an intelligent bimetallicism. There is also, we think, a wider understanding of the case and some realization of the fact that Great Britain cannot alone fix the monetary policy of the world; and that in attempting to do so she is only inflicting great injury upon her own people. The manufacturers are naturally the first to feel this, but expressions in favor of international agreement continue to come from various, and, in some cases, unexpected quarters. It is hard for Englishmen to acknowledge a mistake, but they may be brought to it in time, especially when the consequences touch their prosperity and earnings so closely.

Predictions are generally unsafe, but at the present time it seems not improbable that the next proposition for the re-assembling of the silver conference may come from Great Britain, and may be coupled with a willingness not heretofore shown by that country to enter upon some form of international agreement. Such a result will be very desirable, since it will remove the chief obstacle which has heretofore existed to an international agreement and will give an opportunity for a permanent settlement of this most important question.

THE BASIC STEEL PRODUCT IN 1893

The growth of the production of steel by the Thomas-Gilchrist or basic process is shown by the returns just received for the "Mineral Industry," giving the output for 1893 under the patents covering that process in the different iron making countries of the world. The figures are in metric tons, and we compare them here with those for 1892:

	1892.	1893
Germany and Luxemburg.....	2,013,484	2,304,937
England.....	406,839	363,801
France.....	287,521	332,107
Austria Hungary.....	288,522	320,033
United States.....	91,729	262,403
Russia.....	78,661	
Belgium.....	56,274	
Total.....	3,202,610	3,587,615

This shows an increase of 384,975 tons, or 10.7%, in a year which has not been a favorable one for the industry, since it has been in almost all countries one in which the iron and steel industries have shown a temporary decline, or have at least been stationary. The total production of steel by this process since its first introduction is given in the "Mineral Industry," Vol. 2, now in press.

The growth has been constant and marked, except in the especially unfavorable year of 1888. Germany continues to be the country where the process is most in favor, its especial adaptation to the phosphoric ores of some of the leading iron districts having given it a standing there and brought it into favor at an early date. In England there was a decrease of some 10.5 per cent. in the output, a contrast to the showing in all the other European countries.

The figures for the United States in 1893 are as yet only estimated. The increased use of basic steel in this country in the future is probable.

A feature of considerable economic importance in this process is the large proportion—about 30 per cent.—of phosphate of lime contained in the slag. Last year a production of some 863,000 tons of this slag was reported, and nearly all of that made at the European works was ground and sold for use as a fertilizer, forming a considerable item in the profits of those works.

THE DEL MAR STATEMENT OF PRECIOUS METAL PRODUCTION.

Accurate statistics of any industry are so valuable, and erroneous statistics so harmful, that we feel called upon to notice the statement of the world's production of the precious metals in 1893, recently issued by Mr. Alexander Del Mar in London. We have no means at hand of checking the amounts credited to some of the foreign countries, but if their accuracy or rather inaccuracy is equal to that of the figures attributed to the United States, they are far worse than worthless.

Mr. Del Mar appears to be profoundly ignorant of the manner in which the statistics of the production of the precious metals are com-

piled in this country, both by the United States Mint and by the "Engineering and Mining Journal." There is no foundation whatever in recent years for this statement that "the product of both gold and silver, especially the latter, has been greatly exaggerated in the statistical estimates printed with the sanction of the Mint Director." The mint report for silver production in 1892 (58,000,000 fine ounces) was, in fact, 7,000,000 ounces too small.

The gold and silver output of the United States is very accurately ascertained each year by the Director of the Mint and by the "Engineering and Mining Journal."

DEL MAR'S ESTIMATE OF PRECIOUS METALS PRODUCT OF THE WORLD IN 1893.

Country.	Gold.	Silver.
United States.....	\$5,140,300	\$5,000,000
Australia.....	6,600,000	2,078,000
South Africa.....	5,922,250
Russian Empire.....	5,391,172	133,560
Chili, Peru and Bolivia.....	356,000	3,010,900
Mexico.....	60,650	3,801,570
Guiana, Venezuela, Colombia and the Isthmus.....	1,520,000	478,320
Canada (Est.).....	180,000	55,000
Germany and Austria.....	673,750
British India.....	800,000
Japan.....	1,600,000	260,000
All other.....	60,000	86,000
The World.....	\$26,228,672	\$16,351,490
1892.....	\$24,005,430	\$17,795,649

Instead of \$25,000,000 in gold and \$25,000,000, or say 31,000,000 fine ounces in silver, representing our output, the actual production of refined gold and silver in the United States in 1893, and the gold and silver exported in copper matte, but not including the gold or silver obtained from imported ore or bullion, was very nearly \$37,000,000 of gold and 56,000,000 ounces of fine silver.

These figures, though not final, are based upon the returns of every producer of fine gold and silver in the United States, and will be but slightly modified by the revision now being made preparatory to their publication in the "Mineral Industry," Vol. 2, now in press.

Mr. Del Mar's guess is, therefore, about 33 per cent. too little on the gold and nearly 45 per cent. too little for the silver we produced. Such alleged "statistics," if taken seriously, would be extremely injurious. It is to be hoped Mr. Del Mar has guessed more accurately as to the production of other countries than he has done for the United States.

NEW PUBLICATIONS.

ANNUAIRE DU BUREAU DES LONGITUDES POUR L'AN 1894. Paris, France: Gauthier-Villars & Fils. Pages 60.

This work, which corresponds in some degree to our "Nautical Almanac," contains, in addition to the usual tables, calendars and astronomical calculations, several special articles by authorities on coinage, statistics, geography, mineralogy, etc., and the following special papers: "Light and Electricity, according to Maxwell and Hertz," by M. Poincaré; "The Origin and Employment of the Mariner's Compass," by Rear-Admiral Fleurbaey; "Four Days of Observation on the Summit of Mount Blanc," by Professor Jaussen. There are also several memorial notices of men eminent as astronomers or in the naval world.

ANNUAIRE DES MINES, DE LA METALLURGIE, DE LA CONSTRUCTION MECANIQUE ET DE L'ELECTRICITE. Edited by Jules Gouge. Paris, France; E. Bernard & Cie. Pages 114.

This work, which is prepared and published in connection with the "Journal des Mines," is a general directory of French mines and the allied industries, including lists of manufacturing establishments of many different classes, and also of engineers in the public service and connected with private establishments. It gives also a summary of the French laws governing mines, special laws relating to factories, patent and trade-mark laws, and, in addition, some account of the tariff laws of those countries with which France has extensive business relations. It appears to have been carefully compiled and is a very useful directory.

DYNAMO AND MOTOR BUILDING FOR AMATEURS. By Lieut. C. D. Parkhurst, U. S. A. New York: The W. J. Johnston Company, Limited. Pages 163, 71 illustrations. Price \$1.

In this book, clear and concise instructions, accompanied by working drawings, are given for the construction of such forms and types of motors and dynamos as are simply made and yet will produce fairly efficient results. While intended for the amateur, the information, particularly in the chapters on armature windings, connections and currents, and on the design of a 50-light dynamo, will be of value to almost every electrician. Full descriptions and working drawings are given for the following machines: A small bi-polar shuttle armature motor of simple construction, capable of driving a small ventilating fan with current from a primary battery; a small motor for driving a sewing machine, for which no castings or patterns are needed; a sewing machine motor of more finished appearance and of greater efficiency than the above; a dynamo of modern type, capable of lighting 50 lamps of 16 candle power; a chapter on armature windings, connections, and currents gives minute instructions, illustrated by drawings, in regard to these subjects. The chapter on the 50-light dynamo will be found instructive aside from the construction of the dynamo, as all of the technical points involved in the design are treated, such as the proportioning of the armature and the armature wire, the calculation of the magnetic circuit, etc. In an appendix data of some high class dynamos and motors are given which will be of assistance as guides should the amateur wish to design any other types than those treated in the book.

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.

The Political Economy of Natural Law. By Henry Wood. Boston, Mass.; Lee & Shepard. Pages 306; price \$1.25.

Department of the Interior: United States Geological Survey. Production of Coal in 1892. By E. W. Parker. Washington; Government Printing Office. Pages 238.

Proceedings of the International Geographical Conference in Chicago, July 27th and 28th, 1893. Washington; published by the National Geographic Society. Pages 153; price 75 cents.

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.

Granulating Slag and Matte.

EDITOR ENGINEERING AND MINING JOURNAL:

Sir: I have just read in your issue of January 27th, Mr. John Longmaid's letter on the granulation of slag as practiced at Clifton. Mr. Longmaid's memory is, I think, at fault. Our works are not on the Gila; nor were they threatened with suspension on account of difficulties in removing slag. I considered various ways of removing slag, among the number granulation by water. Possibly Mr. Longmaid, like many others, volunteered an opinion. If so, I have no recollection of it; and I can assure him that it was not considered or in any way acted upon.

The process now in use evolved itself from the jet process in operation at the works of the Anaconda Copper Company, which I visited in the fall of 1888. Shortly after my return to Clifton I erected the necessary pipes and fittings in imitation of what I had seen in Montana. These pipes are still in position. I found that the jet process could not be worked satisfactorily because the fall was insufficient. I then reasoned that if I granulated with a jet and carried away the granulated slag in a launder—just as I handled the tailings from the concentrator—I might attain my object in that way. This was tried, but subsequent working showed that the jet was unnecessary, and other improvements followed. The process was, therefore, not worked out from Mr. Longmaid's suggestion nor was it copied from Mr. Raht's process, which I heard of for the first time a few weeks ago.

CLEFTON, ARIZONA, Feb. 2, 1894.

JAMES COLQUHOUN.

The Basin-Elkhorn Mine.

EDITOR ENGINEERING AND MINING JOURNAL:

Sir: Your correspondent "Glasgow" makes inquiries about the Basin-Elkhorn Mining Company in your issue of January 13th. He is evidently not a shareholder, for he makes a statement which one acquainted with the company would not have made, "That the company was extensively advertised at the time it was launched before the public, both in England and in Scotland." As a matter of fact, the company is a perfectly private one; it was never advertised in any way, and the whole of the shares were taken up by Mr. Maclean, a well known London merchant, and his personal friends. Neither has the mine suspended operations. A short statement of the company's financial position may be interesting. The nominal capital is £150,000, in 100,000 deferred shares of £1 each, and 50,000 preferred shares of £1 each. The vendors received the 100,000 deferred shares and 25,000 preferred shares, credited as fully paid, but no cash was received by them at all. The deferred shares are to yield no dividend until 100% has been paid on the preferred shares. Of the remaining 25,000 preferred shares only 1,420 shares have been paid up at present, so £1,420 represents the total possible expenditure on the mines. Large bodies of concentrating ore have been proved at the 100-ft. level, and preparations are being made to sink the shaft down another 100 ft. to reach shipping ore. The shareholders are now arranging to take up more of the preference shares in order to provide the necessary capital to purchase concentrating machinery, and until this is erected little is being done in the mine. The silver crisis has naturally caused some anxiety, but as the ore has gold contents, it is not at all likely that the prospects of the company will be seriously interfered with, though of course the profits will be reduced. The directors are the chief shareholders, and Mr. Maclean has paid personal attention to the property, having visited it five times in the two years of the company's existence. I am sure that if "Glasgow" had communicated with Mr. Maclean he would have received full and true information as to the company's position and the state of the mine.

LONDON, Feb. 1, 1894

Nickel Coins.

EDITOR ENGINEERING AND MINING JOURNAL:

Sir: The suggestions made by Mr. George W. Shaw in your issue of January 27th under the title of "Some Proposed Reforms in Coinage" should have the careful consideration of the mint authorities. In the matter of token coins especially there is much room for improvement. The dirty bronze cents and clumsy "nickels" at present in use are an imposition upon the public. Pure nickel (the metal was at one time included by chemists in the gold and silver group, on account of its possessing some qualities closely resembling those of these elements) is in a marked degree suitable for coinage purposes, and is gradually replacing the nickel alloys so widely employed for this purpose. Switzerland, the pioneer among modern nations in the use of these alloys for minor coins, sometime since abandoned them in favor of coins struck from the pure metal. Austria-Hungary

is now following her lead by preparing a large issue of pure nickel coins. Such coins are more durable than any of the alloys at present in use and possess a number of advantages. In the first place they are practically out of the reach of the counterfeiter, for the metal is so hard and difficult to handle that coins can only be prepared in a large and well-equipped plant, especially constructed for the purpose. Then furthermore, as they are magnetic, a simple instrument convenient to any person whose calling requires him to handle large quantities of token coins would afford an easy protection against spurious representations. The same factor of safety against counterfeiting is possessed in so large a degree by no other metal at present used for coinage purposes; and this fact is of importance now that it has become so easy to produce and circulate bogus coins. The hardness of nickel would favor carrying out Mr. Shaw's suggestion of an octagonal shape for coins made of this metal, as they would not suffer serious abrasion, and that unusual form would enable one to distinguish them by a very dim light indeed. When other currency is procurable hardly anybody would choose to have a five-dollar gold piece in his possession, on account of the danger of parting with it by mistake for a "nickel." Complaints about the similarity in the appearance of the two coins are quite common. Another advantage nickel possesses over most other metals is that it does not tarnish or oxidize under ordinary circumstances, but it retains a bright surface, nor is it attacked by saline solutions, a fact which among other things debars aluminum from similar use. Our present "nickels" consist of an alloy of 75% copper and 25% nickel, and are too thick and heavy. The fantastic funereal design on the older representatives of these coins has rarely been exceeded for unique hideousness. There is no good excuse for these unsatisfactory characteristics unless it be our national propensity for distinguishing ourselves by the general lack of artistic taste in the designs, etc., of our coins and postage stamps. At the present time the five-cent pieces are the only representatives of our nickel-alloy coinage minted, and there were 1,368,5 tons of these coins outstanding on June 30th, 1892. They have little intrinsic value, for the blanks which the Government purchases all ready for minting cost only a trifle over 0.3 cent each. Assuming that nickel is worth 50 cents per pound (it can be purchased for much less), the weight of the present "nickels" (77.16 grains) could be retained if desirable and yet the blanks would not cost quite half a cent if made of pure nickel. Everything considered, it would appear as though the retirement of the unsightly and clumsy "nickels" now current, and the substitution in their stead of bright, clean, pure nickel coins of slightly different shape, as suggested by Mr. Shaw, would be an unmitigated boon to all who are obliged to handle these tokens. They could be made a trifle thinner and less heavy without detracting from their usefulness, and if to this were added a simple and pleasing design, the country would be considerably the gainer. There is no apparent reason why the one-cent pieces should not also be made of pure nickel, preserving their present weight and diameter, which are convenient.

Anyone who is interested in these matters will find much valuable data contained in a pamphlet published by Mr. Joseph Wharton concerning small money and nickel alloy coinage. Mr. Wharton has for many years made a special study of this subject.

DENVER, Colo., Feb. 1, 1894.

W. L. AUSTIN.

The Origin of Coal.

EDITOR ENGINEERING AND MINING JOURNAL:

Sir: I am pleased to see that two champions—"Froissart" and "Old Theory"—have been attacking the armor. I like the style of warfare of the first, but in regard to the second I think he has taken a good name, and should judge that he had a breastwork of old books, and had not been in the field to gather any ammunition at all. A man's course of reading must be very limited not to have known all the points he has touched. The first paragraph of his article certainly contains some surprising ideas. I think the theories there set forth must be his own manufacture, particularly where he says that had such a fluid have existed, it would have settled down in the Laurentian age and not have waited until the Carboniferous "and we should have learned of its existence through volcanic agency." The volcanic age was post-Triassic; and what has it shown us of the inner contents and lower formations? Another point, he says, "I make reference to the limestone of the Carboniferous as an evidence, etc." He makes a mistake. I refer to limestones in general, but particularly to those previous to that age, and only to illustrate the presence of carbon on the solid earth. The only limestone I know of in the Carboniferous in Pennsylvania is a small bed in the lower measures.

This will also apply to the first champion's attack. I made no statement that the carbon of the coal beds had previously existed in the limestone deposits. I am much obliged to "Froissart" for his figures to show that there is enough carbon in two cubic miles of limestone to supply the market of the United States for a year, if we could only get it into a fuel shape. Both parties attack me as if I had stated that the carbon must have been decomposed from the limestone and formed by some process the present coal beds. Their arguments then go to show that that could not have been done. This presupposes that all carbon of the planet must have been used up in limestone, and other rocks or minerals, and then in the Carboniferous age caused a "change of base." These are their own theories, not mine.

If we accept the theory that this planet was once in the same condition as Saturn is now—and I believe that it is generally accepted—could not carbon have existed outside of the solid sphere? If I have read aright, geology starts with the idea that the material of the sphere was in a solid condition since the Laurentian age—that is, all the material of the present solid earth had been collected into one mass and that stratification of the different formations resulted from transportation and transmutation of the material. That has been a theory; what it is worth study will yet prove. A theory is simply a satisfactory explanation for the time being of an occurrence, and many

that have been set up have been overthrown. The theory of gravitation has answered, but some are attacking that now. There is a theory that the construction of animals is such as to show that they are intended to move forward, with the exception of the crab, and that was created for the express purpose of providing the rule by the exception. I heard of a man who had this fixed in his mind, and having observed, while passing a barn, a calf's tail sticking through a knot hole, could not understand how the calf got through the hole. I commend this example to "Old Theory."

The great mass of the study of geology results in theory, and progress in the study results in changes of these theories. No doubt, many changes will continue to be made. If we look at a section of strata—for example a section lying between two coal seams—theory tells us that the age of each stratum is according to its relative position. The lowest is the oldest and the top the latest formed, but this is not necessarily a fact. They may all be of one and the same age. The whole material may have been at first a mixed mass and gradually the silica, limestone, shales, slates and clays become segregated. I have heard—on good authority—of a large embankment made up of very mixed material, having in the course of a few years become stratified, and I have noticed something of the kind where vacant lots in cities have been filled with rubbish; that is, the material showed a partial stratification quite different from what the accidental position could have been. Now may not the stratification of different formations have taken place in the same way? This, of course, could not apply to beds of limestone, which were built up by animalcules, but I think we are warranted in applying it to limited sections, and thus we may reach a modification of the ideas of stratification.

Chemists have given the geologist an immense amount of information, but he has an immense amount yet to learn, even of those things which we see daily occurring. For example, can he tell us how a hen collects daily enough lime to make an eggshell from a soil in which he can find 1 or 2%, or even less, chemically combined? Therefore to say that nature could not separate carbon from limestone except as carbonic acid, and that it could not go through all the changes necessary to put it in combination with something else to make coal beds, is asserting too positively.

To return to the original proposition: I stated that from my examination of coal seams—having worked coal mines several years—it caused me to believe that the material of coal beds was once in a fluid state, the evidence of that seemed to me much stronger than that it resulted from the collection of vegetable matter. I made no suggestion of what its previous condition had been or from whence it came, and suggested that the question is as hard to define as the previous condition of the siliceous acid of the sandstones, the lime of the limestone beds, and the alumina of the slates and shales.

It may be that there are holes in the armor, and that I may have been scratched, but if so I have not felt it yet.

A. DE GAUL.

THE TASMANIAN EXPOSITION OF 1894.

The International Exhibition in Hobart, Tasmania, will be held during the summer of 1894-95, the summer in that country meaning from November on, and will last for six months. The government of Tasmania has given its official patronage to the undertaking. The proposal was taken up by the people of Tasmania and the adjacent colonies with such approval that the necessary capital was at once subscribed, and the buildings are now ready. The city of Hobart is most favorably situated. The colony has a population of about 150,000, and with the other Australian colonies, the total population within reach is a little over 4,000,000 inhabitants. Hobart is within easy access of the other colonies, and tourists' routes to all places of interest radiate from that city.

The objects of the Exhibition are to promote and foster industry, science and art, as well as to stimulate commercial enterprises by inviting all nations to exhibit their produce, both in the raw and finished state. Large exhibits are coming from Great Britain, the continent of Europe, India, Canada, the Cape and all the Australian colonies. The site which has been granted by the government for the exhibition buildings covers about 11 acres, and the port of Hobart offers cheap and ready means for receiving and delivery of all sea-borne goods. All the arrangements are in the hands of a capable directorate, and all matters connected with the Exhibition will be carried on by men who stand very high in the community. Certificates of merit will be awarded by competent juries in every section.

It should be stated that Tasmania is one of the richest mining countries in the world. Gold, silver, tin, copper and many other metals, as well as coal, are found in abundance in a part of the colony, while the rest is devoted to agricultural interests, there being many fine sheep-farms and cattle-raising stations. In addition to this, grain of every description is obtained in large quantities, owing to the extreme fertility of the soil. For these reasons, machinery for mining purposes and agricultural implements are in great demand, and therefore America should have a first-class exhibit in these specialties, as it is undoubtedly ahead in machinery of this class.

The official agents for the United States of America are Woltman, Keith & Company, No. 11 Wall street, New York. Applications for space must be made by May 1st at the latest, as all goods intended for the Exhibition must be forwarded from New York by July 1st, 1894. All information needed can be obtained at the address given.

A Proposed Tennessee Canal.—The Tennessee Legislature some time ago made an appropriation for the survey of a canal to connect the upper Tennessee River with the Mississippi. Surveys have been made by Capt. J. J. Williams, who has also submitted a report. Two routes were examined, one by the Forked Deer River, which would require 30 miles of canal, and one by the Big Hatchie, which would call for 32 miles.

A SAFETY LAMP WITH TESTING ATTACHMENT.*

The accompanying illustrations show a new gas-testing safety lamp, the invention of Mr. A. H. Stokes, Inspector of Mines for the Midland District, in England. The object of the lamp is to place within the reach of every mine official an apparatus at once simple in arrangement and easy of application for the purpose of testing air currents or parts of a mine when the ordinary oil flame of the safety lamp fails to detect gas. It is now generally admitted that an air current which fails to indicate gas when tested by the oil flame may contain a percentage of gas which, when mixed with coal-dust, becomes an inflammable mixture, and therefore, especially in dusty mines, it is advisable to periodically test and ascertain the percentage of fire-damp in the return air currents of such mines. If such tests can be made with the ordinary safety lamp without carrying cumbersome apparatus, there will be little difficulty in making the tests and recording them in official reports.

The lamp now under review is a modification of the "Gray" type of lamps, one of the four lamps which were recommended by the Royal Commission on Accidents in Mines. The lower gauze ring supporting the glass is all in one piece, and thus there is no danger of the lamp being sent into the mine without such gauze. The upper part of the lamp is provided with Mr. Stokes' arrangement of shut-off for extinguishing the lamp if required. Without the alcohol adjustment the lamp is in every respect an officials' safety lamp for daily use, but the apparatus is not confined to any particular lamp, and may be applied with corresponding advantage to any description of safety lamp.

The following instructions issued by the makers, Messrs. Davis & Son, of Derby, with each lamp, fully describe its mode of application: The vessel of the testing lamp (Fig. 4) should be charged with pure alcohol or alcohol absolute. The wick of the alcohol vessel consists of two strands drawn from the round wick used for oil in safety lamps, one length doubled and drawn through the wick tube by the wire needle accompanying the tester. The wick is to be drawn through the cut level with the top of the tube. The slit i, Fig. 4, across the tube, gives the standard flame.

For testing, unscrew the brass plug c, Figs. 1 and 2, at the bottom of the lamp, and insert the tube of the tester, screw it up the

placing a standard scale inside the glass, or even marking it on the glass, had to be abandoned, owing to the non-luminosity of the alcohol testing flame. Usually it is unnecessary to use the alcohol flame for testing 3% and upward of gas; the oil flame is intended to be used for all ordinary examinations and tests. Pure alcohol is used, and the amount of alcohol contained in the receiver will make about 120 tests, and will burn continuously for about four hours. Methylated spirit can be used, but its results are much inferior to those given by pure alcohol, and burns with a slightly yellow flame.

GOLD AND SILVER MINING IN THE SOUTHERN STATES.

Written for the Engineering and Mining Journal by Stuart W. Cramer, M. E.

In presenting this review of the gold and silver mining industry of the Southern States for 1893 I will pass rapidly over the ground formerly covered, as follows:

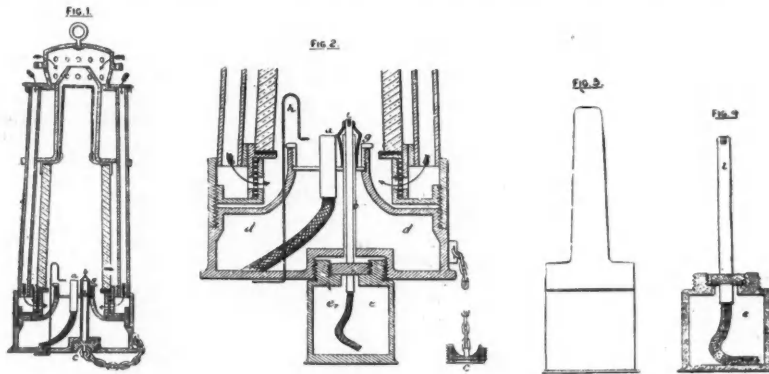
The first authentic find of gold in the United States was that of the Reed nugget, in 1799, in Cabarrus County, N. C. By 1848, the domestic production reached \$24,936,769; \$12,808,575 of it was deposited at the mints, of which all except \$37,850, was recorded as being from the Southern States.

The following table includes my former estimate of the total production of gold and silver brought up to date by adding that for 1893:

	To end of 1892.	1893.	Total.
Maryland.....	\$14,978	\$103	\$15,079
Virginia.....	3,189,610	5,919	3,195,529
North Carolina.....	21,588,844	63,237	21,652,081
South Carolina.....	3,354,509	125,904	3,480,413
Georgia.....	15,902,260	106,446	16,008,706
Alabama.....	403,373	6,387	415,760
Tennessee.....	165,526	269	165,795
Total.....	\$44,652,098	\$311,259	\$44,963,357

The table, as published in the "Mineral Industry" for 1892, has been generally accepted and copied. Its accuracy has been confirmed by additional data collected during the past year.

The gross production for 1893 remains nearly the same as that of the preceding year: North Carolina has fallen off, however, about



GAS-TESTING SAFETY LAMP.

full length of the screw, wait a few seconds until the heat causes the alcohol to ascend, and ignite from the oil flame. To expedite the ignition, the lamp may be held leaning slightly to one side, so that the oil flame touches the top of the alcohol tester. When the alcohol flame has reached its standard height the oil wick is drawn down and the light extinguished. After the test is made the oil wick is raised, bent over by the pricker, and lighted by the alcohol flame. The alcohol vessel is then unscrewed, the plug put in, and the lamp becomes the ordinary safety lamp used by officials.

The gas caps will be as follows: Alcohol flame with a standard height of 13 mm. (0.52 in.). With 0.5% of gas the gas cap, 15 mm. high, very pale; 1% gas, cap 25 mm. high, pale blue; 1.5% gas, cap 36 mm. high, pale blue; 2% gas, 42 mm. high, clear blue spiral; 2.5% gas, 50 mm. high, distinctly defined gas cap. At 3% gas the oil flame will indicate, and it is not intended to use the alcohol tester until the oil flame has failed to indicate.

The chief advantages claimed for this lamp are: It is the officials' ordinary safety lamp, and therefore can be used for light and daily work in examining and testing the mine. The alcohol tester is simple, easily applied, and can be carried in the waistcoat pocket. It is only used for detecting low percentages of gas after the ordinary oil flame has failed to indicate its presence.

The testing for low percentages of gas requires a little training in observation, for the cap is so pale in color and the thick circular lamp glass so detrimental to the observation of such caps, that it requires very careful sight-searching to clearly detect the very pale blue cap due to very low percentages of fire-damp; but any person accustomed to testing for gas in a mine will have little difficulty in using the alcohol tester and ascertaining with approximate accuracy the percentage of gas contained in the atmosphere of various parts of a mine. To assist in detecting the gas cap, the glass is made with a dead black background 1 in. broad for the full depth of the lamp glass, and for the purpose of easy estimation of the gas caps the alcohol flame is made so that when burning at its standard height of 0.5 in., the gas cap may be approximately taken as 0.5 in. of cap to equal 0.5% of gas; or, if the gas cap be estimated at 1 in., the atmosphere may be taken to contain 1% of gas. The idea of

\$24,000, and South Carolina, Georgia and Alabama have gained. The details of this production are shown in the following table:

ESTIMATED PRODUCTION OF GOLD AND SILVER IN THE SOUTHERN STATES, 1893.

States.	Gold.		Silver.		Total Value.
	Fine Ounces.	Value.	Fine Ounces.	Coining Value.	
Maryland.....	5	\$103			\$103
Virginia.....	225	5,891	22	\$28	5,919
North Carolina.....	2,460	50,852	11,900	15,385	66,237
South Carolina.....	6,070	125,478	330	426	125,904
Georgia.....	5,150	106,046	305	384	106,446
Alabama.....	304	6,284	80	103	6,387
Tennessee.....	13	268	1		269
Total, 1893.....	14,267	\$294,922	12,638	\$16,337	\$311,259
1892.....	14,803	306,016	9,854	12,740	318,756

The total deposits of Southern gold and silver in the mints and assay offices, shown by the reports of the director of the Mint, are given here to complete the statistics. To the end of the last fiscal year (June 30th, 1893), the total was: Gold, \$25,024,271; silver, \$69,076; total, \$25,093,347; of which \$5,059,188 (gold) was coined at Charlotte, N. C., and \$6,106,569 (gold) at Dahlonega, Ga. These two mints, it will be remembered, were opened for business in 1838 with deposits of \$84,335 and \$102,915, respectively, the first year; their coinage reached its maximum about 1847, amounting to nearly \$1,000,000 a year, about equally divided between the two; they were closed down at the breaking out of the war, and seized by the Confederates.

The one at Dahlonega was never reopened, but was sold and is now used as a State Agricultural College; the one at Charlotte was reopened as an Assay Office in 1870, and its yearly deposits now amount to about \$240,000.

The ores to be treated in the South are (1) quartz, both free-milling and refractory; (2) and slates of similar nature; occasionally one meets with a limestone, dolomite or porphyry. By far the larger proportion belong to the first class and are refractory. The most successful treatment, as shown by mint returns, is that by stamp mill with both inside and outside plates, followed where pyrites is present by roasting and barrel chlorination. This has been brought to a high state

* Abstract of article in the "Colliery Manager," London.

of perfection by A. Thies, at the Phenix (N. C.) and Haile (S. C.) mines. The former has been closed down by failure of the ore, but the latter is in full operation with large reserves for future operations. The chlorination plant at the Brewer Mine, S. C., has also proved a success, and will be increased. The cyanide process bid fair to obtain a foothold in this section and flattering results were expected at the Moratock mine, N. C., and Creighton (old Franklin mine, Ga.). The former has been abandoned, and the owners of the latter have contracted with the Mecklenburg Iron Works, of Charlotte, N. C., to put in a chlorination plant according to Thies' specifications. The smelter at Thomasville, N. C., has been run in an intermittent way, but toward the close of the year large quantities of ore (zinc-lead silver ore) from Silver Valley have been received, and the general impression is that steady work will be carried on. Another plant is being erected at Blacksburg, S. C., for treating custom ores; like the smelter, however, it will rely on associated mining companies for the bulk of its ores. It will be known as the Caloric Reduction Company; the process will be chlorination. A sulphuric acid and fertilizer works will be run in conjunction with it. Dr. Ricketts is the consulting engineer of the company, which promises well for its success.

Little hydraulicking is now done in the South; almost none, except in Georgia. In North Carolina the Gold Nugget Company is making preparations to wash its property, and the Parker mines occasionally wet their sluices. In Georgia, the Hand Company is still mining by the "Georgia method" of hydraulicking and running all the material through stamp mills. This is also practiced at the Smith and other mines. The Loud Company, in White County, Ga., is the only one doing hydraulic work, pure and simple.

In Maryland the production, which a few years ago bid fair to be large, has dwindled to insignificant proportions; it is all the result of prospect work during the early part of the year, at the Huddleston and other mines in Montgomery County.

In Virginia, work is only of an experimental and prospecting character, and is confined to Goochland, Culpepper, Montgomery and Spottsylvania counties. The only new work in 1893 was at the Walters & Gardner mine, near Christiansburg.

North Carolina mining is in a state of extreme depression. Systematic mining is almost at a standstill. The Hoover Hill, which has been a steady producer for years, closed down with the end of the year. The Moratock was equipped with a cyanide plant that eked out an existence of only a few weeks. The Catawba was sold at trustees' sale and, though an excellent property if well managed, is still idle. The Russell suffered the same fate at the sheriff's hands, but I am informed that work will soon be resumed. I might go further, but it is too discouraging. To look at the bright side of the industry we find the Montgomery promising well; contrary to the usual custom Mr. Mahone, the manager, is proceeding cautiously and proving the property before erecting an expensive plant. The Columbia and Gold Nugget are completing their equipments, and will soon be at work. The Ingram and Ophir are also receiving attention. The Surface Hill showed up as a producer during the latter part of the year and attracted considerable attention; the excitement has been considerably allayed by a sale to Northern parties. Almost the entire production of South Carolina is the output of two mines, the Haile and Brewer. Both hold their own and promise equally good work for the coming year. It may be said that the best milling and mining practice in the South is that carried on here. It is true that they are excellent properties, but great credit is due to the management. Work has also been done at the Thompson and West mines in a small way. The same may be said of the Golden Gate and other minor properties.

In Georgia, the industry is looking up. Colonel W. A. Charters has bought an interest in the Hand and Barlow mines, and it is understood that new work is contemplated. Captain Ingersoll, who for years has dropped for his companies from 100 to 150 stamps, still has charge of all the work. The Findley, also near Dahlonega, has been added to this company's holdings. Singleton, Ivy, Lockhart and Bast mines, owned by the Dahlonega Company, Limited, were sold at public sale early in the year and the two first mentioned subsequently operated. The Wells and Norrel, near Auraria, have been worked during the year; also the Glover, Loud and Yonah, in White County. In the McDuffie district, the Smith mine has held its own and promises to continue it into the coming year. The Creighton Mining and Milling Company operating at the Franklin, in Cherokee County, as I have said before, is installing a chlorination plant. Its work during the year has been productive, and will no doubt be doubly so when the new plant is started up.

Considerable prospecting has been done in Alabama, especially in Clay, Cleburne, Randolph and Tallapoosa counties. A new Fraser & Chalmers 10-stamp mill has been erected on the Lucky Joe; improvements in other plants are also noted. As yet, however, mining in this State is of comparatively little importance and cannot be classified as systematic and regular work.

The small production credited to Tennessee is from petty work on Coker Creek, and nothing new is to be expected.

Such a brief review as the above is necessarily somewhat rambling and incomplete; it is believed, however, that it conveys a fairly correct idea of the present work. The statistics are reliable; for valuable aid in collecting data for the production of the past year I would especially thank Mr. W. E. Ardrey, now in charge of the Assay Office in Charlotte.

Manufacture of Slag Wool.—The London "Engineer" says that J. C. Broadbent & Company are manufacturing silicate cotton, or slag wool, by reducing slag in remelting furnaces in their works at Hazlehead, near Sheffield, and then bringing steam to bear upon the molten slag. They claim that by this mode of manufacture irregularities which are found in running blast furnace slag are avoided, and more regular product obtainable. The slag wool is also made up by them in various ways, as, for instance, in strips with canvas back for wrapping round pipes and covering boilers.

THE SAN FRANCISCO MINING STOCK MARKET IN 1893.

By our Special Correspondent at San Francisco.

During the entire year 1893 the mining stock market was in a more or less stagnant condition. In each succeeding month it was a question merely of degree, not of kind. This applies naturally to the interest manifested by the general public, for so far as those are concerned who in years past have been inoculated with the Comstock gambling veins they have parted with their money generously, and from them the "ring" manipulators made their returns.

As might be expected during a year when great financial distress accentuated the evils inherent in the system of trading here, the total volume of business showed a decrease on that done in the previous year. The following is a corrected statement of the sales in the San Francisco Stock and Exchange Board during the past four years:

Year	Shares of stock sold	Total
1890	5,405,905	5,405,905
1891	5,316,350	5,316,350
1892	4,107,365	4,107,365
1893	3,413,840	3,413,840

The stocks dealt in during the year just ended were almost entirely the Comstocks, to the exclusion of the outside groups. While the group named thus almost monopolized attention, without any developments on the lode warranting any judicious man in investing his money, the assessments were levied with clock-like regularity. While the mining companies in the State of Nevada called for \$1,828,280 in assessments, of this sum the Comstocks swallowed up \$1,600,000, in round figures. The capacious maw of the Comstock absorbed \$2,062,920 in the year 1892, and at first glance it would seem as if the reduced sum in 1893 afforded something to be thankful for. But when we consider the reduced volume of trade and the gradual withdrawal from Pine street—surely, if slowly—of the regular speculators, it will readily be understood that the sum gathered in in the shape of assessments was as large as the ruling powers dared to risk.

With the exception of two "deals" during the year of 1893 the market might be summed up generally as a "chipping" one, and disposed of summarily. The master hands of the inside clique, however, made themselves apparent in the engineering of these "deals," by means of which both "longs" and "shorts" were made to surrender tribute. For a proper understanding of the first series of operations, wherein the Consolidated California & Virginia stock was submitted to a more or less constant manipulation, it is well to note in broad outlines the fluctuations of the general market. The entire Comstock lode sold on the dates specified for the following equivalent sums: April 5th, \$1,615,000; May 2d, \$3,102,000; August 1st, \$607,000; October 5th, \$685,000; November 10th, \$3,950,000; December 20th, \$1,558,000; January 8th, \$2,640,000. These values denote the general trend of the market; it being always remembered that the fluctuations were not dependent on any real changes of value in the mines, but were the inevitable response to the wire-pulling tactics of the Comstock "ring."

In December, 1892, the deal in the bonanza stock was inaugurated. On the 22d of that month it sold for \$1.50, and on January 14th ruled at \$2.70, with a 50c. assessment paid. Between these dates the Ring unloaded 157,410 shares short interest on the market. On February 27th the stock scaled to \$2.90, declined to \$2.05 on April 28th, and struck bed rock on August 3d, when it sold for 95c. At that time the broking contingent notified all customers that all stock held on margins must be taken up. Margin holders, like most other folks, are not overburdened with cash, and what might be expected actually happened. Using the short money to repurchase the stock, by October 5th 46,165 shares had been gathered in at an average cost of about \$1.26 per share. During the short recess from their arduous labors the scheme of discovering an ore body in the now famous Rule drift was sprung full fledged upon the public. Finding, however, that a line of shorts were "coppering" their trump scheme, the former were caught and forced to yield 87,000 shares at an average of \$2.37. By October 26th the Ring had thus once more in hand 133,165 shares of the bonanza stock. The street filled by November 10th 78,445 shares, paying for them at \$5.50.

The time was again opportune for unloading, and between December 10th and 25th the public took 83,965 shares, they netting an average price of about \$4.45. In order to clean up the margins on this block the price was allowed to drop back to \$1.95; but by January 9th, 1894, another block of 48,476 shares had been unloaded at an average price of \$4.45. By January 23d, the stock selling at \$2.65, the Ring had once again a clean card, while the public had the stock.

While Consolidated California & Virginia was thus being manipulated, the north end Comstocks responded in sympathy. Ophir sold at the opening of the year for \$1.50, advanced by an irregular movement to \$3.50 in May, with a 50c. assessment added, and declined to 40c. in October. Upon the new start being made, it improved until November 10th, when the ruling rate was \$2.75, with a 25c. assessment, and on December 20th sold for \$1.05, another assessment of 25c. pending. Mexican also had the same regular irregularity of price. It opened the year at \$1.15, sold to \$2.40 in May, with a 25c. assessment added, and dropped to 45c. in October, again bearing a 25c. assessment. On November 10th it sold to \$1.75, and again declined to 65c. on December 20th, with an assessment of 25c. pending.

The second of the deals adverted to in the beginning of this review had for its basis the Potosi stock, but the Chollar and Savage stocks were included in the operations. It is not worth while to detail each particular movement of these stocks; suffice it to say the public have the Potosi, and it is to be hoped they are satisfied with their bargain. It cost them on an average \$3 per share, and is selling now for 70c. Chollar is being held more steadily, and not having been entirely subject to the same manipulative tactics, has not cost the holders so much. The average price was \$1.85 to \$2, and the ruling rate now is 40c. Savage was unloaded on the street at \$2. Each of these stocks was actually wiped out, after the price had been depressed, by the levying of assessments.

Another of the middle group of stocks that must be attended to is

the Hale & Norcross. The people are holding the stock now at an average cost of \$1.85, and many are holding on in the hope that a \$10 dividend will be declared when the Supreme Court rules in the celebrated suit now before it of Fox vs. the company and others.

Of the other listed Comstocks no detailed account is necessary. They were subject to the fluctuations of the market caused by the operations already indicated. The Gold Hill stocks, with the exception of Belcher and Yellow Jacket, have received, comparatively speaking, little attention, and sales have been very light.

Of the outside groups of stocks very little can be said. For the most part they are "wild-cats," and if the hard times have caused them to sink, even temporarily, out of sight, then such a small mercy may be recognized. The Tuscaroras, during 1893, collected \$130,000 in assessments, presumably used according to their well known methods.

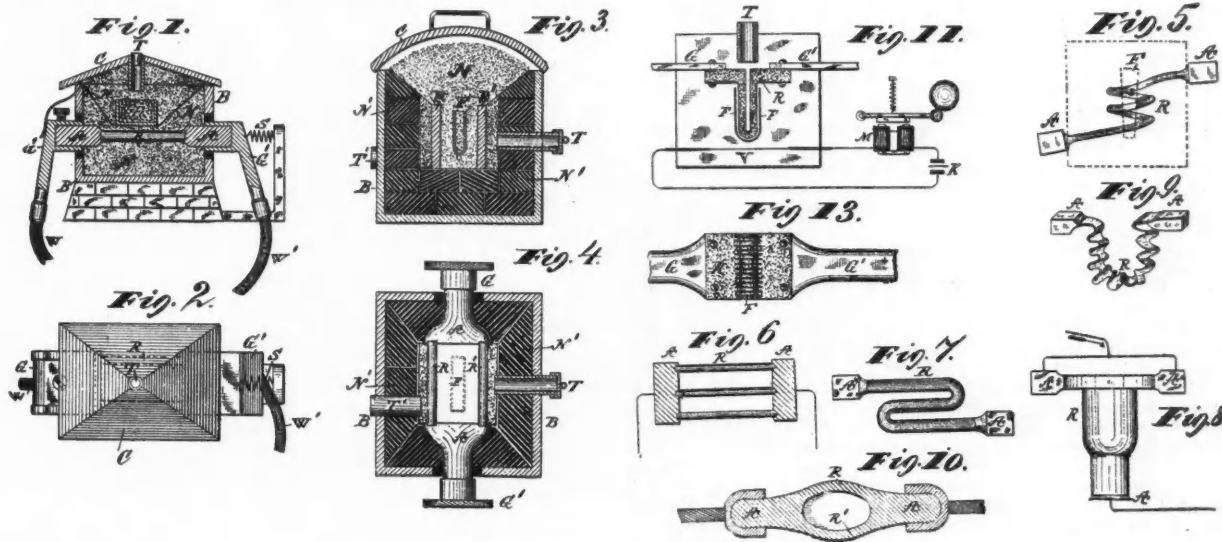
The Quijotoa group of Arizona stocks were also notable only for the assessments collected. Over \$35,000 was gathered in, and this, with the heavy depreciation in silver, caused the public to fight shy of the stocks; for the present they are a drug on the market.

The Bodies gathered in \$62,500 in assessments, but during the year have sold very lightly in this market, and that usually at bedrock prices.

This pessimistic review of the stock market may fittingly be closed by drawing attention to the fact that while many properties along the Pacific Coast have paid regular dividends during the year, not one of those listed in the San Francisco Board has been in such a happy position. In other words the listed stocks are baits only for foolish speculators; dividend-paying mines offer inducements to the conservative investor and the judicious speculator.

THE THOMSON ELECTRIC FURNACE.

The accompanying illustrations show a form of electric furnace recently patented by Professor Elihu Thomson, the well known elec-



THOMSON'S ELECTRIC FURNACE.

trician. The object is to provide a furnace in which there will be little escape of heat energy and in which heat can be quickly accumulated by the passage of the electric current, while at the same time the progress of the carbonizing or heating operation can be observed from outside. The current used may be alternating, intermittent or continuous, and may be derived from any source.

In the drawings, Fig. 1 is a vertical central section of an apparatus embodying the invention. Fig. 2 is a plan; Fig. 3 is a vertical central section of a modification. Fig. 4 is a horizontal section of the apparatus shown in Fig. 3. Figs. 5, 6, 7, 8, 9 and 10 represent modifications in the form of the heat generating conductor. Fig. 11 illustrates a device that may be employed for giving notice when a predetermined degree of heat is reached within the furnace. Fig. 13 is a plan of the form of heat generating conductor shown in Fig. 11. Referring to Fig. 1, B, B, is the casing of the apparatus which is formed of pottery, metal, brickwork or in any other desired manner and is provided with a properly fitting cover C, that can be removed at pleasure and serves to cut off air entirely from the interior of the furnace when the same is in use. R indicates a slab or bar of hard carbon or other material which rests at its ends preferably in enlarged blocks or pieces of carbon, A, A, or other material, which latter are in turn clamped in blocks G, G', that enter through openings in the side of the case and are connected suitably with wires W, W', through which current is fed from any source in amount sufficient to produce heat in the conductor R. Surrounding the conductor R is a mass of powdered carbon or charcoal N, which is a poor conductor compared with the conductivity of the rod R, itself. Other material might be used in place of carbon provided it be a slow conductor of heat. F indicates a substance to be heated, such, for instance, as a graphite box containing filaments as before mentioned or scrap platinum or other material to be heated. The powdered packing of charcoal or other material fills the space around the conductor R and the object F, and is kept in place by the casing B, B. A tube T, of graphite, platinum, or other refractory material and stopped at its upper end with a cap or plug of metal or mica to prevent air from entering the furnace, projects through an open-

ing in the cover C, as indicated. This tube may be employed to enable the operator to note the progress of the heating of the object F. It is desirable to secure the clamps G to the blocks A, by plating or otherwise so as to obtain a good electrical connection. Where the conductor R is a separate rod or slab an elastic thrust may be given to the clamps G, G, by a spring S, or otherwise, which serves in obvious manner to force the parts into close electrical connection. It will of course be understood that the slab or conductor R is of greater resistance than the other parts, so that on the passage of current it heats rapidly or slowly, according to the strength of such current. The heat so produced cannot escape and each increment is added to the preceding and slowly communicated to the surrounding mass of heat nonconductor N, N, but only to its interior portion. The object F, which is placed as near conductor R as practicable, soon experiences an accession of heat which may be continued to almost any degree, limited only by the temperature at which the slab R, if of carbon, will vaporize, or if of metal, by the temperature at which it will fuse. No combustion of the conductor R, if of carbon, or transference of its particles takes place, and it will endure many repetitions of the heating process only becoming a better conductor and more dense and refractory by use. The graphite tube T may be opened occasionally to observe the interior temperature of the mass immediately adjacent to the object F, but care should be taken that air does not enter to such tube in quantity to permit combustion. The tube T should be made very small to prevent loss of heat, and it may sometimes be advisable to employ a charcoal plug for stopping its upper end so as to assist still further in the prevention of loss of heat.

In the modification shown in Figs. 3 and 4, two conductors R, R', are employed and arranged to form branches of the circuit between the clamps of blocks A, A. The bars or slabs are at sufficient distance apart to permit the object F to be placed between them. Surrounding the slabs is a wall of bricks N', N', made from charcoal powder lightly cemented by sirup or tar and baked. These bricks give a low

conductivity for electric current as well as for heat. The open space is filled with refractory powder as charcoal dust. The observing tube T may be inserted at any convenient point as indicated, or a simple opening may be left in the wall of bricks N', as indicated at T', Fig. 4. When this opening is not in use it is to be kept filled with a charcoal plug. The apparatus is used in the same manner as that shown in Fig. 1. When the object placed within the furnace is sufficiently heated the current is switched off and the furnace allowed to cool before it is opened.

In Fig. 5, a conductor R is shown in the form of a spiral of sufficient size to receive the object F within its convolutions. It is preferable to make this form of conductor from metal inasmuch as it is liable to break if made of carbon. In Fig. 6, the conductor is shown as made of three rods inserted into sockets in the plugs A, A. In Fig. 7, the conductor is made of a rod bent on itself as indicated. This form, as well as that indicated in Fig. 9, is to be employed where a considerable length of conductor is needed for employment with a current of large electromotive force but small volume. Where the volume of current is large the heat generating conductor may take the form of a crucible as indicated in Fig. 8, the connections for current being made at its upper lip and at its bottom respectively as shown. The object to be heated may be placed in the crucible or may be packed in such crucible in a mass of powder. In Fig. 10, the conductor consists of a block or piece having an opening at its center. The parts R, R', at the side of the open space give the requisite resistance, while the heavier ends form proper conducting masses for conveying the current to the parts R, R'. The object to be heated may be placed in the open space. Instead of placing the object within the heat producing resistance it may be located outside of it as indicated in Figs. 11, and 13, where the conductor is shown in the form approximating a loop such as is sometimes employed in incandescent lamps. On this loop are placed the filaments of cellulose F, which are to be carbonized, the whole being surrounded with a non-conducting envelope of powder or other material as before.

It is very often desirable to limit the temperature to which the

object shall be subjected to a determinate or definite one, such for instance as the temperature of the melting point of iron or of platinum, or of iridio-platinum, or of other material. In order that the operator may cut off the current at the instant that such temperature is reached it is proposed to employ a fusible wire or strip V, of a metal which will fuse at the limited temperature desired, and to connect such wire or strip into a circuit with a generator of electricity K, and an electromagnet M. The electromagnet M controls any signaling device such for instance as the hammer of a bell, which bell hammer is carried by the armature lever of the electromagnet and is drawn by a spring into contact with the bell when the electromagnet ceases to be energized.

The conductor V may be under light tension if desired, and so long as it is unfused the circuit is kept closed. When the melting point is attained the conductor V fuses and the current is ruptured thus causing the bell to be sounded. Any other signaling or indicating device operated or controlled by electricity might be employed in place of that just described. Several furnaces may be fed from one source of current.

A very convenient method of operating the furnace is by the employment of current from an induction coil. The primary of said coil might be fed by alternating currents from any source, while its secondary is formed of very coarse wire. The core of iron may be movable to regulate the current set up in the secondary, or the regulation may be effected in any other suitable manner usual in such cases. In order to prevent over-heating of the clamps or connections they may be formed with a suitable passage through which a cooling fluid may circulate, such for instance as a stream of water. It is not essential that the conductor be in one continuous piece integral through its length. It may be formed of blocks or sections pressed together, or it may be in the form of a tube consisting of rings pressed together between blocks. At the points of division thus provided an increased resistance is introduced which assists in the production of heat where a current of limited volume but of considerable electromotive force is employed.

ABSTRACTS OF OFFICIAL REPORTS.

LA YESCA GOLD AND SILVER MINES, LIMITED, MEXICO.

The directors of this company, the reconstruction of silver mines of La Luz, Mexico, report a satisfactory settlement of the long outstanding claims of the vendor after protracted negotiations and the removal of a difficulty which has hitherto seriously delayed progress of work at the mines. The company is registered under the Mexican mining laws, and is now in possession of the property. The Liverpool debentures, placed by the late board on very onerous terms as regards net crushings (25% to go to the holders and 25% to the trustees for 250 working days) having matured, and payment being pressed for by the holders, the directors paid them off and by so doing removed a liability likely to prove a serious drawback. Loans, also obtained by the directors of the former company (amounting to £300), expenses of registering the company and carrying through the reconstruction which were provided by large shareholders without charge, have also been repaid. The reconstruction was carried through without any expense being incurred for underwriting.

At the statutory meeting in September last it was stated by the chairman that the appointment of a competent mining engineer was contemplated by the board. After much deliberation, Captain Thomas Michell, a mining engineer of considerable experience, was appointed, who proceeded to and inspected the mines accompanied by Messrs. Flatt and Padilla. Captain Michell states in his report that only a moderate outlay will be required for completion of the mill, repairing tramway, stores, etc., to put the mines in thorough working order. The directors, in making a call of 6d. per share, feel assured that, considering what has been accomplished since allotment, they will have the approval and support of the shareholders.

Captain Thomas Michell's report, dated December 13th, 1893, states that the tunnel from the base of the canon in the San Miguel Mine has been extended due north for 170 metres (about 550 ft.) with the view of intersecting the San Miguel gold-bearing vein. The ground in the forebreast is composed of the principal rock of the country, limestone, and at present seems of a favorable character for development. At a point of 140 metres (about 452 ft.) from the mouth of the tunnel, a vein from $3\frac{1}{2}$ to 4 metres (about 13 ft.) wide has been intersected, the direction of which is N. E. and S. W., but the only development on this is a drift 15 metres long to the S. W. The ore on the dump, obtained from this vein, contains very rich stones of silver, which of itself is sufficient proof that this lode is of much promise. When convenient, it is advised that two levels in opposite directions be driven on its course, for by so doing, in a short period, a large extent of ground for stopping would be laid open. On the summit of the mountain, directly above the present end of the tunnel, are two pits sunk and other old workings on the San Miguel gold-bearing vein, and, after a very careful examination, Captain Michell is of the opinion that by the extension of the tunnel another 25 or 30 metres an intersection will be made with that vein. In conclusion, to put these mines in thorough working order, that is, to erect the machinery, do all the necessary dead work, also develop the properties, it is estimated that it will require only the moderate sum of £2,500.

NATIONAL LEAD COMPANY.

The statement of this company for the year ending December 31st shows as follows: Net earnings, \$1,428,037; dividends paid, \$1,341,388; balance, \$86,649. Add surplus January 1st, \$863,706; surplus January 1st, 1894, \$950,355. The capital stock is \$30,000,000, of which there is \$190,600 in the treasury. The investments in plant, etc., are reported at \$24,085,701; stock on hand, \$4,203,043; cash, \$1,232,003; notes and accounts receivable, \$1,489,123. The liabilities, besides stock and surplus account, are \$37,603 mortgages and \$212,513 accounts payable.

The president, Mr. W. P. Thompson, says in his report: "It will be observed that there has been a diminution of stock on hand of \$1,289,956. This is occasioned mainly by the fact that preceding the year 1893 we had been very extensively engaged in the smelting business for the purpose of aiding in securing our supplies of pig lead, and, incident to this, the smelting, refining and parting of silver ores. It became evident to the board of directors that, in operation, the Sherman silver purchase law had failed of its purpose, and that it was the desire of the English Government to bring India to a gold basis, to escape from the threatened disaster of the over-production of silver. It was deemed wisest and best to curtail our operations in silver smelting as rapidly as possible and, after most careful consideration, it was determined that our smelters at Leadville should be closed in March, 1893, and, as soon as the various contracts we had for bullion and ores had expired, to also close our smelters at St. Louis, which was practically done in June, and the refining and parting plant soon thereafter. In doing this, the stock of silver in ores at Leadville and St. Louis was converted into cash, which is now in the treasury of the company. The extraordinary depression in the price of silver has continued, and it is not the purpose of the board to resume smelting operations on the former large scale until some substantial and reasonably fixed value for silver has been reached, and the business placed upon such stable foundations as will make it practicable to realize fair profits on the investment.

"It will further be seen that the profits in the business were not so large as in the preceding year, mainly arising from the operations of the smelting plants, the fact that for quite a period of the year the prices for linseed oil were quite low, and the diminished output in all branches of the business the last half of the year. In July the financial panic occurred, the effects of which were severe upon this company. There was also knowledge that a new tariff was to be formed which would more or less affect all business, so that during the latter part of the year the volume of sales and deliveries was very greatly diminished.

"The board of directors, keenly alive to the condition of trade and impending changes, and being able to purchase supplies on a lower basis, gradually reduced the price of their commodities, so that at the time this report is being prepared lead products are being sold at a lower price than ever before known in the history of the country.

"It will be observed that the surplus fund is \$950,355, which is now employed in the conduct of the business, but is applicable for the payment of dividends whenever it may be thought prudent. It is also shown that the mortgage indebtedness has been reduced to \$37,603, and provision has been made for the early payment and cancellation of all mortgages, excepting some small annuities, which cannot at present be paid off.

"The additions to plant and construction represent investments and enlargements at New York, Philadelphia, Chicago and St. Louis, and expenditures made necessary by the extension of lines of manufacture to products not heretofore made. The month of January of this year shows the largest volume of business for the same month in the history of the company."

QUINCY MINING COMPANY, MICHIGAN.

The report of this company for the year ending December 31st shows that the product of the mine for the year was 17,708,035 lbs. of mineral, yielding 14,398,477 lbs. of refined copper, from which was realized the sum of \$1,508,632, or 10.478 cents per pound. Sales of silver produced \$2,408, making a total of \$1,511,039. The running expenses at the mine were \$740,362 (5.142c. per pound of copper); building and construction account, \$74,931 (0.520c.); smelting, transportation and all other expenses, \$202,347 (1.406c.); a total of \$1,017,640 (7.068c.). The total mining profit was \$493,399, or 3.427c. per pound. To this is to be added \$15,647 received for interest and \$2,168 for sale of lots, making the total income \$511,214 for the year.

The statement of assets and liabilities in the last report showed a balance on hand as of date: January 1st, 1893, amounting to \$653,211; add earnings of 1893, as above, \$511,214, making a total of \$1,164,425. From this is to be deducted two dividends of \$150,000 each, and \$150,000 paid on account of purchase of mineral land, a total of \$450,000, leaving balance of assets January 1st, 1894, \$714,425. A dividend of \$4 per share, or \$200,000, payable February 15th, has been declared since the close of the year, which, with the dividend of \$3 per share paid August 15th last, makes a total for the year of \$350,000. The capital stock is \$1,250,000.

The report says: From the past year's earnings, \$150,000 have been paid on account of purchase of 640 acres of land adjoining our mine, and containing at greater depth the mineral deposit we are now working, known as the Pewabic vein. It is accessible through our present shafts, one of which is approaching the boundary so rapidly that it became of the utmost importance to secure early title to this valuable property. When this large addition to our mining territory becomes available, and hoisting and stamping equipment has been proportionately increased, it is expected that the earning capacity of the mine will be doubled.

"To provide for deferred payments on the purchase, and for such additional equipment as will be required, the directors have called a special meeting of the stockholders, to be held in New York, Thursday, March 15th next, to consider the question of increasing the capital stock of the company, and giving to stockholders rights to the increased shares, on payment of the par value of \$25 per share, in installments, as required."

A summary of operations for the year is as follows: Average force employed, 885 men; number of miners, 259; wages of miners on contract, per month, \$49.60; yield of mineral per fathom of ground broken, 706 lbs.; yield of refined copper per fathom of ground broken, 574 lbs.; total rock mined, 451,354 tons; total rock hoisted, 429,587 tons; total stamp rock treated, 422,239 tons; product stamp mineral, 11,765,040 lbs.; masses, 5,942,995 lbs.; total refined copper produced, 14,398,477 lbs. The rock mined thus showed a yield of 1.6% copper. If the total stamp rock treated be taken, the yield was 1.7% of copper.

The report of Agent S. B. Harris says: "The principal stoping done in the mine was at the fortieth, thirty-ninth, thirty-eighth, thirty-sixth and thirty-fifth levels north and south of shaft, at the thirty-seventh, thirty-third, thirty-second, thirty-first, thirtieth and twenty-ninth levels north, and at the twenty-first, twentieth and nineteenth levels south of shaft. The diamond drill was used at intervals during the year with satisfactory results. The number of holes bored was twenty-nine, and the aggregate depth of borings was 2,438 ft. The holes drilled were mostly north of No. 6 shaft, between and including the thirty-third and forty-first levels. During the year the man engine was extended from the thirty-eighth to the fortieth level, reaching, probably (with the present engine), the limit of its usefulness. The Hill Side Adit exploration was extended west 570 ft. It passed through several small veins, but none of them are of any apparent value. About 350 ft. from the present end of drift a belt of conglomerate 25 ft. wide was passed through. It resembles the Allouez conglomerate, and is quite regular and healthy in appearance, but it showed no copper to speak of except a little stamp work in a two-inch amygdaloidal seam on the foot wall side.

"The principal improvements made by way of construction during the past year are as follows: At the mine, near the old No. 1 shaft, a frame carpenter shop 50 by 100 ft. was built, having a draughting room 20 by 20 ft. attached. The shop will be fitted with some wood-working machinery. A new lumber yard was also made, contiguous to the shop, and a branch of our railroad extended through the yard from the railroad crossing to North Quincy. It is designed to extend this railroad to connect with No. 2 and No. 4 shafts. A supply building, of stone, 40 by 80 ft., with steel roof, and a stone building, 26 by 32 ft., with steel roof, for oil and hose purposes, were also built just north of No. 2 shaft. Many of the old dwelling houses were repaired and stone foundations placed under them, and there are still quite a number to be taken care of in the same way. At the lake shore, in Hancock, the old stamp mill building and adjuncts, together with the old boiler house, were dismantled, and a new stone building, with steel roof, was erected for the mine pumping station. The size of pump room is 30 by 48 ft., and of boiler room 36 by 56 ft., both rooms being under the same roof. The old warehouse at Hancock was also thoroughly overhauled and practically rebuilt, which makes it more serviceable than it ever was. The principal improvement at the stamp-mill was the building of a tunnel between the boiler house and mill building. The tunnel is 6 by 6 ft., of stone and brick, and it takes the place of the overhead steam passageway, which is now removed, thus lessening the fire risk and saving many other annoyances. Three additional dwelling houses for mill employees, and a barn for company use, were also built, and several changes made to trestles in coal yard, which will facilitate the unloading and storing of coal to better advantage than heretofore."

THE MINING EXHIBIT AT THE CALIFORNIA MIDWINTER FAIR.

Mr. Edward H. Benjamin, general superintendent of the California mining exhibit at the Midwinter Fair, furnishes some interesting information concerning the mineral display which the counties of the State will make. The list of counties which will be represented is as follows: Shasta, Butte, Siskiyou, Calaveras, Santa Cruz, Amador, Plumas, Sierra, Nevada, Placer, Mariposa, Santa Clara, Kern, Tuolumne, Inyo, Mono, Contra Costa, San Bernardino, Santa Barbara, San Diego, Alameda, Napa, San Luis Obispo, Merced, Ventura. Nothing has been received from Trinity County, where the snow is 3 ft. deep on the easiest road leading out of the mines.

Nevada County will make the largest exhibition of ore. A huge globe stands in the center of the space, representing the bulk of gold which has been taken out of that county alone. The globe will be gilded to make it look like gold. The bulk of gold which it represents is said to be worth \$205,000,000. Sierra County will have an obelisk representing the bulk of gold produced in that county alone, the value of the product being estimated at \$180,000,000. Tuolumne County will have a revolving show case made of native woods, furnished with incandescent lights and containing gold specimens worth \$8,000. Shasta County has an exhibit representing, by specimens, 142 mines in that county. Amador County is at work constructing a tunnel which will show the geological formation of the mineral-bearing rock and all the realism of an actual mining tunnel. Plumas County will have most of its exhibit which was at Chicago. The most valuable display, intrinsically, will be made by Placer County, which will consist principally of fine gold specimens.

Santa Cruz will have a very interesting exhibit, embracing minerals and also fossils and curios. Santa Barbara will show, among other exhibits, the largest block of asphalt ever quarried, weighing over four tons.

The State Mining Bureau will have a large exhibit, placing in position the pick of its attractive collections. Siskiyou will exhibit for one thing its pictured rocks, on which there are landscapes imprinted by nature. One of these rocks has a picture of a lake and a perfect shadow of a forest and hillside. The tall trees have long shadows and the short trees have short shadows in this remarkable natural product. Mariposa's exhibit will be small, but will contain some fine ores, among them being fine specimens of asbestos. Butte has a fine display, auriferous gravel, quartz, talc, kaolin, chalk, limestone, fossils and Indian relics of past ages being included. Santa Clara exhibits cinnabar and quicksilver. Quicksilver will also be exhibited from the Altoona district in Trinity County, and the two sections will furnish a lake of quicksilver on which cannon-balls and other heavy objects will float.

A space is reserved for valuable gold specimens, which will be exhibited handsomely arranged in show cases. Exhibits of this sort which are already received are included for the present in a large safe in the Mechanic Arts Building, in the Mining Section. Among the exhibitors are the following: L. M. Simon & Son, Scott Bar, Siskiyou County; Red Point Drift mine, Placer County; Hidden Treasure

Drift Mine, Placer County, principally crystallized gold; Power & Doolittle, Placer County, native gold and cement gravel; Mayflower mine, Forest Hill, Placer County, gold-bearing cement gravel; Morning Star mine, Iowa Hill, Placer County, native gold. Other exhibits of this sort are to be unpacked.

Beautiful specimens of travertine will be forwarded for the exhibition by Mr. Lindley, of Mono County, who will exhibit something like forty slabs about 4 by 6 ft. in size. Napa County makes a fine exhibit of magnesite. A valuable discovery was recently made in Child's Canon. Alameda County will exhibit marble, manganese, carbonate of magnesia. One interesting exhibit will be diatomaceous earth from Shasta County, a deposit of which was only recently discovered. Nevada County's exhibit will include copper and copper products. Calaveras County has a very pretty display of free-gold and copper ore. Plumas exhibits, amid other products, native copper which can be cut with a cold chisel. There is also to be seen native and magnetic iron from Shasta County. There is said to be a whole mountain of it on the McCloud River. In the Shasta collection there is a specimen of stalactites, or iron drift, from Charles Camden's mine, which will attract more than passing attention. It contains gold, silver and copper. It is almost pure iron. A perfect fossil shell will attract attention in the Siskiyou County display. The Kennedy mine, in Amador County, exhibits a pyramid of iron. At one end of the State mining exhibit is the James Lick bronze statue, embracing the figures of three typical miners. This stands on a stout framework of timber, but the framework will be covered with slabs of handsome marble, which will constitute the exhibit of the Inyo Marble Company. At the other end of the exhibit is the facade which was shown at Chicago, and which embraces for its materials marbles and other leading building stones of California.

CLOSE SIZING BEFORE JIGGING IN ORE CONCENTRATIONS.

Written for the Engineering and Mining Journal by Robert H. Richards.

Hoppe, after reviewing the work of Von Sparre, Rittinger and Jarolemek, and later that of Munroe, in "Pr. Zeit." for 1893, says that we must throw away formulae and stop making them. Instead we must roll up our sleeves, put our hands in the water and get some facts. Hoppe is right and he is wrong. Right when he says we must get more facts, wrong when he would throw away the formulae or experience of others.

I have been making an experimental investigation into the question of jigging mixed sizes, and have reached some very interesting conclusions. In this paper I will confine myself to simply stating the problem with some of the chief conclusions that I have reached, hoping in a paper before the Mining Engineers to bring forward my experimental data as proof for the assertions which I now make.

I shall not go back of Rittinger. He was the first to give us a treatise on ore dressing which has placed the subject among the sciences. If two particles of minerals of different specific gravity are allowed to settle in water, with ample space around them, and are found to settle at the same rate, they are called equal settling particles. If the diameter of the larger, lighter grain be F , and that of the smaller, heavier grain be f , then $f:F$ will be the ratio between the two diameters. This will be found nearly constant for different sizes of grain.

Rittinger in 1866, in his treatise on ore dressing, assumed that the law of equal settling particles was the law of jigging. From this assumption the conclusion was logical that the sieve scale of the series of sieves required to prepare particles for jigging, upon a series of jigs, must be according to the diameters F and f ; that is to say, each successive sieve in the series must have holes of a diameter that will bear the ratio of $f:F$ to the holes of the next coarser sieve. The reason for this will be apparent when we consider that all of the particles of lighter mineral which pass through the sieve with holes of diameter F will settle slower in water than will all the particles of heavier mineral which fail to pass through the sieve with holes of diameter f .

In 1870, Rittinger in his appendix, having found that particles smaller than f were saved in jigging, for example quartz and galena together, explained the fact of this extra jigging catch by referring it to acceleration. He argued in this way: A galena particle of diameter f may not take one-tenth as long to reach its ultimate velocity as a particle of quartz of diameter F . Hence instead of finding galena particles of diameter f beside quartz of diameter F galena particles of much smaller diameter than f will be found under the oft-repeated pulsations of a jig, to be equal settling with quartz of diameter F ; and hence acceleration, which is rapid with galena of size f , slow with quartz of size F , accounts for the extra jigging catch.

In 1880 (Volume XVII, Transactions American Institute of Mining Engineers) Munroe advanced the theory of interstitial currents to account for the extra jigging catch. He showed that if equal settling particles of quartz and galena were settling en masse, that each particle was affected by the upward currents around it, and that if we consider the individual particle to be settling practically in a tube the walls of which are made up of the surrounding particles, the diameter f of the small particle of galena will bear a very much larger ratio to the diameter of its tube than the diameter F of the larger particle of quartz will to the diameter of its tube, and as resistance increases as the diameter of the particle approaches that of its tube, the quartz will meet a much greater resistance than the galena, and as smaller particles of galena will therefore be found abreast of the quartz than would be the case if the law of equal settling particles was the only law of jigging, Munroe found by mathematics for quartz of diameter I , and galena of diameter i , the two particles settling en masse together that $\frac{I}{i} = 30$. Munroe mentions that downward currents are apparently necessary to jigging through a bed. Hoppe

("Pr. Zeits." 1893) says that suction plays an important part in jigging, and intimates that he will have more to say later, when his experiments, now in progress, are completed.

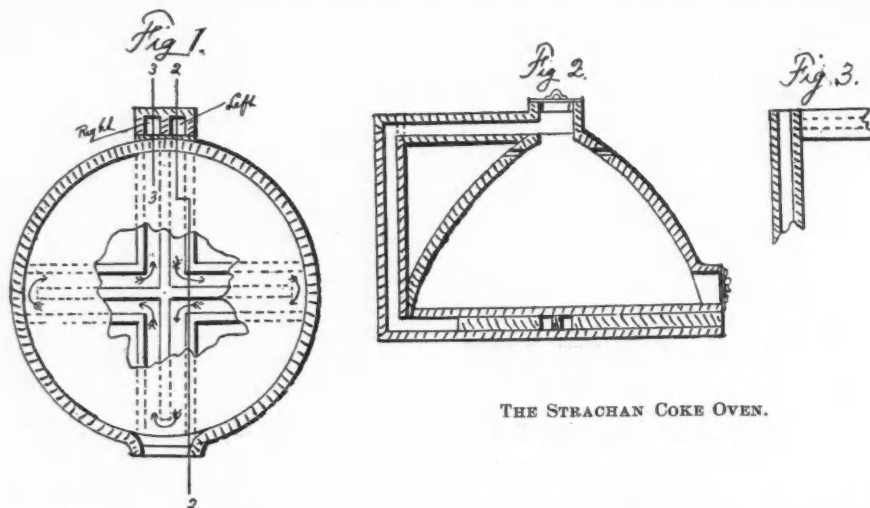
My object is to find out what actual part these different laws, equal settling particles, interstitial currents, acceleration, suction and fluidity, actually do play in jigging. An investigation involving between 3,000 and 4,000 observations has been conducted for the purpose of throwing light upon these questions.

The first conclusion arrived at is that Rittinger's $\frac{F}{i} = 4$ for quartz and galena is a little too high a value for sizes between 10 and 100 meshes to the linear inch; $\frac{F}{i} = 3.5$ is nearer the value.

The second conclusion is that Munroe's value $\frac{I}{i} = 50$ for quartz and galena is much too large; my value is $\frac{I}{i} = 6$ (about); the values range from 5.5 to 6.5 for particles between 10 mesh and 100 mesh in size.

The third conclusion is that Rittinger's acceleration adds nothing to Munroe's interstitial currents. It undoubtedly does work and it is logical that it should; the fact that it adds nothing must be accounted for by parallelism. Two galvanic cells in parallel give no more voltage than one. Two horses harnessed together are no faster than one. So here these two laws, namely, interstitial currents and acceleration, act side by side, but do not add to each other.

The fourth conclusion seems to be that after the above laws have done their best there still remains a great gap between what is accounted for and the practical result in the extra jigging catch, and to account for it we have only to follow the stages of jigging to see the cause. In jigging quartz and galena for example, the pulsion movement arranges the particles according to the above laws so that $\frac{I}{i} = 6$ (about); then follows suction which finds the quartz particle, I , immediately bedded upon the sieve with interstices which are larger than the particles of galena, i ; these galena particles will then be



THE STRACHAN COKE OVEN.

sucked down through the quartz by the rush of water due to the return plunger movement as freely as a squirrel can run into a heap of stones.

Fifth conclusion. If we attempt to jig a much lighter mineral, for instance blende with quartz, we shall find that $\frac{I}{i}$ here is so small a ratio that the blende particle is larger than the interstices between the quartz grains. Logically then suction should be almost, if not quite, powerless to add anything to interstitial currents. My results prove this to be the case.

Finally, the sizing preliminary to jigging minerals with great discrepancy in their specific gravities, as for instance quartz and galena, is simply a matter of convenience to bring to the different classes of jig the sizes most appropriate to that class and to prevent the finest slimes from reaching the jigs. While, on the other hand, if the best and most rapid work is desired on jigging minerals of near specific gravity, for example quartz and blende, their sieve scale must be laid out in accordance with their ratio $\frac{I}{i}$, and it will be safer to be a little inside this ratio to cover the irregularities of flat scales elongated particles, etc.

Belgian Blast Furnaces.—The number of furnaces in blast in Belgium at the commencement of January, 1894, was 26, while there were 16 furnaces out of blast at the same date. The total of 26 furnaces representing the number in blast at the commencement of January was made up as follows: Charleroi district, 10; Liege district, 12; Luxembourg, 4; total, 26.

Aluminum Prices in England.—The Aluminum Company, Ltd., an English corporation, recently petitioned the High Court of Justice for permission to reduce its capital stock from £400,000 (\$1,920,000) to £80,000 (\$384,000), giving as a reason that the great fall in the price of aluminum made this course absolutely necessary. After much delay and evidence from many persons of high standing, the petition has been granted.

THE STRACHAN COKE OVEN.

The illustrations herewith given represent the Strachan improvement to coke ovens, as adapted to the beehive type of oven. The flue shown in the drawing is the practical application of the idea. Fig. 1 is a plan of the bottom of the oven, showing extremities of vertical portions of a flue at the back of the oven, and also the crossing under the floor, which is represented as partly broken away, to exhibit this. Fig. 2 is a section of the oven, on line 2-2 of Fig. 1, showing the horizontal division of a flue, attached to the charging chute, also the vertical down-draught portion, and air inlets near the top of the oven. A vertical section on line 3-3 of Fig. 1 is likewise given in Fig. 3, this being the exit part of the flue, a continuation of the right hand passage in Fig. 1.

The operation of this flue attachment to ovens is as follows: The oven is charged, in the ordinary way, through the charging chute. The charge is then allowed to ignite, and burn, as usual, for about five hours. After the lapse of this time, the drawing door, allowing indraught of air, may be totally sealed, and the inlets at the top of the oven only used. The cap can be placed upon the charging chute tightly, as a rule, but this depends on the nature of the coal. The flame is then conducted along the horizontal portion of the flue (Fig. 2) down the flue, around the cruciform portion, as shown by the arrows, in Fig. 1, then out of the vertical exit part of the flue.

The partition wall between the various parts of the flue becomes so heated as to cause a thorough circuit of flame, and the strength of the draught can be regulated at the exit and the charging chute. The admission of air is also under perfect control, and the appliance, it will be seen, is very simple. It acts best when constructed of fire brick, or of tubes of fire clay. It is quite inexpensive in application and can be attached to any kind of oven, though preferably to the beehive form. The inventor of this device, A. R. Strachan, of Pineville, Ky., has had many years' experience in making coke, both in England and the United States, and he is well acquainted with nearly all known processes for its manufacture. The method described is the result of his experiments, and is intended to correct faults in the

present style of coking. The beehive form of oven, which is almost universally adopted, still has serious drawbacks. Among these disadvantages is the failure to burn the coal completely to the bottom of the charge, thus creating "black ends," and the consumption of a large portion of the coke in the endeavor to avoid that condition. These difficulties are, it is claimed, overcome by this appliance, and an oven of coke which is throughout uniform in structure is obtained.

The principle acted upon by the inventor is the enveloping of the charge in an even and concentrated heat. The heat in the oven, before it can find an escape, must descend to the floor, make a circuit under it and the charge, heating the floor equally with the walls and dome. This heat being retained in the floor and walls an ordinary 48-hours charge can be coked in much less than the time usually taken, and a better coke, in larger quantity than is usual, is produced. The extra percentage of coke drawn from the oven accrues chiefly from saving what is usually burned to ash during the attempt to coke the lower part of the charge in the common beehive oven. But it is observed in practice that, the "black ends" being absent, the percentage of good marketable coke is also greatly increased. From first charging the oven, after it is properly heated, the combustion of the coal is equal all over the charge, and the heat being intense, less air than common is needed, the result being, as stated, with also the saving of the oven from air blasts entering at the door. No special arrangement is needed for the admission of air (though one can be applied as shown), the ordinary system being quite adequate—the "half-moon" or other shaped opening in the drawing door. Ovens with this improvement attached have been drawn and charged every day, and the coke obtained has been pronounced superior to that made from the same coal in the ordinary way. As with this method of coking, a smaller number of ovens will produce a given quantity of coke, cokemakers can increase their output with their present plant. It may be stated also that coke has been made by the use of this process from a coal which, after repeated trials, had been pronounced "non-cooking," from its nature. To the concentration of heat obtained and quick action is to be attributed this result, as also the general one of improvement in structure and strength in coke, made with the use of the Strachan attachment.

A Meteor in Nevada.—A press dispatch from Carson, Nev., states that on the night of February 1st a brilliant meteor shot over Western Nevada and Eastern California, illuminating the heavens for a space of several seconds. It made a noise like a rocket. The illumination was followed by a low rumbling and shock as of an earthquake. It has now been ascertained that the meteor struck about five miles from a railway station called Candelaria, in Esmeralda County, about 140 miles from Carson. A party organized to search for the meteor came upon a huge hole nearly 100 ft. across, where the larger portion had fallen. It struck on a bare knoll, composed of sand and rock. One report is that the ground was hot about the hole, and hence that close examination was impossible. Pieces were found in the neighborhood within a circle a mile in diameter. The surface of the earth for several hundred yards is scarred by pieces of meteoric stone.

Coal Mines in Borneo.—A British colonial report states that during the year 1892 good work was done at the collieries by the staff of the Central Borneo Company. Both the railway from the mines to Coal Point and the principal line of about 8.5 miles, which is to connect the colliery with Victoria, were extended and improved, a second shaft was completed and minor works and machinery constructed and put in order. By abandoning all surface operations and working from low-level adits the company expects, when the railway is opened, to be in a position to supply coal of a superior quality to any hitherto produced in the colony, at a reasonable price. It is anticipated that by means of the railway much of the overturning incidental to the present method of transport will be avoided, and that consequently the conveyance of coal to Victoria by rail will be attended with less expense and less damage from breakage than by the present sea route from Coal Point.

The Estimation of Manganese in Minerals and Metals.—At the last meeting of the Liverpool section of the (English) Society of Chemical Industry a paper was read by Mr. E. H. Saniter, entitled "A Review of Some of the Methods in General Use for the Estimation of Manganese in Minerals and Metals." Mr. Saniter, after referring to the importance of an accurate means for the determination of manganese in spiegeleisen and ferro-manganese, criticised the more important processes in general use, pointing out their chief sources of error, and the means by which these could be best corrected. The conclusions arrived at were supported by a number of analytical data, and pointed chiefly to the unreliability of the method devised by Mr. Pattinson, of Newcastle, unless a manganese sample of known degree of purity be used to standardize the solutions employed. The secretary read a letter from Mr. Pattinson supporting the accuracy of his method, and criticising the results obtained by Mr. Saniter. The subject was also discussed by Mr. G. H. Grey, Dr. Hurter, Professor Campbell Brown and Dr. Kohn. Mr. Saniter subsequently replied.

The Railroad Exhibits at Chicago.—The magnificent railroad historical collection which was exhibited at the World's Fair by the Baltimore & Ohio Railroad Company, has been given to the Columbian Museum, Chicago, says the "Railroad Gazette," and its removal to the Art Building in Jackson Park has already begun. Major Pangborn says, however, that it is to have a building by itself. It appears that one of the conditions on which the company made this gift to the museum was that \$25,000 should be raised to enable Major Pangborn, with competent assistants, to spend two years in Europe and other parts of the world to gather additional material, with a view of making the exhibit as nearly complete as possible. This fund has been guaranteed. It is estimated that the outlay which has already been made for this railroad collection is \$125,000. In addition to this it will be remembered that the Pennsylvania Railroad Company has already given to the museum the valuable collection of photographs, documents, etc., which were shown in its building at the World's Fair, and the New York Central has also given the locomotive "De Witt Clinton" and the train which was exhibited with it.

Electric Power from Windmills.—The Netherland Society for the promotion of Industry invites papers containing an indication of the means to obtain energy through windmills, to accumulate this energy electrically, to transmit it or to make it transportable; and desires more particularly to answer to the following questions: (1) What is the average energy a common windmill is able to produce per day of 24 hours, in combination with an electric accumulator; what would be the installation most suitable to this effect, and what would be the cost of 1 H. P. per hour? (2) Is it possible, from an economical point of view, to apply the new aerial motors on an extensive scale for the accumulation and the utilization of this energy? If so, what mechanical appliances would be required for this purpose? The project of a supposed application of the system, by which a factory is provided with light and power, is wanted as an illustration. The drawings belonging to the answers must be made on white paper (no blueprints) on a scale of $\frac{1}{4}$. The prize offered is the gold medal of the society and a reward. Answers must be sent before July 1st, 1894, with the author's name, in a closed envelope, to the General Secretary of the Society, F. W. Van Eeden, at Haarlem, Holland. Further information about the conditions may be obtained at the same address.

New Rope Tramways.—Two rope tramways on the Bleichert system have lately been completed, says the "Colliery Guardian." The first was in the Transvaal and was erected for the Joe's Luck & Bon Accord (Sheba) Gold Mining Company, at the company's mine, near Barberton. This line has a length of over 8,100 ft. and unites the mine with the mill. The total fall from terminal to terminal is 1,586 ft., the route being full of difficulties, with a gradient at one point of 53%, the longest span being over 813 ft. No engine power is necessary

to drive the line, that developed by the loaded buckets in their descent being more than sufficient to work the line at its full speed. The second, erected for the Black Ball Coal Mining Company, New Zealand, connecting the company's mine near Greymouth with the Midland Railway of New Zealand, crossing in its route the terraces near the mine and the Grey River; this river is subject to very heavy floods, and at such times large quantities of timber and debris are borne down by the current. This line is about 3 miles in length from terminal to terminal; the longest span is 660 ft., the total fall about 60 ft. from the mine to the railway. The line conveys 500 tons of coal per day of 10 hours, with an expenditure of about 8 H. P. only. At the unloading station the coal is discharged into large bins fitted with iron shutles, through which the coal is loaded into the railway trucks as required.

A Large Stone Bridge.—At a recent meeting of the Engineers' Club of Philadelphia, Mr. John C. Trautwine, Jr., described the stone bridge recently constructed by the General Direction of the Austrian State Railways over the River Pruth, at Jaremeze, in Galicia. The data were taken from a description by Chief-Inspector Ludwig Huss. This bridge, the largest of four thrown across the Pruth by the General Direction, has a span of 65 meters (213 ft.), which is believed to be greater than that of any other stone railway bridge in the world, although it is exceeded by the 220-ft. span of the Cabin John Aqueduct Bridge in Washington, built in 1859. The rise is about 18 meters (59 ft.), which makes the radius about 126 ft. The Stanislaw-Woronienka line follows for 29 miles the deep, narrow, and very rocky valley of the Pruth, on the northeastern slope of the Carpathian Mountains. The rocky and wooded banks of the stream furnish excellent stone for the arches and walls, and timber for the centers, and afford exceptionally good footing for the arches. The four bridges referred to are similar in general design, consisting of one large segmental arch over the stream, carrying small spandrel arches for the support of the roadway, while the approaches are carried upon semi-circular arches of about 40 ft. span, resting upon masonry piers. They are all built for single track only, and are but 4.5 meters (14.7 ft.) wide. Cut stone was employed in those arches which exceeded 40 meters (131.2 ft.) in span, rough coursed work for spans from 15 to 40 meters (49.2 to 131.2 ft.), and a rubble of flat stones for smaller arches. To avoid an excess of unequal loading upon the centers during the construction of the larger arches, the innermost ring was first built entire, and the mortar was allowed some two or three weeks to harden before the second ring was begun. The construction of the latter was then commenced at several different points, so that the ring was closed simultaneously at not less than three points.

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 FEBRUARY 3d, 1894.

- 13,039 of 1892. Electrolytic Apparatus. J. Hargreaves, Widnes, and T. Bird, Liverpool.
 2,377 of 1893. Metallurgical Furnaces. A. and H. Allen and A. Bashforth, Rotherham.
 2,883 of 1893. Bessemerizing Lead Sulphide. A. Macdonald, London.
 4,870 of 1893. Zinc Oxide Pigments. A. P. Laurie, London.
 4,90 of 1893. Electrolysis of Salt. T. Parker and A. E. Robinson, Wolverhampton.
 5,349 of 1893. Red Oxide Paints. M. N. d'Andria, Manchester.
 6,405 of 1893. Electrolytic Apparatus. E. T. Parker, Wolverhampton.
 22,327 of 1893. Sulphuric Acid Concentrator. J. Bradbury, Manchester.
 23,436 of 1893. Electrolysis of Salt. Union Chemical Company, New York.

EPATENTS 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, FEBRUARY 6TH, 1894.

- 513,971. Process of Making Aluminium Fluoride. Wilhelm Ackermann, Giebichenstein, near Halle-on-the-Saale, Assignor to the Grabau's Aluminium-Werke, Trotha, near Halle-on-the-Saale, Germany.
 513,972. Duplex Revolving Screen for Cleaning and Grinding Coal. Lorenz Aulmann, Des Moines, Iowa.
 513,974. Process of Smelting Ores. William L. Austin, San Francisco, Cal.
 513,987. Drill Bit and Reamer for Earth Boring. Alex. G. P. Creed, Sydney, New South Wales.
 513,999. Continuous Brick Kiln. Thomas Green, Sioux City, Ia., Assignor of one half to the Sioux City Brick and Tile Company.
 514,006. Apparatus for Treating Phosphate Rock. Samuel Hughes, Charleston, S. C.
 514,016. Separating Machine. Orville M. Morse, Jackson, Mich.
 514,039. Process of Purifying Aluminous Minerals. Heinrich F. D. Schwahn, Kansas City, Mo.
 514,040. Process of Purifying Native Sulphate of Barium. Heinrich F. D. Schwahn, Kansas City, Mo.
 514,041. Method of Separating and Recovering the Constituents of Ores, Earths, Clays, etc. Heinrich F. D. Schwahn, Kansas City, Mo.
 514,045. Producing Asphaltic Composition Powder for Roadways. Charles H. Slicer, Baltimore, Md.
 514,060. Rotary Pump. Victor Bries, Fabacher, La.
 514,067. Crusher. William W. Sly, Cleveland, O.
 514,124. Process of Making Nitric Acid and Caustic Alkali. George Lunge, Zurich, Switzerland, and F. Pham M. Lyte, London, England.
 514,125. Process of Making Caustic Alkali and Lead Chloride. Farnham M. Lyte, London, England, and George Lunge, Zurich, Switzerland.
 514,137. Process of Recovering Precious Metals. William P. Miller, Melrose, Cal.
 514,251. Hydraulic Crane. George W. Zastrow, Baltimore, Md.
 514,255, 514,256, 514,257. Pressure Gauge. William H. Bristol, Hoboken, N. J.
 514,275. Method of and Apparatus for the Electro-Deposition and Refining of Copper or Other Metals. Langan S. Randolph, Baltimore, Md.
 514,276. Process of Electrolytic Separation of Nickel from Copper. Pierre de P. Ricketts, New York, N. Y.
 514,310. Furnace for Natural Gas. Fred Denz, Buffalo, N. Y., Assignor of one-half to Felix Denz, same place.
 514,318. Electrode for Use in the Manufacture of Chlorine and Caustic Soda. James Greenwood, London, England, Assignor to the Caustic Soda and Chlorine Syndicate, Limited, same place.
 514,352. Valve for Regulating the Outflow of Liquids. Peter Erichsen, Lunden, Island of Alsen, Germany.
 514,381. Centrifugal Blower. Garrett W. Poole, Newark, N. J., Assignor by mesne assignments to the New Jersey Blower Company, same place.
 514,406. Brick Drier. Andrew F. Barron, Austin, Ill.
 514,421. Method of and Apparatus for Forming Bricks. Henry H. Keller, St. Louis, Mo., Assignor to the Ross-Keller Brick Machine Company, same place.

PERSONALS.

Mr. Gustave Kroehl has been appointed director of the Santa Fe mine, Mexico.

Mr. J. W. Schaub has resigned his position with the Pottsville Iron and Steel Company, at Pottsville, Pa.

Mr. Eugene Creller has resigned his position of superintendent of the Idaho Mining Company, Grass Valley, Cal.

Mr. A. Williams has been appointed assistant secretary of the Lackawanna Iron and Steel Company, at Scranton, Pa.

Mr. George K. Fischer, mining engineer, and formerly of Denver, Colo., is now located in the Monadnock Building, Chicago.

Mr. W. T. Manning has been appointed chief engineer of the Baltimore & Ohio Railroad. He has been acting chief engineer since Colonel Douglas resigned, in October, 1892.

Mr. W. J. Olcott has been made president and general manager of the Lake Superior Consolidated Mines, including all the companies under control of the Rockefeller syndicate.

Mr. Fred G. Bulkeley, for several years manager of the Aspen Mining and Smelting Company, of Aspen, Colo., has gone to Monterey, Mex., where he will assume the general management of a group of properties for Eastern capitalists.

Mr. E. C. Engelhardt, chemist and metallurgist, formerly of Deadwood, S. Dak., has established an office in Denver, Colo., where he will make a practical test of the "Engelhardt" process, which is a modification of the barrel chlorination process.

Maj. S. C. Eaton, of the United States Assay Office, at New York, has gone to Arizona, where he will make an examination of the Phoenix mine and mill with a view to recommending the course to be adopted in treating the ores from that mine.

Mr. William S. Eaton, who recently resigned as treasurer of the National Tube Works Company, has been succeeded by Mr. Arthur F. Luke, assistant treasurer for four years. Mr. Eaton remains as director and as chairman of the finance committee.

Mr. H. Ph. Ehrhardt has resigned his office as director of the Santa Fe mines, and has accepted the position of manager of the San Rafael and Guadalupe mines, in the district of Cartepena, in the State of Durango, Mex. These mines are owned by the Monterey Smelting Company.

Dr. Eugene Townsend has been nominated by the President as superintendent of the Mint at Philadelphia. He was formerly a physician, but for some years past has been engaged in business and is now treasurer of the Citizens' Trust and Surety Company, of Philadelphia. From 1885 to 1889 he was deputy naval officer at that city.

Mr. Flournoy C. Johnson, for four years past chief assistant chemist of the N. P. Pratt Laboratory, at Atlanta, Ga., has accepted the position of chemist to the National Acid Company, the Standard Guano and Chemical Manufacturing Company and the Standard Cottonseed Oil Company, at New Orleans, La., where his headquarters will be hereafter.

Mr. J. Elfreth Watkins, who had charge of the Pennsylvania Railroad exhibit at the World's Fair, at Chicago, as assistant to Mr. T. N. Ely, has resigned from the Pennsylvania Railroad service to accept a position as director of the "Department of Industrial and Mechanical Art" at the Columbian Museum, in Chicago. Mr. Watkins was for some years a civil engineer on the Pennsylvania Railroad, and was afterward curator in the transportation section of the National Museum at the Smithsonian Institution until 1892, when he resigned to take charge of the preparation of the Pennsylvania's exhibit.

OBITUARY.

Job Rich, a retired coal operator, died at Pottsville, Pa., on February 13th, aged 82 years.

Alfred Solvay, a brother of the inventor of the "Solvay soda process," died recently at Nice, France, aged 54 years.

W. M. Watkins, who was at one time superintendent of various mines in Nevada, died suddenly at Silver Cliff, Colo., on February 8th.

Jonathan D. Stevenson died in San Francisco, Cal., on February 14th, aged 94 years. He was a pioneer. He was a native of New York and went to California in 1847, as commander of the New York Volunteers, raised at the request of President Polk. This force is known in history as Stevenson's Regiment. In 1848 the regiment was disbanded, and its commander went to the mines, where he prepared the first code of mining regulations. He later engaged in the real estate business, and was in 1872 appointed Shipping Commissioner of San Francisco, holding office until 1885. Afterward he practiced law up to a few months ago.

SOCIETIES AND TECHNICAL SCHOOLS.

Foundrymen's Association.—At the regular meeting in Philadelphia, February 7th, various committee reports were received. Mr. W. J. Sauter was chosen a member of the executive committee in place of L. B. Whitney. A paper on "Molding Machines," by P. O'Connor, of New Haven, Conn., was read and discussed. This was followed by a lively discussion on a paper by Mr. W. J. Keep, of Detroit, on "Foundry Chemistry," which criticised pretty sharply some existing ideas on the best irons for foundry use.

Engineers' Club of Philadelphia.—At the regular meeting, February 3d, Mr. Edward K. Landis read a paper on "Magnetic Concentration of Iron Ores," in which he said that though the method had been known for some time it was commercially a new process. He described a number of experiments made and gave a formula for calculating the amount of crude ore to be treated to produce a ton of concentrates. The paper was discussed at some length by Messrs. Birkinbine, Thompson, Morris and others.

American Chemical Society, New York Section.—The regular monthly meeting was held February 9th at the University Building, Prof. Peter T. Austen presiding. Mr. J. S. Stillwell read a paper on "Some Points of Interest in the Manufacture of Oxygen and Nitrous Oxide Gases." The processes of compressing these gases were explained, and a number of interesting properties of liquid nitrous oxide were mentioned. The presence of a minute amount of organic matter in ammonium nitrate is most prejudicial to the production of nitrous oxide, as it carries a dangerous formation. Dr. Hugo Schweitzer gave an elaborate critical review of the methods of analyzing lard, some of the impurities in which are not easy to detect. Attention was drawn to the use of sunflower oil in oleo-margarine, this oil being cheaper than cottonseed oil. The announcement was made that Mr. N. M. Grosvenor, Jr., had discovered ethyl-acetic ether to be a good solvent for perchloric acid.

Engineers' Club of St. Louis.—At the regular meeting in St. Louis, February 7th, Messrs. A. J. Hammond and M. L. Mitchell were elected members. A committee of five was appointed to consider the feasibility of a system of boulevards in the central part of this city, and report back to the club. This committee consists of Messrs. Julius Pitzman, chairman; W. S. Chaplin, W. B. Potter, C. M. Woodward and Robert Moore. Prof. J. B. Johnson then addressed the club in regard to the testing laboratory of the Washington University, where an extensive series of timber tests are now in progress under the auspices of the Forestry Division of the Department of Agriculture. The construction and uses of the various testing machines were explained, after which the meeting adjourned to the laboratory itself, on Seventeenth and St. Charles streets, where cross-breaking tests were made on yellow pine beams 4 x 4 and 8 x 14, and a compression test on a yellow pine column 10 in. square and 12 ft. long.

Lake Superior Mining Institute.—Prof. F. W. Denton, secretary, announces that the second annual meeting of the institute will be held at Houghton, Mich., beginning Wednesday, March 7th. Members will meet at the Michigan Mining School Building, in East Houghton, at 3 p. m., Wednesday, where an opportunity will be given to see the school's equipment and to become acquainted with the local members of the Institute. The first session of the Institute will take place at 8 p. m. at the Armory Opera House. Excursions to points of interest will be made on Thursday and Friday. The meeting will last until noon Friday. The following is a list of papers to be presented at the meeting: "Sinking of shaft, West Vulcan," by Capt. William Bond; "Diamond Drill Holes," by F. Parke Channing; "Ore Dressing on Lake Superior," by Prof. F. F. Sharpless; "Some New Geological Sections of Keweenaw Point," by Dr. L. L. Hubbard, State Geologist. In addition to the above a paper will be read by H. V. Winchell, and it is probable that still other papers will be presented. Underground and stamp mill views will be shown by means of a projecting lantern.

Colorado Scientific Society.—At the regular monthly meeting held in Denver January 8th, Dr. Richard Pearce read a paper on "The Ores of Cripple Creek." It was pointed out that the physical character and geological occurrence of these ores presented many features in common with those of the Silver Cliff region. Investigations had been made by the author at various intervals and had been carried out for the most part on specimens and bulk samples from the following mines: The Garfield Grouse, the Prince Albert, the Independence and the Anaconda. In the ore of the Garfield Grouse no tellurides had been found, but gold had been detected which had a habit similar to that of sylvanite. In the clayey portions the occurrence of oxide of tellurium had been inferred and the author had concluded that the free gold had been derived from the alteration of a telluride of gold. The results of the sampling of many carload lots had shown that the gold and silver existed in the proportion in which they occur in sylvanite, rather than calaverite or krennerite. In the ores from the Prince Albert and Independence mines the

quantity of tellurium was twice as great as that to be accounted for by the composition of sylvanite, and the experiments which had been made suggested that while this fact might be explained by the occurrence of native tellurium it was possibly due to the removal of part of the gold of some telluride mineral. In the Anaconda ore—the last submitted for examination—free gold was found accompanied by violet-colored fluorite in a greenish rhyolite. The similar association of fluorite and sylvanite was pointed out by the author as having been observed in the John Jay and Melvina mines in Boulder County. Dr. Pearce stated that he considered it probable that in depth unaltered sylvanite would characterize the ores of these mines. An interesting discussion followed.

Association of Engineers of Virginia.—The annual meeting was held January 31st and February 3d, in Roanoke, Va. The directors reported 86 members on the roll, as follows: Resident, 27; non-resident, 59. In addition to the three regular meetings, six monthly meetings were held during the year, all of which were well attended and very interesting. The completion by the Association of a set of building regulations, applicable to a medium-sized city of 20,000 population or over (which are about to be adopted by the city of Roanoke), the work on a Road Law for the State of Virginia, also several excellent papers and discussions presented by members at both the regular and monthly meetings show a very creditable year for the Association, and the published proceedings for the year 1893 will be of great value to every member. Officers for the year 1894 were elected as follows: President, Chas. S. Churchill; vice-president, W. H. Adams; directors (to serve three years), J. B. Fuller, H. A. Gillis and William Dunlap; treasurer, J. R. Schick; secretary, Jno. A. Pilcher. The following new members were elected: L. S. Randolph, Blacksburg, Va.; S. A. White, Roanoke, Va. Mr. Churchill presented the report of the Committee on Regulations Governing the Erection of Buildings. The committee as per instructions had presented these regulations to the city council of Roanoke and later to the Council Committee on Ordinances, who accepted them and who propose to recommend them for adoption as a building law for the city of Roanoke at next council meeting. Action of committee was approved and the full set of regulations was referred to the publication committee. Mr. Coleman presented the report of the Committee on State Laws for Public Roads, which, after being taken up by sections and discussed, was adopted with slight amendments. A committee consisting of Mr. Clarence Coleman and Mr. J. C. Rawn was appointed to take the proper steps to bring the proposed law before the State legislature. A paper was read by Mr. Rene de Saussure on "Graphical Methods." It proved to be very interesting and after discussion was referred to the committee on publication. The monthly meetings, subjects and authors of papers were announced as follows: February 28th, "Bridging the Hudson River," Chas. C. Wentworth; March 21st, "Blair Furnace Construction," Rubens Patterson; April 18th, "Aluminum Alloys," Samuel Wallis; May 16th, "Boiler Construction," G. R. Henderson.

INDUSTRIAL NOTES.

The Catsauqua (Pa.) Rolling Mill, which has been idle for some time, has resumed operations.

The Slatinton (Pa.) Rolling Mill has resumed operations in all departments after being idle for several months.

The Birmingham Rolling Mill Company will start up its mill at Birmingham, Ala., next week. It has been shut down since July.

The American Tube and Iron Works, at Youngstown, O., which have been idle for several months, started up on February 13th, with 400 men.

The Lunkenheimer Company, Cincinnati, has issued a very neat folder illustrating its renewable seat gate valve and giving sizes, prices, etc.

The Pittsburg Bridge Company has been awarded a contract for a steel building, weighing about 150 tons, by the Johnson Company, of Johnstown, Pa.

The Delaware Rolling Mill, Phillipsburg, N. J., started up six furnaces on February 12th, making steel bars. This mill has not been in operation since last spring.

The Sullivan Machinery Company reports recent orders for 11 of its direct-acting channelers for use on the Chicago drainage canal. There are already 25 of these machines in use on that work.

A fire occurred at the Bath Iron Works, in Bath, Me., on February 13th, destroying the carpenter shop, tin shop, molding loft, machine shop No. 2, the bending shop and the big ship shop. The loss is placed at \$150,000.

The Reading (Pa.) Rolling Mill Company has posted notices of wage reductions of from 10 to 25%. Puddlers will be reduced from \$3 to \$2.50, laborers from \$1.10 to \$1, puddle helpers 24 cents a heat, and roll changers one-half. The new scale takes effect February 17th.

The property of the old Brady's Bend Iron Company, in 6,000 acres of land lying in Clarion and

Armstrong counties, Pa., was sold last week at trustees' sale to Jerome D. Gillette, of New York, for \$80,000. The purchase was made in the interest of a company to be organized.

The Bucyrus Steam Shovel and Dredge Company, South Milwaukee, Wis., recently sold two steam shovels to the Heidenreich Company, of Chicago, for use on the great drainage canal now building to divert the drainage of the city of Chicago away from Lake Michigan, the source of its water supply.

At the Carnegie Steel Company's plant at Homestead, Pa., the converting, 10, 23, 35 and 40-in. mills have started on double turn. The 23, 32 and 119-in. mills are on single turn. Of the two open-hearth mills each has five furnaces in operation. The force in the machine shops and fitting departments is much larger.

The smelting department of the Omaha & Grant Smelting and Refining Company's works, in Omaha, Neb., has been shut down on account of a breakdown in the machinery and over 200 men are idle. The officers say that owing to the short supply of ores the smelting furnaces will not be started up again for, perhaps, a month.

The Roane Iron Company has just blown in its new Florence furnace at Rockwood, Tenn. Its output amounts to 90 tons per day. The estimated cost is \$200,000 and its erection has been under way since April last. The company has spared no pains or expense to make it of the latest approved pattern in every respect. With its own ore mines and coal washer, it is able to work economically.

At the annual meeting of the American Tube and Iron Company, held at Middletown, Pa., these officers were elected: Col. James Young, president; George Matheson, vice-president; A. S. Matheson, general manager; F. Musselman, secretary and treasurer; James H. Matheson, superintendent; James Young, George Matheson, John J. Showers, A. S. Matheson, A. W. Momeyer, directors.

The Guild Mineral Washer Company has been organized in Baltimore during the week, the incorporators being A. L. Taveau, Julian S. Jones and Charles B. Eisenhart, of Baltimore; C. G. Memminger and E. W. Coddington, of Florida. The purpose of the company is the manufacture and erection of ore washers. The capital stock is placed at \$100,000 fully paid up. The board of directors are: C. G. Memminger, president; A. L. Taveau, secretary and treasurer; Julian S. Jones, attorney; and George Guild, of Knoxville, Tenn., constructing engineer.

The new plant of the William Powell Company, Cincinnati, O., is one of the most complete of its kind in the country. The works consist of a group of buildings. A contains the offices, warehouses and brass finishing department, the front being 119 ft. and three stories high, by 175 ft. long, of pressed brick trimmed with sandstone, making a very handsome and substantial appearance. Building B is the foundry 60 x 150 ft., and C the pattern house. Each building is separate and distinct, being isolated as much as possible for protection against fire. The engine is of 150 H. P., Corliss type, and the boiler an upright one of their own design. They have an 85-H. P. generator which furnishes the current for five motors distributed throughout the various buildings and also for lighting 350 incandescent lights and 10 arc lamps. Their specialties, "Star" valves, "Star" sight feed lubricators, "Signal" and stop feed oilers, grease cups, guard steam stops, etc., are reported in good demand.

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.

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GENERAL MINING NEWS.

The Bureau of Statistics, Treasury Department, reports the total exports of mineral oils from the United States in January as follows: Crude oil, 6,282,054 gallons; naphthas, 563,922 gallons; illuminating oils, 44,687,170 gallons; lubricating oils and paraffin, 2,246,620 gallons; residuum, 2,016 gallons; total, 53,781,782 gallons, valued at \$2,413,991. As compared with January, 1893, there was a decrease of 1,523,886 gallons, or 2.8%, in the totals.

National Lead Company.—At the annual meeting in Jersey City, February 15th, the following directors were chosen: A. P. Thompson, R. R. Colgate, J. L. McBirney, J. A. Stevens. The only new director is Mr. Stevens, who succeeds W. H. Thompson. A resolution offered by Mr. Fredericks, of Baltimore, calling for a more detailed report, was defeated by a vote of 211,790 to 1,374 shares.

ALABAMA.

Jefferson County.

Tennessee Coal, Iron and Railroad Company.—A press dispatch of February 15th says: Mine No. 2 of this company, at Blocton, caught fire last week. J. T. West, a pumpman, was smothered to death, and four other men are reported lost. The fire still rages. The origin of the fire is not known.

ALASKA.

Alaska-Treadwell Gold Mining Company.—The cablegram from Alaska announces the January operations as follows: Shipment of bullion, \$56,779; tons of ore milled, 19,920; tons of sulphurets treated, 361; of bullion there came from sulphurets, \$8,086; estimated gross expenses for period have been \$25,268. The manager reports that work is much retarded by unusually bad weather. He also cables that a robbery from the chlorination works has resulted in a loss of \$7,500. Steps are being taken to arrest the delinquents. The net profits available for dividends for the first eight months of the present financial year are, therefore, about \$361,000.

ARIZONA.

Yuma County.

(From our Special Correspondent.)

Gold Rock Mining Company, Yuma.—This property is situated about 20 miles from the town of Yuma and in it one of the richest strikes ever made in the neighborhood was made. The ore has yielded free gold well from the first and the mill is now being enlarged from 15 to 25 stamps. Last week, at a depth of 150 ft., a chamber of ore was struck that is apparently very rich.

CALIFORNIA.

Mining assessments of California mines falling delinquent in February amount to \$19,000.

Amador County.

(From our Special Correspondent.)

New shafts are being sunk on the Alma and Argonaut (old Pioneer) mines, near Jackson. These properties are supposed to be on the same vein as the Kennedy, which adjoins the Argonaut on the north. The Alma is half a mile south. Each of these new mines has been incorporated and plans made to sink 2,000 ft. The Kennedy is down 2,200 ft. below the croppings and the quartz is as good as at any point above. The vein is well defined and shows no sign of weakening.

The Farrell and Middle Bar mines on the Mokelumne River, four miles southeast of Jackson, are being opened. Good rock is being taken from each of them. The Farrell has a five-stamp mill for prospecting. The Gover mine is one of the most promising properties in the county to-day. Within the past four months a body of gold-bearing quartz, 30 to 50 ft. wide, has been opened in the lowest levels, and there are now large reserves of pay rock in sight, enough to keep the little 20-stamp mill employed for some years. Three miles north of the Gover the Pioneer mine, formerly known as the New London, is now being re-opened. A new shaft is being sunk, the hoist having been moved from the Plymouth Consolidated at Plymouth. The Mayflower and South Mayflower near the town of Amador are working under new management. The Keystone mine is doing better under the management of Superintendent Hale than for several years previous. Placer miners about Volcano and Pine Grove are reported to be doing well. It is expected that some new drift gravel mines will be opened this year on the ancient river channels about Pine Grove and toward Rancheria.

Butte County.

Stow.—It is stated that this mine, at Forbestown, will soon be drained by a tunnel which will be run in the hill below the mine, tapping the ledge at a probable depth of 1,000 ft., says the Oroville "Mercury." The mine will thus be drained without the aid of pumps, and possibly the ore will be delivered through the tunnel, avoiding the necessity of hoisting works. The Stow mine has shown itself by development to be one of the most extensive on the coast. It will require a large outlay to construct the tunnel. Heavy machinery is now on the way to the mine for this purpose. Burleigh drills run by air compressors will be used. The length of the tunnel is not known exactly, but it will probably be not less than 1,000 ft. long.

(From our Special Correspondent.)

Danver Mine, Forbestown.—This mine and the mill adjoining, owned by G. W. Price, have been bonded by F. W. Dunn, a capitalist from Nevada. The bond has 60 days to run, the price to be paid if a sale is consummated being set at \$24,000.

Pactolian Mine, Hurleton.—A small prospect mill has been put up and will be run by water power. The Phoenix mill is running day and night. A three-mile water ditch has been completed from the latter mill to Dutch Ravine and the pumps at the Stow mine are now run by water power.

Calaveras County.

(From our Special Correspondent.)

In the vicinity of Angels several new mines are being opened. Northeast of town the Birney and Cook mines are new properties being opened with encouraging results. These prospects lie side by side and have shafts 110 and 65 ft. respectively.

A good strike has lately been reported from the neighborhood of Vallecito. In Smith's Flat, west of Angels several mines are being opened, among them being the Blair Consolidated, Eclipse and Star of India.

West of Murphy's the Mayflower mine is being rapidly opened by W. S. Edwards; 50 men are employed. Work was commenced but a few months ago when the mine was only a prospect. As fast as room could be made for them other men were engaged, and the property is fast assuming the appearance of a mine.

The Thorne mine, six miles south of San Andreas, is to be reopened. It has a shaft down 100 ft. on an 8-ft. vein of gold quartz.

In the old gravel channels of the county quite a number of drift mines are being opened, particularly in the vicinity of El Dorado and on the Jesus Maria Creek.

The Utica-Stickles mines continue to make a large monthly output of gold bullion. This group is the largest in the county. It comprises the Utica, Stickles, Gold Cliff and Matson. There are 160 stamps at work crushing about 18,000 tons of rock monthly. The output is variously stated from \$160,000 to \$185,000. It also includes the sulphurets from the Eureka Consolidated, in Tuolumne County, which are treated at the Angels works.

The Buckhorn mine, near Murphy's, is again being reopened, a small force being employed. The mine was at one time a producer of some prominence.

Utica Mine.—The clean-up being made at the mill is said to be the largest of any yet. The output for December amounted to \$200,000. The production for the three months preceding December, 1893, aggregated \$500,000.

Kern County.

(From our Special Correspondent.)

Bonanza Mine, Red Rock.—This claim, which was sold a short time since, for \$6,000, is reported to have yielded \$40,000 in gold out of ground 250 ft. along the gulch and averaging only about 6 ft. in width. The capacity of the dry washers was so overloaded that parties who leased the tailings are doing well.

Christ Maher Mine, Agua Caliente.—Sinking has been carried 55 ft. and the ledge at that depth has gradually widened to 7½ ft., and is rich in gold and silver.

Mariposa County.

(From our Special Correspondent.)

The long period of idleness on the Mariposa estate in this county seems about to end. During the past year a representative of Senator Jones, one of the principal owners, has been engaged in prospecting on the grant and has proved the existence of several veins heretofore unknown, as well as demonstrated the value in some of the mines that were worked years ago. Among the latter is the Josephine in which is exposed a mass of gold-bearing rock 50 ft. wide. Cross-cuts show it to be at least 200 ft. long. Good prospects have also been obtained near the Princeton mine, which in the early days produced considerable and is only worked to a depth of 400 ft. A five-stamp mill has been built on the outskirts of Mariposa, where quartz from the various mines will be worked in 100-ton lots. It is intended to test thoroughly all these mines before any large mills are built. Since the shutting down of these mines years ago the methods of working have changed considerably and quartz formerly too low grade to pay will now return a profit. The area of the Mariposa estate exceeds 40,000 acres and embraces nearly all the valuable mines of the Mother lode at its southern end, south of the Merced River. The principal mines of the grant in early days were the Princeton, Pine Tree and Josephine, Mount Ophir, Mariposa, Green's Gulch, Oso and Mexican. These mines were all equipped with hoists and mills at one time or another, but the machinery has long since been torn down and removed. For years the grant has been closed to prospectors, but now they are allowed to roam over the hills and if they discover anything are permitted to work it on royalty. Several good finds have been made.

Mono County.

Bulwer Consolidated Mining Company.—A bullion shipment, valued at \$1,333,36, has been received at San Francisco, from this company's mine of Bodie, and the clean-up at the mill has yet to be made.

Nevada County.

Maryland Mining Company and Idaho Mining Company.—The plant of the Idaho Mining Company was transferred to the Maryland Mining Company on February 3d, and the latter company has taken full possession, says the Grass Valley "Tidings." By this change the work of rebuilding and repairing the hoisting plant recently destroyed by fire will be under the management of the Maryland company. S. P. Dorsey, president of the Maryland company, will act as superintendent and general manager of the mine hereafter and Victor Dorsey will act as assistant superintendent. Superintendent Dorsey says that the work of rebuilding will be pushed as rapidly as possible. The new hoisting works will be a modification of those destroyed.

Providence Mining Company.—This company,

says the Nevada City "Transcript" has in contemplation a project for obtaining its water power from the South Yuba Company's ditch, at Town Talk. The water will be conveyed by ditch and boxes part of the way and then by pipe direct to the mine. By this arrangement a greater pressure can be obtained than at present, and the power can be distributed to better advantage.

Sebastopol.—The final arrangements for the bonding of this mine to E. H. Baxter and others, of San Francisco, and B. F. Runnels, of Grass Valley, have been completed. Work will be begun on this mine by placing the necessary machinery on it and sinking a new incline shaft on or about May 1st.

San Bernardino County.

(From our Special Correspondent.)

Goler District Placers.—While overestimated as usual in such cases, the placer grounds are yielding fairly well and in some instances rich returns are being obtained. Gold has run as high as \$10, and in exceptional cases \$20 per sack of 80 lbs. of dirt. This Bonanza ground is owned by Hay & Canfield, who are compelled to have a guard keep watch on the valuable deposit. Many prospectors have left the camp and mining is now down to a business basis.

Trinity County.

(From our Special Correspondent.)

La Grange Hydraulic Gold Mining Company.—F. Beaudry, the general manager of this company, has just consummated a deal by which the Red Hill placer ground passes under his control. The sum paid is said to have been \$280,000. Associated with Mr. Beaudry are some French capitalists. The property obtained embraces 1,500 acres of gravel and of valuable water rights, and it is intended to spend \$200,000 in constructing ditches to the improvements.

COLORADO.

Boulder County.

Pine Shade.—The managers of this mine, at Jamestown, are about to commence the erection of a mill of 150 tons daily capacity.

Custer County.

Denver Kaolin Company.—This company has begun work on its property just east of Silver Cliff. A cut of 30 ft. wide is being run into the hill and a building 20x40 is being put up for a dry and storage house. A contract has already been made for hauling out 50 tons per month.

Gilpin County.

Ore shipments from Black Hawk for January show a good increase over the same period of last year. One hundred and ninety-seven carloads of ore and tailings, aggregating 5,910,000 lbs., were forwarded to Denver and Argo smelters during that month. This is an increase of over 2,000,000 lbs. over January, 1893. There is also a marked increase in the amount of mill dirt which is being handled by the various stamp mills in the city. The new Gilpin mill will at once put in 25 additional stamps, owing to an unexpected increase in the amount of custom ore received.

Argyle Gold Mining Company.—The directors of this company have promised the stockholders that a dividend would be paid some time in February from the earnings. The mine is now looking well and there are large ore bodies in the seventh, eighth and ninth levels. From 20 cords of mill dirt shipped recently the average was $6\frac{1}{2}$ oz. gold to the cord, an aggregate of 131 oz.

Fisk and Teller-Fisk.—The sale of these properties, near Black Hawk, is announced. According to the Denver "Republican," negotiations for the sale were commenced last summer by J. P. Hopkins, of Denver, but they did not come to a final issue until last month, when the Fisk Gold Mine Company (Limited) was formed in London, the enterprise being floated by Mountain, Walton & Co., of London. The purchase price is said to have been fixed at £190,000 (\$950,000), which, however, does not represent the net price paid for the property. The sale was made after a report upon the properties by P. Coulson Bunn. In his report Mr. Bunn states that the Fisk mine is located upon a true fissure vein, of an average thickness of 3 ft., and the indications point to the vein becoming wider and richer as depth is attained. In 1893 the mines produced over \$250,000. In February it is expected to produce \$30,000. The mine is developed by a working shaft 950 ft. deep, from which eight levels have been driven into the vein. The Teller-Fisk adjoins the Fisk, and the Fisk lode runs through it, and it can be worked from the Fisk shaft without any dead work or outlay. From August, 1891, to April 1st, 1892, the mine produced \$38,567. Of this amount \$36,008 was spent in repairs and development work. About this time the Fisk Mining and Milling Company took over the property. From April, 1892, to March, 1893, there were produced 10,210 tons of milling ore and 181 tons of smelting ore, realizing \$181,750, and producing a net profit of \$107,482. With the acquisition of the Teller-Fisk property Mr. Bunn's report states that, assuming that the ledge therein is equal to that of Fisk, the company will have 45,000 tons of ore ready to be worked from the Fisk shaft from the surface to the 900-ft. level, which will produce a net profit of \$550,000. He also intimates that the profits to be made by the mine will not be less than \$175,000 annually, but

by the acquisition of the Teller-Fisk and the erection of an air drilling plant, the net revenues will not be less than \$300,000 annually. The ore mined is of more than low grade, running about \$18 to the ton on an average. The company that has bought the property has been capitalized at \$1,000,000, in shares of \$5 each, of which \$50,000 is working capital. The principal officers are prominent English capitalists, the board of directors consisting of Henry Bonner, Charles Horsley, Lionel R. Netre, Joseph Walton, all of London, and James Stevens, of Manchester. The secretary of the company is William Hope, London, and consulting engineer, P. Coulson Bunn. It is proposed to conduct further development work vigorously and bring out all the possibilities of the properties.

Lake County.

The following from Leadville is published by the Denver "Republican" of a late date: One of the most encouraging features of the local mining situation at present is the activity, real and prospective, with which the search for gold is being carried on. The snow in the mountain gorges and valleys at present renders operations on a large scale impossible, but indications are good for a summer campaign on the part of the prospectors and for an investment of capital on a scale hitherto unknown. In the Twin Lake region a new district, called Lost Canon, is being thoroughly prospected. An assay from a property there ran 7 oz. in gold, with a good showing of silver. The property is controlled by Joseph McDonald. The famous gold belt, extending from the Little Johnnie to the Lillian mine, on Breece Hill, will be thoroughly developed during the coming season, and extraordinary developments are looked for. It is reported that \$65,000 was recently offered and refused for a one-eighth interest in the Little Johnnie. The Alicante and Bird's Eye districts have, for the last few weeks, been occupied by a small army of surveyors staking off claims in the interests of Eastern capitalists. The locality is supposed to be rich in gold.

Bonair Mining and Milling Company.—Articles of incorporation of this company have been filed. The capital stock is placed at \$400,000, in capital shares of \$1 each. Operations will be confined to Lake County, and the principal place of business will be in Denver. The directors are S. W. Dorsey, Eben Smith, C. T. Limberg, R. H. Reid and H. H. Officer.

Golden Treasury.—Patents have been filed by M. Stuart and W. Robinson et al., on the Golden Treasury mining lode, in the California mining district.

Jamie Lee.—W. G. Brown, trustee, has sold to Mary E. Brown, of Denver, a seven-thirty-second interest in the Jamie Lee lode, in the California mining district. Consideration private.

(From our Special Correspondent.)

The exceedingly low price of silver is proving quite a drawback to those properties, where silver is the leading product, and in a number of cases men have been laid off from the larger properties while quite a number of lessees have been compelled to close down entirely. There is no new work being done.

A \$10,000 gold display was made here this week, being the work of one man and one hour's time. The gold came from Farnum Hill, about 20 miles from here, and from the Campion et al. consolidation of this city. The largest nugget weighed 78 oz. and was composed entirely of crystallized and flake gold. The property on Farnum Hill comprises over 5,000 acres and is owned by the Campion syndicate, of Leadville.

Antioch.—This property, a gold producer, is again being worked with very good results. The stamp mill is also running and has all the ore it can handle.

Bison Mining Company.—It is the intention of these people to begin shipments from their property next week. They have a good body of iron and lead ore and shipments will be about 100 tons daily.

Bonair Mining Company.—Articles of incorporation have been filed of the Bonair Mining Company. The concern is capitalized for \$200,000 and the principal parties interested are Senator Jones, of Nevada; Stephen Dorsey, D. H. Moffat, Eben Smith and Henry Smith. The company has been formed for the purpose of working the old Star of Hope Company's property, better known as the Bohn shaft.

Commercial Mining Company.—The Capital shaft belonging to this company is now on the regular list of shippers, the output being 35 tons daily of iron ore, 45% excess and carrying a fair amount of silver. The streak of galena is well defined and runs from 150 to 700 oz. of silver to the ton.

Little Vinnie.—The lessees of the Golden Eagle Mining Company's property—the Little Vinnie—have opened up a fine body of gold ore. The ore chute is the same as that of the Little Johnny property, and development work promises very excellent results. The ore body opened up is a large one and quite rich, carrying both lead and gold.

Marian Lease.—The Marian people have completed their new shaft. It is 1,030 ft. deep and three shifts are now drifting to catch the ore body. The territory being explored is entirely virgin ground.

Pitkin County.

The following correspondence from Aspen is published in the Denver "Republican": So far as silver mining is concerned, Aspen is fortunate in having so many properties sufficiently developed that it is possible to work them by improved methods at the present price of silver bullion. Such properties as are now worked without loss are, with few exceptions, those which have the advantages of tunnel facilities in their upper, and electric machinery in their lower workings, reducing the cost of getting ore and waste to the surface to a minimum.

With the exception of the Pontiac, all mines along the course of this tunnel are being worked to some extent. The Bushwhacker and Park-Regent are working below the tunnel level with the aid of electric motors, as is also the Della S. The Champion-Empire has no tunnel connection except for air, but the upper territory is under lease to P. Fitzgerald. In the Mineral Farm about 35 men are working on some 20 subleases, covering about all the ground from the tunnel level to the surface.

Many owners of large properties have adopted the plan of leasing most of their partially worked territory. Some of the lessees make an occasional rich strike, but on the average when royalties are paid there is very little "velvet" remaining, and the majority, it is said, are lucky if they pay expenses and have wages left.

Cowenhoven Tunnel.—The report recently published to the effect that the Cowenhoven tunnel is about to be extended through the Alta Argent property and into the Koch ranch, Manager Brunton declares to be untrue. The tunnel is to be swung out of the shales and into the brown lime, and possibly in doing this it may be extended 100 ft. or more, but of any contracts for further extension the manager claims to have no knowledge.

Saguache County.

The following items of Creede mining news are taken from our local exchanges: Ore shipments from Creede have been holding at from 12 to 15 cars a day since the Amethyst output fell off because of the cave-in shutting off No. 3 shaft. Some prospecting is being done in property under cover, but little except in places contiguous to big ore bodies.

Emma.—The body of hard lead carbonates recently opened into at this property at Spar is holding out. Shipments are being made from the sidetrack at Wason. This new find is making some awakening in the camp. The Polar Spar group, owned by Dietrick, Moore & Rogers, will come in for a part of vein, and the owners are considering plans for considerable development in the spring.

United Mines Company.—This company has let a contract for 300 ft. of shafting, and it intends to crowd the sinking of the Happy Thought shaft with all possible speed. This work, besides giving employment to 25 or 30 men, means much for the northern end of the Amethyst vein. It means that if there is any ore in the vein it has got to give up. The company has ample capital, and its stockholders include the principal mining men of Colorado.

The Mother tunnel is pushing on toward the vein. Everything in the cross-cut working looks favorable to an early contact with the lead and promises an ore body. The Ballarac company is crowding work on Shallow Creek and feels confident of locating the body from which the gold float of that locality came. The lead recently cut in the Eureka extension is proving solid and contains good looking vein mass. There is some probability that the Transfer will resume work at an early date. The Park-Regent is driving ahead under contract and expects to catch the lead on the dip early in February. The Ridge has opened into another big body of galena in the left drift and finds it solid in place. After a short stop for repairs the mill is again running. Amethyst shaft No. 3 will probably be opened again soon and work will again be resumed on an even larger scale than before the cave-in occurred. The big pump cannot be placed for weeks yet.

San Miguel County.

Shipments of ore and concentrates from Telluride for the week ending February 9th amounted to 408 tons, of which 384 tons came from the Smuggler-Union. Since January 1st total shipments aggregate 2,368 tons.

FLORIDA.

Suwannee County.

Ocala & Blue River Phosphate Company.—At the annual meeting recently, the following board of directors was chosen: C. W. White, Citra; E. S. Gauden, Old Town; R. L. Anderson, C. S. Clark and Gustave Thuellier, of the French Phosphate Company. Mr. White was again elected president, and E. S. Gauden, vice-president. The affairs of this company are said to be in a very satisfactory condition, with the outlook good.

IDAHO.

Alturas County.

War Dance Mine.—In this mine, says the Hailey "Times," the miners in a cross-cut from the 150-ft. level have struck a large body of galena ore, which appears to be part of a continuous vein. The strike is very similar to that made some time ago on the

250-ft. level. The property is owned by J. W. Burns and Edward Flannery; but it is under bond for \$30,000 to J. O. Swift, who is developing it.

Kootenai County.

Bunker Hill & Sullivan Mining Company.—This company is still working a light force, which is not likely to be increased at present.

KANSAS.

The State Board of Railway Commissioners has issued an order reducing the rates on coal from the mines in Southeastern Kansas to Wichita from \$1.90 to \$1.35 per ton. This is the result of a long fight between the manufacturers in the interior towns and the railroad companies. It is expected that the companies will refuse to obey the order, wishing to test its legality in the courts.

KENTUCKY.

Lawrence County.

Great Western Mining and Manufacturing Company.—This company, whose mines are at Peach Orchard, has been discharged from the receivership by the court, and has made arrangements to continue actively the work on its coal mines.

MAINE.

Knox County.

Eagle Quarry Company.—This company has its quarry in full operation and is making large shipments of blocks.

McLoon Quarry.—The new kilns of Capt. C. F. Williams are doing splendidly, says the Rockland "Courier-Gazette." They are small kilns, and in their green state yield 130 casks a day. They burn oil—the Rockwell duplex system. The system was put in by S. W. McLoon, who is giving it a severe test. It is working well and makes no offensive smoke or odor.

Rockland & Warren Lime Company.—This company has three kilns going at Warren. These kilns have been afire 11½ months, the demand for the company's product being so brisk that it has been impossible to shut down even for repairs.

MICHIGAN.

Iron—Marquette Range.

Ames.—The drift from the 70-ft. level in the new shaft has struck ore at a distance of 75 ft. from the shaft.

Salisbury.—The hoisting engine at this mine, says "Iron Ore," was started up last week. The bailer was put on at once and the pump stopped. The bailer is 4 ft. in diameter by 14 ft. long, and holds 1,354 gallons, or 5½ tons of water. The mine is 860 ft. deep and to keep the water out the bailer is run from 10 to 12 hours out of the 24, and pulls up during this time from 800 to 1,000 tons of water. While in operation it averages a trip every four minutes. It will take several weeks to move the large pumping engine over to the new foundation. The ground where the machinery before stood is still slowly going down.

Iron—Menominee Range.

Pewabic Iron Company.—This company is now employing 375 men in its mines and 30 men cutting wood. No. 1 shaft of this mine is now down to the fifth level and the large steam pump which did duty in the level above is sending the water to surface. At the fourth level the east drift has been driven 750 ft. and a cross-cut north about 150 ft. from the end of the drift has passed through 40 ft. of ore, and two stopes are being cut out. No. 2 shaft is down 50 ft. below the third level, but sinking is not now being pushed. A drift has been driven east from this shaft at the third level, a distance of 600 ft., making the whole distance from No. 1 shaft to the breast of this drift 1,800 ft.

MINNESOTA.

Iron—Mesaba Range.

(From our Special Correspondent.)

Biwabik.—This mine is still idle, but work, it is expected, will be resumed shortly on several stripping contracts.

Duluth & Iron Range.—This company has completed the survey of a new line out of the Lake Superior basin, which, when built, will enable its locomotives to land teams of 35 loaded cars instead of 20 as now. It is expected that the line, about 20 miles long, will be built as soon as spring opens.

Hale.—The Lehigh Valley Company has made a contract for carrying the ore of this mine, taking it on a through rate from the docks, lake to Buffalo and rail thence to furnaces. It is understood that part of the ore will go to furnaces less than 100 miles from tidewater. The Thomas Iron Company pays 75 cents a ton for the ore, delivered on cars at the mine. Hale ore is a high grade non-Bessemer.

Iron King.—About 130 men are employed here stripping for steam shovel mining, and railway connections are being made.

Missabe Mountain.—Test pitting and drilling is going on here. From the foot of a shaft 70 ft. in ore a drill has been put down 110 ft. farther, and is still in high grade ore. It is intended to learn the depth of the formation.

MISSOURI.

Jasper County.

(From our Special Correspondent.)

Joplin, Feb. 12.

Saturday evening closed a fairly active week throughout this lead and zinc mining district. There was no marked advance in the price of ore, but the demand was good and the ore buyers were in the market for everything offered. The top price for zinc ore was \$18 per ton and the average about \$17. Lead ore remained during the week at \$17.50 per thousand, while one car sold the latter part of the week at \$18; this advance in price was caused by an ore buyer coming into the county representing the Argentine smelter of Kansas City. Following are the sales of ore from the different camps: Joplin, 1,376,650 lbs. of zinc ore and 465,330 lead, value \$19,520; Webb City, 1,030,540 lbs. of zinc ore and 55,970 lead, value \$9,443; Carterville, 1,544,520 lbs. of zinc ore and 243,000 lead, value \$17,350; Zincite, 100,440 lbs. of zinc ore and 11,200 lead, value \$1,015; Oronogo, 4,900 lbs. of zinc ore and 116,910 lead, value \$1,929; Galena, 793,260 lbs. of zinc ore and 98,430 lead, value \$7,395; district's total value, \$56,652; Newton County, 469,300 lbs. of zinc ore and 89,405 lead, value \$5,437; Aurora, 672,100 lbs. of zinc ore and 235,000 lead, value \$8,534; lead and zinc belt's total value \$70,623.

Quicke Mining Company.—This company, of Webb City, located on the Tracy land, recently had their entire plant destroyed by fire and as soon as the insurance was adjusted commenced the building of a new ore dressing plant of 50 tons capacity. The plant is being built by Geo. T. Cooley and will be completed in about two weeks.

MONTANA.

Jefferson County.

Balm.—This mine, near Basin, has been sold by W. P. Emery to Percy D. Morgan and others for \$15,000.

Basin & Montana Gold Mining Company.—This company has been incorporated at Basin. The capital stock amounts to \$500,000 divided into the same number of shares. The incorporators are Eugene Ring, J. A. Leens and Lewis Vogel. The properties owned by the company are the Adelaide and the Adelaide Extension, near Basin.

Lewis & Clarke County.

Montana Mining Company, Limited.—By cable from the mine, the directors are informed that the total output for January was: Gold, 1,830 oz.; silver, 14,600 oz.; the estimated realizable value of the same was \$45,400. The ore milled during the month was 5,355 tons, 100 stamps having been in operation. The expenditure was as follows: Working expenses, \$33,200; development, \$9,500; extraneous expenses, including insurance, \$2,450; tailing dams, etc., \$100; total, \$45,250.

Meagher County.

Cornucopia.—A rich strike is reported in this mine at Neihart, and the working force is to be increased at once.

Missoula County.

Thompson Falls Mining and Milling Company.—W. H. Anderson was elected president and manager. John M. Evans is vice-president; W. Q. Hanft, secretary; and Fred C. Stoddard, treasurer. The property of this company is on Thompson River, four miles from the railroad and nine miles from Thompson Falls. It is a copper-silver proposition.

Park County.

Henderson Mountain Mining and Milling Company.—This company's property, at Cooke City, is advertised to be sold by Receiver M. W. Fitzgerald at St. Paul on February 17th. The property consists of a cyanide mill and leases on gold mines on Henderson Mountain, in the New World district. The property will not be sold separately and no bid will be received for less than \$12,000.

Silver Bow County.

American Mining and Townsite Company.—At a meeting held in Butte recently, the following officers were elected: W. H. Wix, president; B. M. Francis, vice-president; W. I. B. Nichols, secretary; and W. C. Bachelor, treasurer. The trustees decided to let a contract to sink a shaft on the Pride of the West, one of their claims, near Homestake. Mr. Nichols, the secretary of the company, is authority for the statement that the company is putting in machinery with which to work the claims, the company owning five others besides the one mentioned.

Estella Mine.—In the Murray-Heinze suit over this mine, which was decided in favor of Mr. Heinze by the district court, at Butte last December, the court has granted a motion for a new trial. The defendant has 60 days to file exceptions to the order.

NEVADA.

Mining assessments of Nevada mines falling delinquent in February amount to \$131,300.

Eureka County.

(From our Special Correspondent.)

The teams from White Pine County are laid off for the winter. The snowfall between Hamilton and Eureka is far heavier this year than for many previous winters. It averages between 3 and 4 ft. on the level in the intervening valleys.

Eureka & Palisade Railroad Company, Eureka.—This company received during the month of January 1,226 tons of ore from the mines of Eureka district, in transit to Salt Lake City, Utah, and Vallijo Junction, Cal., as follows: From the Diamond mine, 747 tons; Eureka Consolidated mine, 181 tons; Jackson mine, 105 tons; Richmond mine, 87 tons; Phoenix mine, 46 tons; Idaho mine, 41 tons; and Hamburgh mine, 20 tons.

Lincoln County.

Jim Crow.—The Condor mill is working Jim Crow ore. About 16 tons a day are being crushed with the 10 stamps. The extraction for the first four days was about 90%, and this is expected to be increased. This shows the Jim Crow-Monitor ore to be free milling, says the Pioche "Record." It will require nearly two months to clean up the ore now on hand, some 700 tons, which averages \$60.

Magnolia.—This mine has recently developed a seam of ore better than any heretofore encountered. The ore is screened and the coarsest shipped to Salt Lake, while the fine stuff, which runs \$300 to the ton, will be shipped to the Hiko mill, says the Pioche "Record." This mill is expected to resume operations again soon. Wood is being put in and a good test run is likely to result this time.

Storey County—Comstock Lode.

The Comstock payroll for the month of January was \$65,214, an advance over the previous month of \$4,370. As a number of new explorations will be undertaken this month the Virginia "Chronicle" says that the February payrolls will probably show a further increase.

In the Comstock mines the prospecting work recently started is going ahead with vigor, says the San Francisco "Report." Should there be improvement at any point more men will be added to the working forces. The old Central tunnel, from which the upper part of the Ophir mine will soon be prospected, has been cleaned out and repaired for a distance of 525 ft., and in a short time a drift will be started from it to connect with the old Mexican shaft, which in the early days cut some of the richest ore ever found on the Comstock. In the Consolidated California & Virginia mine the Rule drift, on the 1,000-ft. level, is in 550 ft. with the face in ledge matter, with small streaks of ore giving low assays. The face of this drift is now about 50 ft. distant from the winze down from the northerly workings from the Best & Belcher side. The bottom of this winze is 40 ft. above the 1,000-ft. level. This winze is being cleaned out by the Best & Belcher people, who are about to push forward and facilitate a connection with the Rule drift. In the Potosi mine there is improvement in the face of the south drift on the 450-ft. level. This drift will soon be under a point where the rich Sharon ore body was being worked in the early days. In the Belcher good progress is being made in repairing old drifts on the 850-ft. level preparatory to raising up in some promising streaks of ore.

The Virginia City "Enterprise" of February 9th publishes the following review of Comstock operations: In the Consolidated California & Virginia the 1,000 level southwest (Rule) drift is still being advanced on that course. The northeast drift on the 1,000 level of the Best & Belcher is being reopened at the rate of nearly 100 ft. a week and is expected to connect with the Rule drift about March 1. Air connections and safety exits are the first things to be considered in underground work, said Superintendent Lyman yesterday. In answer to the inquiry whether west or east cross-cuts will be run from the Rule drift after an air connection is made, Mr. Lyman said he was not prepared to answer that query, as he had not been informed on that point by Mr. Rule. The work of reopening the Central tunnel, to prospect the ground in the west end of the Ophir, is progressing at the rate of 100 ft. a week. The tunnel has a total length of 900 ft., and the work now in progress is to make a connection with the Mexican shaft to secure an air supply. When the tunnel is reopened its full length exploratory work of unusual interest will follow, as it is among the probabilities that even a more important discovery than the "Rule find" may be developed, as that vicinity is noted for gold-bearing quartz stringers, which, if followed may result in the uncovering of an important ore body. The usual amount of ore is being extracted in exploratory work below the 1,650 level in the north end of the Consolidated California & Virginia. That point of the mine has been producing ore during the past eight years—ever since the discovery made in 1886—and the ground now being prospected is entirely new.

Crown Point Mining Company.—This company is stopping on a streak of quartz from 2 to 4 ft. in width, in the raise from the 300 level, of fair-grade ore on the average. The 700 level raise is being steadily pushed ahead, and the top is in quartz assaying from \$4 to \$7 per ton, nearly all gold. It is up a total distance of 71 ft.

Chollar Mining Company.—The south drift on the 100 level is out 22 ft.; face in quartz that gives low assays. They are doing the usual amount of repairing in the main shaft. Extracted and sent to the mill the past week 99 tons and 400 lbs. of ore from the 100 level; milled during the week 113 tons. On hand at mill 60 tons and 400 lbs. Average battery assays, \$20.32; average car sample assays, \$23.93.

Hale & Norcross Mining Company.—At this company's mine there is an accumulation of 624 tons of ore, of which 385 tons is first class and 239 tons second class, and it is being added to from week to week. The ore came from the winze below the 1,300-ft. level of the mine. Besides this ore, the company has about 300 tons of first-class ore on the dump of the old "Combination" shaft which came from the 3,100-ft. level of the mine eight years ago. This makes 924 tons of ore already on hand, the extraction of which has been paid for. In due time this ore will be milled and the company will have the benefit of the proceeds.

Utah Consolidated Mining Company.—At the annual meeting of the stockholders of this company 55,196 shares were represented, and the following officers elected for the ensuing year: H. B. Havens, president; Geo. R. Wells, vice-president; and H. Zadig, A. Wollberg and E. B. Holmes, directors. A. W. Havens was re-elected secretary and D. B. Lyman superintendent. The secretary's financial statement showed a credit of \$2,139.40.

Union Consolidated and Sierra Nevada.—The joint east cross-cut which the Union Consolidated and Sierra Nevada managements are running from the north drift to the joint west drift on the 900-ft. level is in about 50 ft. and the face shows signs of an approach to the quartz formation which was encountered some distance south and had to be avoided on account of much water and swelling ground, which made the work expensive. The water has been well drained out of the fissure.

(From our Special Correspondent.)

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

Mines.	Ore H'st'd	Car Sample Assay.	Ore Milled.	Av. Bat'ry Assay.	Bullion for Week.	Total.
Alta.....						
Belcher.....	14 ¹					
Con. Cal. & Va.....	75 ²	27.28				
Chollar.....						
Hale & Norcross.....	6 ³	29.85				
Occidental.....	21 ⁴	21.65				
Sageville.....	26.34		350 ⁵	20.09	\$4,922.05	274 ⁶

¹ Fair grade ore. ² Cars. ³ This closes ore shipments for the present. ⁴ Crude bullion shipped to Carson.

Belcher Mining Company.—The 850 level has been cleaned out and timbered for 90 ft. It was on this level that an ore body was first discovered, and from this level up to the 600 no work has been ever done, and consequently there is considerable ground to be explored in this part of the mine. From 150 tons of ore crushed at the Brunswick mill \$7,000 was returned with expenses paid. The ore averaged over \$49 per ton, part of which was gold. In addition to this amount there is about \$7,000 in the treasury.

Crown Point Mining Company.—The pay ore on the top of the raise from the 300 level is from 3 to 4 ft. in width, being fair grade, but requiring assortment.

White Pine County.

Osceola Gold Mining and Milling Company.—Mr. A. J. Millick, superintendent of this company, has closed down the mill for the winter. He expects to resume work again in the mill about March 1st, says the White Pine "News." Mr. Millick says he has given the cyanide process a thorough test, and reports it a success. Some men were put to work on the Cumberland mine last week.

Osceola Placer Mining Company.—This company has closed down.

NEW JERSEY.

Morris County.

Weldon Mine.—Hexter Brothers, who have been operating this iron mine above Milton, have closed down and taken out the pumps.

NEW YORK.

Jefferson County.

Chaumont Lime and Stone Company.—This company has been incorporated at Chaumont for the purpose of quarrying stone and making lime. The capital stock is \$250,000, and the directors are Allan E. Copley, G. W. Copley and Hiram Copley.

OHIO.

The Hocking Valley coal operators have submitted to the mines a new scale of wages based on a rate of 50 cents per ton for pick mining. No action has yet been taken by the men. Late dispatches say that the men will go to work under this scale.

The miners in the Massillon district have not yet accepted the reduction of 12½ cents per ton proposed by the operators, and there seems to be no present prospect of a reopening of the mines.

OREGON.

Baker County.

Bonanza Mine.—Work will soon be begun on a tunnel 1,600 ft. long, which is expected to cut the vein at a point 600 ft. below the present workings. The mill is running to its full capacity.

Snow Creek.—Some very good ore is being taken out from this mine, and the development work is being pushed.

White Swan.—This mine, says the Baker City "Democrat," has been sold to a Chicago syndicate for a price not far from \$250,000. A new company is to be organized at once.

PENNSYLVANIA.

Anthracite Coal.

Kingstone Coal Company.—An extensive cave-in occurred at the Gaylord mine of the Kingstone Coal Company, at Plymouth, on February 13th. A large number of miners and laborers were at work under a section of the roof which has for some time past been considered very weak. After a shot had been fired, and without any warning whatever, the roof, consisting of rock and coal, fell in with a heavy crash. It is not known as yet whether any of the men were killed outright by the falling debris, but it is known that 13 of them are hemmed in one of the gangways. The air supply is now shut off and the chance of living for any length of time is very small. A rescuing party is trying hard to reach the entombed miners.

Richmond.—Work in and around the Richmond colliery, says the Forest City "News," is being actively carried on. In the shaft the north gangway has been driven about 700 ft., four chambers have already been extended to meet the slope or second opening, a distance of 1,000 ft. The slope is 300 ft. long. There are four headings on the south gangway and chambers will be started this week. About 80 men were employed on the inside last month, but the force will be increased as the work progresses. Last month the output of coal was 4,177 tons, and these figures will look small when once the number of miners are at work that it is expected to employ. About 30 men are now employed outside. The top vein is between 6 and 7 ft. in thickness, as far as worked yet. Sixteen feet below is the second vein, and it will average 8 ft.

Bituminous Coal.

The fourth annual convention of District No. 2, United Mine Workers of America, met at Altoona on February 13th, with delegates present representing 10,000 miners. The meeting was presided over by Master Workman T. A. Bradley. The first day's session was devoted to hearing reports of committees. The object of the meeting is to discuss the wage scale. The convention will be in session several days.

At the second day's session resolutions were adopted condemning the operators for unlawfully making monthly payments, and appealing to all miners to use every lawful means to uphold the semi-monthly pay law.

Slate.

Chester Slate Company.—This company recently held its annual meeting at Easton and elected the following directors: Theodore Whitesell, H. S. Cavanaugh, C. A. Morrison, B. F. Schnable and Joseph A. Weaver. The directors then organized by electing Theodore Whitesell, president; Joseph A. Weaver, vice-president; B. F. Schnabel, secretary and treasurer; John H. Geiser, superintendent.

Northampton Hard Vein Slate Company.—This company has elected the following directors: James Young, Theodore Whitesell, George W. Geiser, Wm. M. Smith and Chester Smith. The directors have organized by electing James Young, president; Wm. M. Smith, vice-president; G. W. Geiser, secretary; Theodore Whitesell, treasurer.

Pennsylvania Hard Vein Slate Company.—This company has elected the following directors: G. W. Geiser, James Young, Birge Pearson, Reuben H. Trach and Milton H. Schall. The directors elected G. W. Geiser, president and treasurer; M. H. Schall, secretary.

SOUTH DAKOTA.

Lawrence County.

Red Cloud.—The new tunnel started some weeks ago on the north side of this property is now in 60 ft., with indications of close proximity to the vein. During the progress of the work a 10-ft. vein of quartzite standing on edge was cut through. The rest of the way was through a hard talcose slate intermixed with seams of quartz from 4 to 6 in. wide, carrying a large percentage of iron.

TEXAS.

The following mineral productions for the year 1893 are reported by State Geologist E. T. Dumble: Bituminous coal, 265,666 tons; brown coal, 57,079 tons; total coal, 322,745 tons. Pig iron, 7,874 tons. Salt, 20,221 tons.

UTAH.

Tooele County.

Little Pittsburg Mining Company.—The stockholders' meeting of this company was held in Salt Lake City last week. Owing to the recent gold excitement at Camp Floyd and the showing of the company's property, which lies in the heart of that district, there was an unusually large representation of stock. The following board of directors was elected for the ensuing year: W. E. Hubbard, J. E. Foote, J. C. Taylor, S. E. Vance and E. L. Sheets. The company recently sent to its mines a new supply of tools and provisions, and expect to push the development of the properties as soon as the weather will permit. During the chloride excitement in that district one of the claims in the Little Pittsburg group sold for \$50,000. It is situated about 1½ miles northwest of the Mercur mine and on the same belt.

Mercur Gold Mining Company.—The annual meeting of the stockholders of this company was held at Salt Lake City on February 8th. The following were elected as directors: John Dern, H. W. Brown, E. H. Airis, G. S. Peyton and J. H. Hedges. After the adjournment the board of directors elected the following officers: John Dern, president; H. W. Brown, vice-president; G. S. Peyton, treasurer; R. L. Scannell, secretary; and declared dividend No. 4 of \$25,000, being 12½ cents per share and payable March 1st.

Salt Lake County.

The shipments of ore and bullion from Salt Lake City for the week ending February 3d, were as follows: Bullion, 654,657 lbs.; silver and lead ores, 2,236,634 lbs.

The receipts of ore and bullion at Salt Lake City for the week ending February 7th, were to the aggregate value of \$120,512, of which \$67,757 was in bullion and \$52,755 was in ore. The receipts of Pennsylvania bullion amounted to \$18,857; Hanauer, bullion, \$3,100; base bullion, \$23,400; gold bar, \$16,000; silver bar, \$2,100; sulphides, \$4,300. Ore receipts were \$4,205 by Wells, Fargo & Co.; \$32,050 by McCornick & Co.; and \$16,500 by T. R. Jones & Co.

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

Niagara Mining and Smelting Company.—On February 3d the Niagara tunnel had been driven a total distance of 1,060 ft. 6 in., and it is going in now at the rate of about 30 ft. per week. It is estimated that the tunnel is completed nearly two-thirds of the required distance. The object of this tunnel is to undercut the main contact lode in depth from 300 ft. to 500 ft. below the present workings, secure drainage and concentrate the work of the company at a favorable point less than two miles from the railroad station, by which it is estimated that nearly one-third of the present cost of operating expenses will be avoided.

VIRGINIA.

Augusta County.

(From our Special Correspondent.)

Basic City Land, Mining and Manufacturing Company.—This company has sold the mineral right in the Bare Ore Bank, near Greenville, to E. F. Lewis and associates, of Milwaukee. In the trade is included the right of way to the property, and the furnace site at Basic City. The price is reported to be \$20,000.

WEST VIRGINIA.

Logan County.

(From our Special Correspondent.)

Glen Allen Cannel Coal Company.—H. E. Hammond, E. F. Milten, C. A. Johnathan and C. A. Fridge, of Virginia, and W. M. Hall, of Kentucky, have incorporated this company, with a capital stock of \$20,000. A charter has been obtained, and it is proposed to commence opening its mines at Gray, at an early date.

WYOMING.

Albany County.

Snowflake Tunnel.—This tunnel is now in 175 ft. and is advancing at the rate of 15 ft. per week. The tunnel is now on a vein of good ore; at present it is only 5 in. wide, but the width is increasing. The tunnel is expected to cut the Mammoth lode in about 150 ft. farther.

Fremont County.

(Reported for the "Engineering and Mining Journal.")
Lewiston is the center of attraction to-day in Wyoming goldfields; the Burr mine has just uncovered a new deposit in which an 8-in. pay streak yields some rich ore. James Noble, in the same vicinity, has just uncovered a 4½-ft. vein of ore which shows all pay streak, and Charles Jackson shows up a 3½-ft. vein of fine gold quartz.

Laramie County.

(Reported for the "Engineering and Mining Journal.")
A very fine vein of black slate has shown up in the Oronogo tunnel associated with quartz carrying gold; this tunnel is 400 ft. in the hill and this is the third vein of ore shown up. All are carried in quartzite gangue except the slate vein and all lie between porphyry and syenitic granite walls. The rocks in these hills are metamorphic crystalline of the Silurian age.

FOREIGN MINING NEWS.

CUBA.

Ponupo Mining and Transportation Company.—The first meeting of the stockholders of the Ponupo Mining and Transportation Company was held at Bethlehem, Pa., on February 13th. An organization was effected with a capital stock of \$1,000,000. The following board of directors was elected: John Fritz, James W. Fuller, Samuel Thomas, Oliver Williams, J. F. Anderson, L. B. Leisner, J. S. Wetz, T. M. Dodson, George H. Myers. The board of directors organized by electing John Fritz, president; George H. Myers, vice-president; and William B. Myers, secretary and treasurer. The company is engaged in mining manganese ore in Cuba. The company is also said to own the controlling interest in the Santiago de Cuba Railroad. Other members of the company are: John Leisenring, George D. McCreary, Richard Sharp, W. B. Whitney, Charles

M. Dodson, M. S. Kemmerer, David O. Luckenbach and Morris C. Luckenbach.

GREAT BRITAIN.

New Coalfields.—When some 18 months ago the promoters of the Lancashire, Derbyshire & East Coast Railway Company asserted that by the time the line was opened it would have direct communication with pits having a total output of 10,000,000 tons of coal, a large number of persons living outside the colliery districts no doubt received the statement with a certain amount of reserve, says the London "Engineer." In addition to the new Bolsover colliery, which is being rapidly developed, the Bolsover Colliery Company has just made known its intention of commencing early in the spring to sink a large and important colliery near the village of Cresswell, at the extreme eastern boundary of its vast estate, leased from the Duke of Portland. The shafts are to be of such dimensions, and the surface and other plant so complete, as to enable the company to raise 3,000 tons per day if it is needed. The lease secured by the company covers about 10 square miles, and will, it is calculated, supply a daily output of 1,500 tons for 60 or 70 years to come. It is only about 3½ years since the sinkings connected with the Bolsover colliery were commenced, yet the shafts were sunk, tubbed and finished in a year and eight months from the sod being cut. The quality of the coal is excellent. The top hard, one of the best seams in Derbyshire, was met with at a depth of 365 yds. At the same time as the Bolsover colliery was being sunk, the Shireoaks & Streetly Colliery Company put down two shafts near the village of Whitwell, where it met with coal much nearer the surface than it expected. The development of the estates belonging to the Duke of Portland will doubtless open out other virgin coalfields.

MEXICO.

Mexico—Sultepec District.

Malacate Mines.—These mines, which are now being worked by Adolphe Rock and associates, comprise 140 pertenencias. A company was recently formed for developing these mines with English capital (£500,000) under the name of the Malacate Mining Company, Limited. Mr. Rock is president and treasurer; Mr. Jesse Grant is vice-president; and Mr. Jose Maria Gamboa, secretary. The machinery now on the road is expected to be erected and in working order by April 1st next. The motive power and concentrating machinery have been supplied by the Walburn-Svenson Company, of Chicago; the smelting machinery by Fraser & Chalmers, of Chicago; and the pumping plant by the Deane Steam Pump Company, of Chicago. The mines contain low-grade ores, capable of high concentration, all bearing gold. There are also dry ores of high grade, to be used for fluxing purposes with the former.

NEW CALEDONIA.

The value of the mineral resources of New Caledonia, says the Australian "Mining Standard," has hitherto been recognized chiefly in connection with the production of nickel ore, but gold and cinnabar resources which have, up till recently, either been hidden or disregarded, are now to receive attention. We learn from recent advices that some sensation has recently been caused in Noumea by the discovery of gold between La Foë and Canalia. A special concession of 493 acres has been granted by the government to the owners of a property known as the Mount Marcelle mine at a nominal rent, without any particular restrictions. The work carried out to date upon the property may be looked upon as prospecting only, but sufficient is shown to prove that the mine or mountain is a most valuable one. Several reefs run through the whole length of it, averaging in size from 3 ft. to 5 ft. wide, assays taken from various portions of which have given 2½ oz. to 3½ oz. per ton. The ore is entirely of a free milling character. Every facility is on the ground for working the mine to advantage, including suitable timber, while a fresh water river, 120 ft. wide, passes alongside the property. At the base of Mount Marcelle, and included in the concession are two cinnabar springs; but, so far, no work has been done toward developing this important industry. It is understood, however, that operations will be immediately commenced with the view of opening up the same, which, if successful, will prove of great benefit to the colony.

TONGKIN.

The French government gives notice that the laws in force in relation to the mines of Annam and Tonquin provide that only French citizens, or Annamites, or French corporations will be permitted to own or operate mines or to undertake explorations for mineral deposits.

TURKEY.

The Turkish Minister of Public Works has decided to grant a concession for the working for 99 years of two mines, namely, one of argentiferous lead to Mr. Alfred Abbott, the other of antimony to Jaco Mishon Ashir Effendi. The first of these mines is situated within the farm of Izor, in the caza of Keukeli, in the province of Salonica, and the area is 379 hectares; the second is at Tourmoushlou, a village situated near Avrathissar, also in the province of Salonica, the area being 134 hectares.

COAL TRADE REVIEW.

NEW YORK, Friday Evening, Feb. 16.

PRODUCTION OF BITUMINOUS COAL, in tons of 2,240 lbs., for week ending February 10th and year from January 1st:

	1894.		1893.
	Week.	Year.	
Shipped East and North:			
Phila. & Erie R. R.	546	5,966	16,350
Cumberland, Md.	52,803	513,152	355,967
Harciay, Pa.	548	2,699	10,068
Broad Top, Pa.	7,055	41,857	89,824
Clearfield, Pa.	26,252	378,587	461,860
Allegheny, Pa.	25,536	152,379	119,307
Beech Creek, Pa.	39,711	238,513	295,460
Pocahontas Flat Top.	41,436	296,888	28,664
Kanawha, W. Va.	48,375	297,241	363,917
Totals	272,932	1,727,365	1,998,167
Shipped West:			
Pittsburg, Pa.	15,038	119,210	159,730
Westmoreland, Pa.	36,379	181,784	215,003
Monongahela, Pa.	9,294	48,527	99,543
Totals	64,311	379,521	474,276
Grand totals	337,243	2,106,886	2,472,443

PRODUCTION OF COKE on line of Pennsylvania R. R. for the week ending February 10th, 1894, and year from January 1st, in tons of 2,000 lbs.: Week, 62,971 tons; year, 345,688 tons; to corresponding date in 1893, 637,186 tons.

Anthracite.

We do not find the condition of the anthracite coal market changed in any respect whatsoever from our last week's review of the trade. The blizzard weather of the early part of the week stimulated buying somewhat, but not enough to enable us to report a really active demand. When there is cold weather producers are able to sell somewhat more than they mine and when the weather is not propitious they sell just about what they are mining, or, perhaps, somewhat less. It is as it has been, and as it will continue to be for some time to come, essentially a weather market.

A meeting of the anthracite coal sales-agents was held in this city on Thursday. Nothing of importance was done despite the fact that the session occupied several hours. While some of the agents present state that nothing was done in reference to the output we learn from a representative of one of the largest companies, who was present, that the recommendation was made that the output for the second half of February be restricted to 40% of the October, or 10% less than the amount recommended for the first half. This action shows as clearly as anything possibly can just in what condition the anthracite trade is just now. In regard to prices it was decided to leave them unchanged; the sales-agents agreed to try to maintain the present prices, or, say, on the basis of \$4 for stove and chestnut, which is below the circular rates, but it is universally admitted that nobody is getting the full circular. On the other hand, the reports of the great cutting of prices which are circulated by the daily press are not warranted by facts. There has been and there always will be, some sellers who are willing to make concessions in the matter of values, but there has been no significant underselling on the part of any of the more prominent operators, and no more "shading" of prices during the past week than is usually the case at this time of the year. At any rate, coal can be freely bought on the basis of \$4 for stove and chestnut. All the companies and the more prominent individual operators declare that they will not sell at any lower figures. There is good reason for it, after all; nobody seems to want to buy any coal just now.

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

	Broken. Egg. Stove. Chestnut.			
Hard white ash	\$1.00	\$1.10	\$1.40	\$1.40
Free white ash	3.90	4.00	4.40	4.40
Shamokin red ash	4.35	4.60	4.40	4.40
Schuylkill red ash	4.35	4.75	4.55	4.55
Lykens Valley	5.00	5.65	6.00	5.25

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

The Reading Railroad reports that its coal estimated shipment for the week ending February 10th, was 165,000 tons, of which 16,000 tons went to Port Richmond and 15,000 tons to New York waters.

NOTES OF THE WEEK.

The difficulty which has been in existence for some time between the Lehigh Valley Railroad Company and the Coxe Brothers & Co. has been settled. The following announcement was made on Wednesday by the Lehigh Valley Railroad Company: An agreement has been entered into between the Lehigh Valley Railroad Company and the Delaware, Susquehanna & Schuylkill Railroad Company (which is the railroad recently constructed by Coxe Brothers & Co.), by which the coal of Coxe Brothers & Co. destined for tidal waters in the vicinity of New York harbor, shall hereafter be shipped via the lines of the Lehigh Valley Railroad Company. It is understood that this is a trackage agreement by which the Delaware, Susquehanna & Schuylkill Railroad Company is to transport its coal to market in its own cars, with its own motive power, over the Lehigh Valley Railroad.

There is no doubt that it will be of advantage to the Lehigh Valley Company, as it will give that company a long haul of from 500,000 to 1,000,000

tons of coal each year. While Coxe Brothers & Co. are not required to ship all their output for New York by the Lehigh Valley Railroad, it is generally supposed that very little of their coal will go by any other route.

Bituminous.

The bituminous coal market, if anything, is slightly better than it has been of late; but stocks in producers' hands are being moved off very slowly. The New England market east of Cape Cod still remains the dullest and the greater proportion of the shipments are to points this side of the cape.

Consumers have not yet used up their stock of coal and are not adding to it except in sporadic cases, when they receive some inducement from lower ocean freights, or the relief of the producers at the shipping ports.

There seems to be less coal on the main line roads to tidewater just now than for some weeks. The blockade is accordingly much relieved. This is due somewhat to the stringent measures taken by the various transportation superintendents in withholding cars from dilatory shippers at loading ports and in sidetracking their coal.

Transportation is improving somewhat. The car supply is equal to the demand and there is no change in all-rail business. Local business to the various harbors is fair. The coastwise vessel market is in a very poor condition, the competition between the vessels being very lively. Ocean freight rates are lower than last week. We quote as follows from Philadelphia: To Boston, Salem and Portland, 75c.; Providence, New Bedford, New Haven, Bridgeport and Allyn's Point, 65c. From Baltimore, Norfolk and Newport News, rates are 10c. higher than the above quotations.

The Grand Trunk contract was given out at from 15c. to 25c. below last year's figures. We hear that some of this coal, basing the estimate on the prevailing railroad rates, was sold by Western producers at a figure that would not net them 40c. per ton at the mine.

NOTES OF THE WEEK.

The ship "Lord Downshire" arrived at San Francisco, Cal., from Kuchinozu, Japan, on February 6th, with 3,550 tons of coal. This is the largest cargo of the kind ever received at that port from that source. Two small consignments of 1,400 tons came to hand in January. Imports in 1893 were 7,727 tons. The local gas companies contracted for this coal some time ago. So far it is said to have given satisfaction. Two other cargoes now out 41 and 30 days, respectively. These vessels have about 4,000 tons between them. Two other larger ships are now loading. All these cargoes will be used for gas purposes.

The Convention of District No. 2, United Mine Workers of America, at Altoona, Pa., adopted a resolution on February 15th favoring a general strike of all miners as soon as possible, but opposing local strikes.

Buffalo.

Feb. 15.

(From our Special Correspondent.)

No interesting features to note in the anthracite coal trade this week other than that the demand for local use and for near-by points has been good, for the reason that we have had a few days of old fashioned winter weather. Prices unchanged; dealers do not anticipate any changes in quotations for some weeks to come. Wholesalers expect great results from the decreased output; whether they are correct or not time will show.

Bituminous coal continues very quiet, as manufacturers still do a cautious business and do not feel like extending operations, although they anticipate that good times are coming again soon.

Coke dull and unchanged. For a few days the ice on Lake Erie outside our harbor and breakwater reminded our citizens that winter was really a fact. Severe windstorms, however, have sent nearly all the ice down Niagara River, and there is but little left except in the bay. No progress has been made yet in arranging for a combination of vessel owners to regulate the price of freight on the lakes next season.

On February 9th the Grand Trunk contracts for coal were awarded for the Suspension Bridge delivery as follows: Messrs. Morgan, Brown & Baine, of Pittsburg, 150,000 tons; Messrs. Osborn & Sager, of Pittsburg, 150,000 tons; Evans Morris, of Youngstown, O., 50,000 tons; Messrs. C. N. Shipman, of Buffalo, N. Y., 50,000 tons; the Washington Coal Company, of Pittsburg, 50,000 tons; this coal is from the Pittsburg region excepting Shipman's, which is from the Shawmut mines, and Morris' from the Mercer County mines. The Nova Scotia mines secured 80,000 tons to be sent to Massena Springs, via Montreal. The 70,000 tons for Detroit and Sarnia was awarded to the Ohio Coal Company, of Cambridge, O.

Chicago.

Feb. 14.

(From our Special Correspondent.)

Nothing can be said to the credit of the Chicago coal market at the present time so far as business is concerned. The continued dullness has nearly reached the point of oppressiveness, for coal dealers both retail and wholesale appear thoroughly disgusted with the state of affairs. Orders from out of town are mighty few and small in comparison with a normal year. The country trade of Chicago is of good proportions, and the lack of this business

goes a long way toward creating the present depression. In usual years a snowstorm of the proportion that has fallen throughout the West early this week would have created a great demand for coal, but dealers note no change on account of the severe storm. Prices continue to be cut indiscriminately, the Illinois coal appearing to be sold for any price obtainable. The Ohio operators at a meeting at Columbus, Ohio, on the 12th inst., decided to make a reduction of 12% in miners' wages. The miners have partially agreed to the reduction, but numbers of them hold out. If the cut is not accepted by next Saturday night the mines will close down, a lock-out ensuing, which will perhaps continue for six months. A joint session of the Pennsylvania and Ohio coal carrying railroads held a meeting here to day. The question of rates for carrying coal the coming year on lake traffic was discussed, but nothing decisive done. Mr. R. L. France has sent invitations to a few dozen people to participate in an excursion to the canal coal region of Kentucky. A special train will leave via the Monon route Sunday morning next. The trip will consume three or four days, the object being to call attention to Kentucky's valuable canal coal. Mr. H. Armstrong, manager of the Lick Creek Coal Company, of Chatham, Ill., is at present in Chicago in the interest of his company's mines. Mr. John Lowe, agent of the Boyd, Stickney Coal Company, has gone to California on a pleasure trip.

Anthracite.—Prices are: Egg, range and chestnut, \$6.10. Retail prices being egg, range and chestnut \$6.50@7.25.

Bituminous.—The tonnage in bituminous coal shows rather a decrease, if anything, over last week. The Illinois coals appear to be fluctuating in prices to a wonderful degree, almost any price being snatched up. Now that the Ohio operators have decided on a 12% reduction in cost of mining, it is most probable that Illinois and Indiana will follow suit, and if such be the case it will lead to the lowest prices for Illinois and Indiana coal ever seen. 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 smthing, \$3.70; Mt. Olivet, \$2.20. Canal coal quotations are: Pinkney, \$4.25; Birdseye, \$5.00; Kentucky, \$5.60.

Coke.—The coke market has a tendency toward betterment, but as the present market is the worst ever seen anything toward an advance, however small, could be looked at in the shape of improvement. Prices remain the same, which are: Connellsville furnace, \$4.20; crushed, \$4.30; Ellsworth, \$3.75@4.25; West Virginia, \$3.75@4.

Pittsburg. Feb. 15.

Coal.—To say the coal trade is dull is drawing it very mild, in fact it is demoralized from the head of the Monongahela to New Orleans, on the Mississippi. Striking is still the rule, not the exception; the fact is the coal men have a big stock of coal in most of the Western and Southern markets and are not anxious to have coal mined just now, besides there have been few empties in this port, although there is a large number on the way up. Since our last report the water being at a good boating stage the river shipments amounted to 2,936,000 bushels, principally for the lower markets. The low prices at Cincinnati continue.

Connellsville Coke.—The reports from the coke regions are so conflicting that you find it very difficult to tell what is the true situation; one thing is certain there must be a change; the present situation cannot continue much longer; the condition of the trade is the worst in its history. Last week closed with 90-cent coke free in cars at the ovens, and it is a matter of common knowledge that coke has been sold at 85 cents in certain trades last Friday and Saturday. There is nothing in it for the operators, and with the wretchedly low wages and the tendency toward a further cutting of rates, the discouraging feature for the workers is aggravated by the growing disposition to pay the men in store goods. It requires 1½ tons of coal to make a ton of coke, and the labor on a ton of coke cost 30c. When the cost of labor is deducted from the selling price of coke it leaves less than 40c. a ton for coal. Some coke makers pay 10c. a ton royalty; out of the 40c. a ton for coal the operators would, therefore, have but 30c. a ton to pay for mining and other expenses.

The demand is improving; an increased price is expected to follow, but no change in wages is looked for. New ovens are being fired at several points. The total shipments last week were 5,110 cars.

IRON MARKET REVIEW.

NEW YORK, Friday Evening, Feb. 16, 1894.

Pig Iron Production and Furnaces in Blast.

Fuel used.	Week ending		From Jan., '93	From Jan., '94.
	Feb. 17, 1893.	Feb. 16, 1894.		
	F'ces.	Tons.	F'ces.	Tons.
Anthracite.	74	32,663	27	13,944
Coke.	139	130,593	83	85,167
Charcoal.	37	3,050	15	3,852
Totals.	250	182,311	125	103,223
			1,217,192	711,619

Pig Iron.—In this market nothing has occurred during the past week to cause a modification of our

last review of the trade as to general features. The disposition to buy has been growing, and several fair sized sales are reported, the Southern furnaces capturing the bulk of the orders owing to their concessions as to price. While the volume of business done is somewhat larger, prices show no tendency to advance. It is a fact, however, that there are many signs of increasing activity among consumers of pig iron, and in this fact must encouragement be found. The production has gained somewhat since last month and is likely to increase, slightly, it is true, but always showing that trade conditions throughout the country are improving. 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, \$11.50@12.2; Eglinton, \$19.50@20; Summerlee, \$21.50@22.

Billets and Rods.—Some sales of billets are reported this week, and indications point to an increased volume of business in the near future. Prices are a shade firmer. We quote nominally: Domestic billets, \$1c@18.50; wire rods, domestic, \$20@27.50; foreign rods, \$30@40.

Manufactured Iron and Steel.—There has been more doing in manufactured iron and steel during the past week than for some time past, and there are prospects that the volume of business will continue to show an increase for some weeks. Prices show no improvement and are still low. We quote Angles, 140@160c.; axles, scrap, 170@170c. delivered; steel, 170@170c.; bars, common, 125@130c.; retined, 145@2c. on dock; beams, up to 15 in., 150@160c.; 20 in., 170@190c.; car truck channels, 195@2c.; channels, 150@165c. on dock; steel hoops, 155@175c., delivered; links and pins, 155@175c.; plates, flange, 180@2c.; firebox 2@250c.; flange, 175@2c.; marine, 250@275c.; sheared, 180c.; shell, 150@170c.; tank, 135@150c.; universal mill, 140@160c.; tees, 170@2c., all on dock.

Merchant Steel.—There is nothing new to report of this market. It continues quiet. We quote tool steel, \$6@6.50; tire steel, \$1.90@2; toe calk, \$2@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 has been an improvement in business in old materials this week. Several sales are reported as follows: Old steel rails, street, 150 tons at \$9.75 per ton f. o. b. cars Jersey City; old iron tees, 200 tons at \$12.50 per ton New York; No. 1 wrought scrap, 900 tons railroad scrap, at \$12 per ton delivered at mill, and 2.0 tons yard scrap at \$10 vessel New York. Other quotations are nominally as follows: Old iron T rails, standard sections, at \$11.75@12.00, New York delivery; wrought turnings, delivered at mill, \$9; railroad scrap, also delivered at mill, \$12; No. 1 wrought scrap at \$9.50@10, and No. 1 machinery cast scrap, \$8.50@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 \$8.50@9 delivered at mill; old car wheel, \$10.50@11 New York; cast borings, \$5.50@6 delivered at mill.

Rail Fastenings.—We do not hear of any business doing in this market. Quotations are nominally: Fish and angle plates, 130@150c. at mill; spikes, 175@190c.; bolts and square nuts, 215@240c.; hexagonal nuts 230@250c., delivered.

Spiegelisen and Ferromanganese.—We do not hear of any business doing in this market in either spiegel or ferro. Prices are nominally: Spiegelisen, 10@12c., \$21@22; 20%, \$25@26. Ferromanganese, \$2@2.50.

Steel Rails.—We do not hear of any sales of standard sections this week. The market continues very quiet. The combination price for standard sections, \$24.80 tidewater, still obtains. Girder rails are quoted at \$28 at mill.

NOTES OF THE WEEK.

A plan for the reorganization of Cofrode & Saylor, incorporated, and the Reading Rolling Mill Company has been prepared and submitted to the creditors.

A meeting of the stockholders of the Bethlehem Iron Company was held in South Bethlehem, Pa., on February 14th. Mr. Warren A. Wilbur presided and A. L. Schropp was secretary. There were represented at the meeting personally or by proxy 83,478 shares of stock out of a total 100,000 shares. The resolution authorizing the board of directors of the company to increase the capital stock from \$5,000,000 to \$10,000,000 was adopted. All the shares represented were cast in favor of the resolution. It is said that the increase will be used to rehabilitate the steel rail mill, so that the company can compete in the manufacture of rails with any other company.

The annual meeting of the stockholders of the Illinois Steel Company was held in Chicago, Ill., on February 14th. The meeting was largely attended, nearly every stockholder being present or represented by proxy. The following officers were elected: President, J. C. Morse; first vice-president, W. R. Sterling; second vice-president, Robert Forsyth; secretary and treasurer, H. A. Gray. Directors were chosen as follows: H. H. Porter, Morgan Botch, N. Williams, Robert Forsyth, N. Thayer, Marshall Field, J. C. Morse, Francis Hinton, Francis Bartlett, A. G. Forbes, W. R. Sterling.

The report for 1893 shows a net manufacturing profit for the year of \$915,508. Incomes from securities owned amounted to \$269,186, making a total income of \$1,184,694. Interest on bonds amounted to \$63,127, leaving the profit for the year \$551,367. The surplus for the preceding year was \$536,331, making the total surplus \$1,117,899. Owing to the great shrinkage in values of material on hand there was written off December 31 a sum of \$349,472. The balance sheet shows quick assets and salable securities in excess of bills payable amounting to \$12,062,755, or 91.38% of the bonded debt in addition to five plants owned. On account of the stagnation in business the works at South Chicago were operated but eight months of the year, the works at Joliet but six weeks; the works at Milwaukee were closed almost the entire twelve months.

Chicago. Feb. 14.

(From our Special Correspondent.)

The Chicago iron market has shown but slight changes from the previous week. Such business as is going is confined chiefly to small lots, though a good sized order is noted here and there. Inquiries are somewhat better, a number being for large quantities for long deliveries. The consumers regard the situation in a more favorable light, and in consequence dealers are hopeful of better times very soon.

Pig Iron.—A holiday and a terrific snowstorm have held sales down a considerable this week, although the situation appears rather improved. The sales are mostly in small lots. The furnaces both north and south remain unchanged as to prices, these prices being the lowest ever known, yet consumers fail to take advantage of that fact. It may be from the fact that they expect prices to go even lower, as numbers believe pig iron will settle down to \$11 per ton and remain there with but slight fluctuations. The Northern furnaces are receiving almost all the business from Chicago at present and the Southern furnaces are almost shut out of here.

Prices continue to be snatched a trifle, which are 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, \$11.75@12; No. 2, \$11.50; Lake Superior charcoal, \$15@15.50. Lake Superior coke No. 1, \$13.50; No. 2, \$11.50@12.50; No. 3, \$11.00@11.50. Lake Superior Bessemer, \$14; Lake Superior Scotch, \$13.75@14.25; American Scotch, \$15.50@16. No. 2, \$16. Ohio strong softeners No. 1, \$15.50@16; Tennessee charcoal No. 1, \$15.50@16; No. 2, \$15. Standard Southern car wheel, \$18.25@18.75. Southern silveries, No. 1, \$13.75; No. 2, \$13.50.

Structural Iron and Steel.—One of Chicago's largest builders is again in the market for structural material for some large buildings. Business is fairly good, with a better outlook than for some time past. Quotations are as follows, Chicago delivery: Angles, 155@160c.; tees, 180@190c.; universal plates, 155@165c.; sheared plates, 180@190c.; beams and channels, 145@155c.

Plates.—Business has not improved any over last report, sales being but moderate. Prices are, mill shipments, Chicago delivery: Flange steel, 200@210c.; best firebox steel, 300@500c.; tank steel, 160@170c. Store prices are: iron or steel sheets 10 to 14, 240@215c.; tank steel, 190@200, flange steel, 225@250c.; sheet steel, 225@240c.

Merchant Steel.—Small orders for early shipment are coming in faster, while conditions are such as to offer good hopes for a continued increase of business. Prices are, carload lots: Smooth finished machinery steel, 190@200c.; tire steel, 190@210c.; ordinary Bessemer bars, 150@155@165c.; toe calks, 225@235; ordinary tool steel, 6.50@7.00c.; special brand tool steel, 12@20c.; crucible spring, 3.50@3.75c.

Galvanized Sheet Iron.—Some few good sized sales are noted and inquirers are more numerous. Warehouse business continues firm. Quotations on galvanized iron is 75 and 10 and 5% off on Junia or mill shipments. Small quotations from stock are selling down to 75% off.

Black Sheet Iron.—There is not much change noted over previous week, the holiday and severe snow-storm having kept down the volume of trade materially, but on the whole business continues fairly good. Mill prices carload lots f. o. b. Chicago, No. 24, 240c.; No. 26, 250c.; No. 27, 260c. Same gauges and steel sheets are 310c., 320c. less 10c. per 100 lbs. for large lots.

Bar Iron.—Business in bar iron is holding its ground, orders continuing to come in, showing a gradual increase with each week. The improvement, which is light, is steady and gradually creeping back to its normal conditions. Mill prices f. o. b. Chicago, 125@135c. for bar iron, and 135c.@140c. for soft steel bars. Jobbing prices are 150@160c. for bar iron and 160@170c.

Billets.—The steel mills in this vicinity are sold up to July 1st on wire rods. Billets continue to improve, the aggregate tonnage being, if anything, rather larger than previous week. Billets are firm at \$18.50, rods being quoted \$25.

Steel Rails.—Some good sized orders have been placed during the week. All appear to be awaiting the arrival of large railroad orders, and until such are placed the market will not improve very materially. Quotations remain at \$25@27 according to quality.

Nails.—Wire nails are ruling a trifle better, good-sized shipments being made to the West. Steel cut

nails are not much in demand. Jobbing prices are \$1.25@1.30.

Scrap.—Sales are chiefly small lots. No increased business is noted. 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.—The prices asked for old iron rails and those bid appear to be far apart. Consumers say that \$10.50@ \$11.00 are the correct quotations, and which they stand ready to pay. Quotations as they now stand are \$11.50@ \$12.50 for old iron rails and \$9.50@ \$11 for old car wheels.

Pittsburg. Feb. 15.

(From our Special Correspondent.)

Raw Iron and Steel.—The improved condition of trade noted in our last has been fairly maintained. Consumers of raw iron and steel have made up their minds that the present is a good time to lay in a stock and prepare for business. Soft steel consumers were on hand in full force, making ready for large spring and summer business. The reactionary influences that have been at work, particularly since the first of the month, have placed the trade in a much more satisfactory condition. There is no lack of inquiry on the part of buyers; at the same time there is a good deal of conservatism manifested in contracting for heavy purchases for future requirements. Producers of pig iron find much that is encouraging in the present tone of the market, and the general feeling is one of increasing confidence. Sellers are firmer in their refusal to consider contracts that call for concessions on quoted rates. Notwithstanding the talk of prices being on rock bottom, consumers do not look for any increase in quotations, at least for the present, pointing to the reserve furnace capacity to keep prices from going higher. If the furnaces now in blast were only to be considered prospects would be brighter, as the consumption appears to be taking care of the output on the present basis. In the meantime both producers and consumers are keeping a close watch on the market in order to be prepared to take advantage of any change one way or the other. Few concerns have any great amount of work actually on hand as yet, but the indications are unmistakably favorable, so that there need be no hesitation in saying that business is improving.

Coke Smelted Loke and Native Ore.		2,000 Billets and Slabs, next 3 mos. at mill. 16.00	
3,000 Bessemer, Feb. March	10.75	2,000 Billets, Feb., March	16.15
3,000 Bessemer, March, April	10.75	1,000 Billets, Feb., March	16.20
2,000 Bessemer, Feb. March	10.70	1,000 Billets and Slabs, March, at mill.	16.25
2,000 Bessemer, Feb. March	10.65	500 Billets, Feb., at mill	16.25
2,000 Bessemer, Feb. March	10.75	500 Billets, prompt, at mill.	16.00
1,500 Bessemer, Feb. March	10.70	Muck Bar.	
1,000 Bessemer, Feb. March	10.75	1,000 Neutral, Feb.	20.50
1,000 Bessemer, April, May	10.75	300 Neutral, prompt	19.50
1,000 Bessemer, March, April	10.75	250 Neutral, Feb., March	20.25
1,000 Bessemer, March, April	10.75	Skelp Iron.	
1,000 Mill, March	9.75	2,000 Sheared	1.35 4 m.
600 Gray Forge, Feb. March	9.55	500 Sheared	1.45 4 m.
500 Gray Forge	9.55	440 Nar. gr'vd.	1.25 4 m.
300 Mill	9.75	350 Wide ar'vd.	1.25 4 m.
250 Mill	9.75	Blooms, Billets, Bar Ends.	
No. 1 Foundry	11.75	1,000 Delivered	10.65
No. 2 Foundry	10.75	Skelp Steel.	
No. 1 Silvery	15.00	1,000 Wide ar'vd.	1.05 4 m.
No. 2 Silvery	13.10	Ferro-Manganese.	
Charcoal.			
80 Cold Blast, Extra	29.00	280 80% delivered	52.50
75 Cold Blast	25.00	Sheet Bars.	
50 Warm Blast	17.00	150 At maker's mill	21.80
50 Warm Blast	17.00	Steel Wire Rods.	
50 No. 2 Foundry	17.00	750 3 gauge American	24.00
50 Warm Blast	17.00	Scrap Material.	
Blooms, Billets and Slabs.			
5,000 Billets, Feb. March	16.25	100 Light steel scrap, gross	8.75
2,500 Billets, Feb. March, at mill.	16.00	75 Light steel scrap, gross	9.00
		65 Cast scrap, gross	8.80

Philadelphia. Feb. 16.

(From our Special Correspondent.)

Pig Iron.—Furnace interests are not crowding the trade. Forge averages \$11.25@ \$11.50; No. 2, \$12.75; No. 1, \$13.50, with the usual fluctuations for quality.

Muck Bar.—The mills at work gather enough business to keep going.

Steel Billets.—Shaded cost of transportation is given as the reason for shaded billet quotations. Makers say their net prices are the same. A fair business was done at \$18. As to business at less there is some doubt, though it is asserted sales have been made below \$18. There are rumors of large transactions, but they will be closed in western Pennsylvania.

Merchant Iron.—An increase in deliveries is given as the reason for an improving market. Rumors of very low prices are afloat down to 1.15c. for common. City mill quotations are 1.40@ 1.50c. small lots.

Nails.—Shipments are taking place from factories to stores.

Skelp.—A better demand is now confidently predicted, and quotations are given at 1.30c., though orders have been taken, it is said, at less.

Pipes and Tubes.—The receipt of inquiries since Monday has raised manufacturers' hopes of business.

Sheet Iron.—The sheet iron card has been torn up, and an active competition is now in progress for some big business.

Plate.—The struggle for some small orders for plates of special quality has affected prices. Buyers are promised very quick delivery. Some more plate business we had set our hearts on has fitted westward. As to quotations they are very little, but business can be done at 1.25 and from that up.

Structural Material.—Small orders come in every day at 1.40@ 1.50c. for angles and 1.50@ 1.60c. for beams. Western competition has taken several good orders.

Steel Rails.—No sales reported. Quotations, \$24 at mill.

Old Iron Rails.—No transactions.

METAL MARKET.

NEW YORK, Friday Evening, Feb. 16, 1894.

Prices of Silver per Ounce Troy.

Feb.	St. Ex.	London Pence	N. Y. Cts.	Value of sil. in \$.	Feb.	St. Ex.	London Pence	N. Y. Cts.	Value of sil. in \$.
10	1.88 1/4	29 1/4	67 1/4	.491	14	4.86 3/4	29 1/4	61 1/4	.493
12	1.89 1/4	29 1/4	64 1/4	.488	15	4.89 3/4	29 1/4	63 1/4	.494
13	1.89 3/4	30 1/4	64 1/4	.501	16	4.87	29 1/4	63 1/4	.483

Silver has been very erratic the past week, owing to the anticipated action of the India Council. The announcement by the Chancellor of the Exchequer that the government would not "peg" the price of bills, would not open the mints to private coinage, and would not put an import duty on silver was the first sharp clear statement given on the silver question. The result will be to leave the exchange value of the rupee and the commercial value of uncoined silver to the laws of trade, which would seem to be a wise conclusion.

The United States Assay Office at New York reports the total receipts of silver for the week to be 141,000 oz.

Gold and Silver Exports and Imports at New York, Week Ending February 10th, 1894, and for Years from January 1st, 1894, 1893, 1892.

Week	Gold.		Silver.		Excess of Ex. or Imp.
	Exports.	Imports.	Exports.	Imports.	
1894	\$708,810	\$109,925	\$882,665	\$2,000	\$1,477,550
1893	2,334,358	701,925	5,155,794	118,934	6,699,207
1892	18,064,272	133,806	3,575,587	410,685	21,055,630
1891	863,722	1,688,634	3,465,102	109,100	2,471,090

The gold exported for the week nearly all went to Havana; the silver to London. The gold imported was chiefly from Havre and the silver came from the West Indies.

During the five days ending February 15th, the exports and imports of gold and silver have been as follows: Exports, gold, \$1,137,000; silver, \$588,091; imports, gold, \$741,947; silver, \$75,593. Of the gold exported \$1,119,000 was in Spanish gold and went to the West Indies. The remaining \$18,000 was in American coin and bullion, \$4,000 of which went to South America and \$14,000 to the West Indies. Of the silver exported \$40,700 was Mexican coin and went to London. \$650 Spanish coin went to South America, and all the rest, \$546,741 in American coin and bullion, went to London.

NOTES OF THE WEEK.

An increase in the volume of business begins to be apparent, and reports from all quarters show a growing improvement. The drawbacks just at present are chiefly the labor troubles which are affecting the coal mining and other interests. The new tariff bill is still under consideration in the Senate Finance Committee, and it is uncertain when its consideration will be taken up by the Senate. The general belief is that few material changes will be made in Committee, though minor amendments will be presented.

The statement of the New York banks for the week ending February 10th shows an increase of \$13,051,500 in loans; decrease of \$25,989,300 in reserve; \$21,759,200 in specie; \$8,633,100 in legal tenders; \$17,632,000 in deposits, and \$180,300 in circulation. The reserve was \$85,633,700 in excess of the legal requirement.

This statement is a sharp contrast to those issued for a number of weeks past. The decreases in reserve, specie and deposits may be explained by the payments made on account of the new issue of United States bonds, and the specie especially has been transferred to the Subtreasury. The large increase in loans is a feature which cannot be attributed to the same cause, and it may be said to be due, in part at least, to an increasing volume of business.

The United States Treasury statements on Thursday, February 15th, showed total balances in excess of outstanding certificates amounting to \$133,431,864, divided as follows: Gold, \$105,325,397; silver, \$9,671,796; legal tenders, \$9,241,494; treasury notes, etc., \$10,303,577. As compared with the previous week this is an increase of \$14,929,694 in the total balance, and of \$11,004,068 in the gold balance. The gain is due to payments on account of new loan.

It is stated that the Secretary of the Treasury has decided to issue no more gold certificates at present. The amount outstanding has been reduced to about \$7,500,000. It is considered that there is no longer any necessity for their use.

The debate on the Bland bill for coining the seigniorage silver in the Treasury still continues. Action was delayed earlier in the week by some dilatory motions and the absence of a quorum. On Thursday Mr. Bland gave notice that he would ask for an order limiting debate.

The coinage executed at the mints of the United States during the month of January, 1894, was as follows:

Denomination.	Pieces.	Value.
Double eagles	333,280	\$6,665,600.00
Eagles	446,600	4,466,000.00
Total gold	779,880	\$11,131,600.00
Half dollars	638,000	\$319,000.00
Quarter dollars	248,000	62,000.00
Total silver	886,000	\$381,000.00
Five cent pieces	1,004,000	\$75,200.00
One cent. bronze	4,960,000	49,600.00
Total minor	6,464,000	\$124,800.00
Total coinage	8,129,880	\$11,674,400.00

On February 12th, in London, the Indian Currency Association presented to the Government a memorial protesting against the present dilatory policy. The memorial says that the closing of India's mint to silver was harmless, although it caused a temporary disadvantage, owing to the abnormally large imports of silver. Other causes, say the memorialists, were more potent in bringing about the present disorder. The minimum rate for Council bills was abandoned, they declare, at the very moment when success was assured. The result has been the present panic, they add. The minimum must be fixed at once and the importation of silver for private account must be prohibited, while the sale of bills should be intrusted to a special Indian appointee.

A few Calcutta firms dissent from this memorial and favor the immediate reopening of the mints to silver.

The effect of the closing of the Indian mints to silver is shown by the trade returns from that country. For the five months from July 1st to November 30th, 1893, the period following the mint stoppage, the imports were valued at 3,907,630 rupees, an increase of 7,731,300 rupees over the corresponding date in 1892. These imports included 6,235,300 rupees silver coin in 1893, but only 5,631,000 rupees in 1892. The exports for the same period were 37,248,400 rupees this year, a decrease of 3,016,000 from last year.

The London "Economist" says of the position of affairs in India: Issues of bills do not enable the government to liquidate its debts. They merely change the form of the debt and postpone the date of payment. The involve, moreover, the locking up in the Indian treasuries of an equivalent amount of rupees, which would have been drawn out and put into circulation if the Council had sold its drafts. The Indian Government, that is, keeps millions of money lying locked up and infrequently at home, while it borrows an equal number of millions here, for which, of course, it has to pay interest. Thus far it has been able to borrow cheaply, but dominated by its necessities, it may be compelled to come into the market at an inopportune time, when lenders will be much more exacting in their demands. In any case, now that the attempt to fix a minimum price for the Council drafts has been abandoned, this method of finance results in nothing but waste. It may be said that the locking up of several millions of money in the Indian treasuries helps to impart a scarcity value to the rupee. The government, however, is not meditating a continuous lock up, else it would not borrow on short bills. Consequently, any scarcity that may be caused now by keeping these millions off the market will be followed by a demoralizing superfluity when they are released. But how are they to be released? It is inconceivable that the government will be able to sell next year an amount of Council drafts sufficient not only to defray the home charges for the twelve months, but also to pay off the £6,000,000 of Treasury bills already issued, and any additional issue that may be made before the end of March. The probability, therefore, is that these bills will have to be continued, for although they might be replaced by a permanent loan, the advantage in point of cheapness is on the side of a small floating debt. And in view of this it seems to us that the best course for the government to pursue is to frankly accept the situation, and use the money it has accumulated in paying off rupee debt in India. That it is bad policy to increase the sterling and diminish the rupee debt

goes without saying. The trade of India has already been more than sufficiently disturbed by the impulsive, short-sighted and vacillating action of the government. That it will be still more disturbed if the Treasury continues to draw in and hoard millions of money at the busy time of the year, to be got out somehow or other when the slack time comes, is obvious.

The Bank of England on Thursday, February 15th, reported its gold holdings at £23,972,693, an increase of £2,180,232 as compared with the corresponding date in 1893.

The specie holdings of the Bank of France on Thursday, February 15th, were, in sterling, £69,027,418 gold and £50,586,349 silver; an increase of £3,570,565 gold and £35,794 silver over the corresponding date last year.

The Imperial Bank of Germany on February 10th reported its specie holdings, both gold and silver, in sterling; at £44,052,000, a decrease of £1,022,000 as compared with the corresponding date in 1893. For the week the specie increased by £429,000.

The imports of gold and silver, both coin and bullion, into France for the year 1893 were valued at 466,505,000 fr., a decrease from 1892 of 41,241,000 fr., or 8.1%. The exports of gold and silver for the year were 244,308,000 fr., an increase over 1892 of 30,083,000 fr., or 14.5%. The excess of imports over exports was 222,197,000 fr. in 1893, as compared with 293,531,000 fr. in 1892.

The local Parliament of British Columbia last week passed resolutions in favor of a double standard, gold and silver alike, to be made legal tender to any amount, a fixed ratio being established between the two metals. These resolutions are to be presented through the Dominion Government to the government in London.

The Russian budget for 1894 shows an expected deficit variously stated at from 35,000,000 to 65,000,000 roubles. As taxation has been pushed almost to the extreme limit it will not be possible to raise the money in that way, and it is stated that the deficit will be made up by taking money from the reserve fund, which has been accumulated for use in case of war.

Domestic and Foreign Coins.

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

	Bid.	Asked.
Mexican dollars.....	\$51¼	\$53
Peruvian soles and Chilean pesos.....	.48	.52
Victoria sovereigns.....	4.87	4.89
Twenty francs.....	3.28	3.92
Twenty marks.....	4.71	4.78
Spanish 25 pesetas.....	4.83	4.88

Other Metals.

Copper.—Several orders for lake copper have been in the market and booked at 9½, partly for spot and partly for March delivery, and although the volume of business has not been large, what has been done lends encouragement, as presaging a more regular demand from now on. Several parcels of electrolytic copper have also been placed, at prices not yet reported. Casting copper is still quoted nominally at 9 to 9½.

Abroad a few transactions in fine copper have taken place, prices gradually declining, while g. m. b.'s have been neglected, but close slightly better at £41 5s. for spot and £41 15s. for three months prompt. The lack of demand for copper is due to the general demoralization consequent upon the great decline in silver values, which has virtually closed the Eastern markets for a while. Refined and manufactured copper is to be quoted as below: English tough, £43 7s. 6d. @ £43 15s.; best selected, £44 5s. @ £44 15s.; strong sheets, £51 @ £51 10s.; India sheets, £49 @ £49 10s.; yellow metal, 4½d.

The New York Metal Exchange has issued the following official list of the various descriptions and brands desirable in fulfillment of contracts for copper of good merchantable brands, adopted by the board of managers February 8th, to go into effect March 1st, 1894:

American Ingots.—Baltimore, Lake Superior, M. A., Orford.

Bars.—Arizona Copper Co., Copper Queen, Detroit Co., Old Dominion Co., B. & M. not below 93% dry assay.

Electrolytic Copper of American production, of such brands as are listed on the London Metal Exchange, and of not less than 98% conductivity.

The standard of good merchantable brands shall be 96% dry assay, but no excess shall be paid for. A pro rata allowance at the settlement price shall be made for deficiencies below 96% down to and including 95%, and a double pro rata allowance, based on the settlement price, for deficiencies ranging below 95% down to and including 93%. Copper below 93% shall not be a good delivery.

The Copper Committee of the New York Metal Exchange reserves the power of adding to or withdrawing from the above list, as it may think fit; but should either power be exercised, a fresh list will be issued.

The following figures give the production in tons of 2,240 lbs. of copper in the United States, and also by the chief foreign mines, and the exports from the United States for the month of January:

Production, fine copper, long tons:	January.
Reporting mines in the United States.....	10,852
Pyrites and outside sources, United States.....	1,340
Reporting foreign mines.....	6,115

Total production, long tons..... 18,307

Exports from United States, fine copper..... 7,717

The exports of copper from the port of New York for the week ending February 16th, as reported by the New York Metal Exchange, were as follows:

Liverpool—Adriatic.....	Bars	25 tons
Gallia.....	Cakes	2 "
".....	Pigs	100 "
Umbria.....	Ingots	50 "
Swansea—Manchester.....	Bars	101 "
Hayre—La Gascogne.....	Ingots	1 ton
".....	Cakes	1 "
Swansea—Kansas City.....	Bars	80 tons
Hayre—La Gascogne.....	Ingots	50 "
".....	Plates	16 "
".....	Cakes	7 "
Rotterdam—Loch Eilve.....	Ingots	150 "
".....	Plates	67 "
Liverpool—Umbria.....	Bars	2 "
Swansea—Kansas City.....	Pigs	40 "
".....	Bars	52 "
Liverpool—Umbria.....	Bars	2 "
Glasgow—Britannia.....	Ingots	10 "
Antwerp—Apollo.....	Plates	20 "

The exports of copper from Baltimore for the week ending February 15th, as reported by our special correspondents, were as follows:

	Lbs.
Feb. 9.. London—Michigan.....	1,928 ingots 25,000
" 10.. Hamburg—Bohemia.....	207 cakes 113,794
" 11.. ".....	7,676 ingots 100,000
" 12.. ".....	5,756 plates 112,300

Other exports reported were 20,000 lbs. iron ore in bulk to London per steamer "Michigan."

Tin.—During the week now closing a very large volume of business has been transacted at gradually receding prices, and it is very evident that consumers and manufacturers throughout the country are practically bare of stocks, and from now on will have to come into the market more regularly and buy more freely than for a long time past. Ruling prices are, of course, very tempting, as sales have been made at from 19% down to 19% duty paid, and at 4c. per lb. less in fond. These figures are, in reality, the lowest which have ruled for many years past, and must have an appreciable effect upon the consumption of the metal.

In Europe the demand seems to have been fairly steady, and the pressure to sell heretofore exerted from the East has practically ceased, shipments simultaneously falling off to some extent. Closing London prices are £63 12s. 6d. for spot and £69 10s. for three months.

Lead is in poor demand owing to the total cessation of outdoor work because of the extremely severe weather, and as producers have at the same time come out as sellers, lower prices are to be recorded. Sales of several hundred tons have been made at prices ranging from 3.35 down to 3.15.

It is rumored that the Senate sub-committee has so changed the Wilson bill as to make lead ores dutiable at 1c. per pound of lead contained, but there is no confirmation of this report.

The foreign market is rather better, as quotations for Spanish are now £9 5s. @ £9 6s. 3d., and for English 2s. 6d. more.

St. Louis Lead Market.—The John Wahl Commission Company telegraph us as follows: Lead is on the down grade and the metal has once more few friends. As low as 3.22½c. has been accepted for retail lots. The general asking price at the close is 3.05c., but it is reasonably safe to say orders at this figure are scarce.

Quicksilver.—We quote: New York, \$12.50; London, £5 17s. 6d. The receipts of quicksilver at San Francisco, Cal., for January were 3,227 flasks, against 2,243 flasks for the same month last year and 1,704 flasks in 1892. The exports from that port by water in January were as follows:

	Flasks.	Value.
New York.....	1,000	\$30,000
Mexico.....	200	6,000
Central America.....	100	3,000
British Columbia.....	31	992
Total.....	1,331	\$40,042
In 1892.....	3,208	133,261

In January, 1893, the shipments to New York were 2,600 flasks, valued at \$107,900.

Spelter is in very good request, the galvanizing as well as brass mills having more to do, and we have to quote spot at 3.90 and March shipment at 3.95, while for April the price is 4c. New York.

Aluminum.—The Pittsburg Reduction Company quotes No. 1, over 98% pure, 65c. per lb. for large lots, 75c. for small quantities; No. 2, from 94% to 96% pure, 60c. for large quantities, 73 for small lots. Wire from \$1.25 to \$2.58 per lb., according to size. Plates and sheets, 90c. @ \$1.50 according to width and thickness. The Neuhausen Company quotes \$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 45c. for powder or wire.

Platinum.—Messrs. Eimer & Amend, New York, quote platinum crucibles and dishes, hammered

ware, French make, at 45c. per gram for smaller quantities, 43c. per gram for lots of not less than 100 grams, and 41c. for lots of not less than 250 grams. Wire and foil at 42c., 41c. and 40c. respectively for the quantities named. Current retail price for crucibles is 50c. per gram. At present platinum prices are steady.

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.

Antimony is dull and without change in price.

CHEMICALS AND MINERALS.

NEW YORK, Friday Evening, Feb. 16.

Heavy Chemicals.—The past week in the heavy chemical market has been characterized by extreme dullness. Nothing of interest has transpired. In bleaching powder some little business for future delivery has been done, while for caustic soda there has been some demand for spot goods. Carbonated soda ash and alkali are quiet. We quote as follows: Caustic soda, 60%, 2.77½ @ 2.82½c.; 70%, 2.61 @ 2.70c.; 74%, 2.62½ @ 2.82½c.; 76%, 2.85 @ 2.90c. Carbonated soda ash, 48%, 1.10 @ 1.25c.; 58%, 1.05 @ 1.15c. Alkali, 43%, 1.05 @ 1.15c.; 58%, 1 @ 1.10c.; according to package. Sal soda, English, 95 @ 1c.; American, 80 @ 90c. Bleaching powder, 2.12½ @ 2.50c.

Acids.—We do not hear of anything new or interesting to report of the acid market this week. It continues quiet and unchanged, either as to business or as to prices. 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%, 8 c. @ \$1.20; 90c. @ \$1.10; 22%, \$1 @ \$1.2; nitric, 40%, \$4; 42%, \$4.50 @ 4.75; sulphuric, 7c. @ \$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 Sicilian brimstone. It continues quiet. Quotations for best unmixed seconds are: On the spot, \$13; shipments, \$17.25 @ \$17.50. Thirds are \$1 less.

Fertilizing Chemicals.—The position of this market shows no change from last week. The demand continues light, but owing to the scarcity of stocks the ammoniates are still high in price. There is no feature of interest to report. We quote: Sulphate of ammonia, gas liquor, \$3.7 @ \$3.85; bone, \$3.55 @ \$3.65; dried blood, \$2.60 @ \$2.65 per unit for high grade and \$2.40 @ \$2.45 for low grade. Azotine, \$2.50 @ \$2.60. Concentrated phosphate (30% available phosphoric acid), 7c. per unit. Acid phosphate, 13% to 15%, av. P₂O₅, 60c. per unit at seller's works in bulk. Dissolved bone-black, 17% to 18% P₂O₅, 9½c. 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 @ 25. Bone tankage, \$23 @ \$24; bone meal, \$24 @ \$25.50.

In lots of 50 tons on contracts we quote: Double manure salts, 48-53% (basis 48%); New York and Boston, \$1.12; Philadelphia, \$1.14½; Charleston, Savannah, Wilmington, N. C. and New Orleans, \$1.17. High grade manure salts, 90-95% and 93-99% (basis 90%), respectively: New York and Boston, \$2.07 @ \$2.11; Philadelphia, \$2.09½ @ \$2.13½; Charleston, Savannah, Wilmington, N. C., and New Orleans, \$2.12 @ \$2.16.

Phosphates.—Quotations are as follows: Land rock, 60% bone phosphate of lime, \$5 f. o. b. vessel; Charleston, 62%, \$5.75; river rock, 58%, \$6; all kil-dried. We learn from a reliable source that a Charleston syndicate, composed principally of the other fertilizer companies, has purchased the products of the Royal Fertilizer Company, about 22,000 tons at \$6.25 cash, in bulk.

Muriate of Potash.—In lots of 50 tons, prices are as follows for muriate of potash: 80-85% and minimum 95% (basis 80%), respectively: New York and Boston, \$1.78 @ \$1.91; Philadelphia, \$1.80½ @ \$1.83½; Charleston, Savannah, Wilmington, N. C., and New Orleans, \$1.83½ @ \$1.86.

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, \$9 @ \$9.25; Charleston, Savannah, Wilmington, N. C., and New Orleans, \$9.75 @ \$10. For sylvinit, 27-35%, prices are as follows per cent. per gross ton, invoice weights: New York, Boston and Philadelphia, 37½c.; Charleston, Savannah, Wilmington, N. C. and New Orleans, 41c. Actual weights, 1c. more per cent.

Nitrate of Soda.—There is no change to report of nitrate. Quotations are: \$1.90 @ \$1.95 on the spot.

Liverpool. Feb. 7.

(Special Correspondence of Jos. P. Brunner & Co.)
Chemicals continue in a very quiet state and there is no activity in the demand. Manufacturers are kept fairly busy with deliveries on forward contracts, but there is more fresh business wanted. Soda ash is quiet and few transactions reported on the open market. For Leblanc makes, prices vary according to market, make, quantity, etc., and it is difficult to give any reliable quotations, but nominal spot range is about as follows: Caustic ash, 48%, and carbonate ash, 48%, £3 15s. to £4 5s. per ton;

caustic ash, 57@58%, and carbonate ash, 58%, £4 10s. to £5 per ton, net cash. Ammonia ash is quoted by makers at £4 per ton net cash for casks, or 5% less for bags, but there are some resale parcels to be had at a shade less.

Soda crystals receive little attention from buyers and are easy at £2 17s. 6d. to £3 per ton, less 5%. Caustic soda is in moderate demand, while quotations are nominally unchanged, the range for prompt or February-June delivery, according to export market, being about as follows: 60% £7 15s. @ £8 10s. per ton; 70% £8 15s. @ £9 10s. per ton; 74% £9 15s. @ £10 10s. per ton; 76% £10 15s. @ £11 10s. per ton, net cash. For parcels under 10 tons, 5s. per ton extra is charged. For contracts over all 1894 special concessions are offered.

Bleaching powder is less freely offered, but prices are about unchanged at £7 10s. @ £8 5s. per ton, net cash for hardwood packages, according to market. Chlorate of potash is quite idle, and although makers quote 8s. for prompt delivery, dealers are offering at 7% @ 7 1/2%, and it is reported that the lower figure has been shaded by weak holders. For forward delivery nominal range is about 7% @ 7 1/2% for February-June and 7% @ 7 1/2% for February-December.

Bicarb soda is in demand and firm at £8 15s. per ton less 2 1/2% for one cwt. kegs, with usual allowances for larger packages. Sulphate of ammonia was rather active last week and a good business was done, but as buyers have pretty well filled their orders for the present, the tone is a little off this week and nearest values to-day are about £14 5s. @ £14 10s. per ton less 2 1/2%; for good grey, 2 1/2% @ 5%, in double bags f. o. b. here Nitrate of soda is in moderate demand, but holders are firm at £9 12s. 6d. @ £9 15s. per ton, less 2 1/2% for double bags f. o. b. here, according to quality. Carb ammonia, lump, 3 1/2% per lb.; powders, 3 1/4% per lb., less 2 1/2%.

MINING STOCKS.

[For complete quotations of shares listed in New York, Boston, San Francisco, Aspen, Colo.; Baltimore, Pittsburg, St. Louis, London and Paris, see pages 166 and 168.]

NEW YORK, Friday Evening, Feb. 16.

There is nothing of interest whatever to report of the mining stock market this week. It continues very quiet and absolutely devoid of features.

The Comstocks were quiet and without any change of importance from last week. There were sales of 550 shares of Consolidated California & Virginia at \$3.25 @ \$4.30. The closing price was \$3.70. Of Gould & Curry 200 shares were sold at \$5 @ \$9.3c. Comstock Tunnel, common, was in some demand, 4,400 shares changing hands at 7 @ 8c. The same may be said of Consolidated Imperial, of which 2,600 shares were sold at 10 @ 15c. Other sales were: 50 shares of Ophir at \$2.30; 200 shares of Sierra Nevada at \$1.10 @ \$1.25; 550 shares of Yellow Jacket at 75c. @ \$1.05; 200 shares of Alpha at 20c.; 300 shares of Alta at 15c.; 300 shares of Best & Belcher at \$2.05 @ \$2.25; 500 shares of Mexican at \$1.25 @ \$1.75; 400 shares of Overman at 55c.

The following companies report having had cash on hand February 1st, 1894: Alpha, \$3,189; Alta, \$1,384; Andes, \$1,202; Belcher, \$7,401; Best & Belcher, \$15,478; Bullion, \$3,190; Bodie Consolidated, \$6,942; Caledonia, \$7,156; Challenge, \$1,302; Chollar, \$9,734; Confidence, \$6,395; Consolidated Imperial, \$837; Consolidated California & Virginia, \$15,138; Consolidated New York, \$3,402; Crown Point, \$14,273; Exchequer, \$3,081; Gould & Curry, \$2,260; Hale & Norcross, \$16,755; Julia, \$2,277; Justice, \$389; Kentuck, \$1,965; Lady Washington, \$835; Mexican, \$22,300; Mono, \$4,201; Navajo, \$256; Nevada Queen, \$2,157; Ophir, \$20,339; Overman, \$895; Potosi, \$6,701; Savage, \$13,003; Scorpio, \$14; Segregated Belcher, \$1,247; Sierra Nevada, \$3,608; Silver Hill, \$526; Standard Consolidated, \$33,653; Syndicate, \$1,191; Union, \$14,930; Utah, \$1,766.

The following mining companies report having had an indebtedness on February 1st, 1894: Bulwer Consolidated, \$4,004; Belle Isle, \$177; North Belle Isle, \$1,059; North Commonwealth, \$1,059; and Occidental Consolidated, \$21.

One of the most active stocks this week was Quicksilver, common, of which 2,045 shares were sold at \$2 @ \$3. Bulwer Consolidated shows sales of 300 shares at 5c.

The superintendent of the Brunswick Consolidated Gold Mining Company writes as follows from Grass Valley, Cal., under date of February 7th: The 700 drift has been extended 9 ft. for the week and the ledge is from 5 to 7 in. wide. It is well sulphureted, but does not show any free gold. In the stope the ledge is from 10 to 12 in. wide and the ore looks fairly well.

The stock was not traded in during the week. Of the Colorado stocks we note sales of 1,400 shares of Lacrosse at 4 @ 5c. There was a sale of 200 shares of Leadville Consolidated at 11c.

Moulton, which had not been traded in for some time, shows sales this week of 800 shares at 25c. There was a solitary transaction of 100 shares of Phoenix of Arizona at 25c.

The Horn Silver Mining Company reports that the proceeds from ore sales during the month of January amounted to \$37,904.

Boston.

Feb. 15.

(From our Special Correspondent.)

There is very little doing in the market for coppers and prices show but slight changes from last week, with the exception of Osceola, which has been pressed for sale and declined from \$26 1/2 to \$24 1/4 on comparatively small transactions.

Boston & Montana declined from \$23 1/2 to \$23 on sales of less than 200 shares.

Butte & Boston dropped from \$8 1/4 to \$8 on small dealings. Calumet & Hecla sold at \$295 and recovered to \$297 on sales of less than 20 shares. Tamarack sold at \$157 @ \$158. Quincy, steady at \$120 although a single share sold at \$118. Franklin sold at \$9 1/4 for small lots and Kearsarge at \$7 @ \$6 1/4, a decline of 3%. A small lot of Tamarack, Jr., sold at \$17, a decline of \$2 from last sale.

There were no dealings in Centennial or Wolverine this week and nothing in the way of gossip in either of them.

Total sales for the week were 1,090 shares.

San Francisco.

Feb. 9.

(From our Special Correspondent.)

Trading is being carried on in the mining stock market under difficulties just now. The Street is lying back in Micawber-like attitude awaiting something to turn up. Little news of importance is being received from the mines, and what little business is being done is on the expectation of something developing at the north end of the lode. To-day the market was absolutely stagnant and the business done ridiculously small in volume.

The north end Comstocks have remained just fairly steady during the week, but the remainder of the list show a decline from last week's ruling rates. Consolidated California & Virginia sold to-day for \$3.15; Ophir for \$2.25; Mexican for \$1.20; Sierra Nevada for 87 1/2; and Union Consolidated for 87 1/2c.

Of the middle group Best & Belcher has been the one most in demand, selling to-day at \$1.95. Gould & Curry sold for 70c.; Hale & Norcross for 65c.; Potosi for 68c.; and Savage for 67c.

The Gold Hill stocks have been altogether neglected; the sales even of Belcher and Yellow Jacket, that have been the favorites at this part of the lode, selling at a marked decline. Belcher ruled to-day at 86c.; Alta at 11c.; Alpha at 6c.; Challenge, 38c.; Crown Point, 63c.; Justice, 6c.; Oberman, 20c.; and Yellow Jacket, 75c.

There was no improvement on these prices before the market closed.

San Francisco, Feb. 16 (By telegraph).—The opening quotations to-day are as follows: Best & Belcher, \$2.30; Bodie, \$1.50; Bulwer, 50c.; Chollar, 65c.; Consolidated California & Virginia, \$4; Eureka Consolidated, 10c.; Gould & Curry, 85c.; Hale & Norcross, 75c.; Mexican, \$1.55; Mono, 10c.; Navajo, 10c.; Ophir, \$2.70; Savage, 75c.; Sierra Nevada, \$1; Union Consolidated, \$1; Yellow Jacket, \$1.

London.

Feb. 7.

(From our Special Correspondent.)

During the past week the previously recorded revival in business in the mining stock market has been fully sustained and there are signs that the improvement will be permanent. The majority of the business transacted at present is in the stock of proved mining companies and very little is done in the purely speculative department. This upward movement seems to have been led by the Indian gold group, for it was that class which commenced the recent activity and the other sections of the mining market followed sympathetically. Many members of the stock exchange who have absented themselves from the mining market for months have returned to their old haunts. There is altogether quite a hopeful feeling abroad, and this feeling is not at all confined to the stock exchange, but is noticeable right through the metal, coal and manufacturing trades.

During the last day or two silver has dropped again and now stands at a lower price than was ever recorded before. This, however, has had no adverse effect on American mining stocks, and the stock to feel it the most is Broken Hill, Australia. It must be said, however, that most of the American silver stocks on the market here are at such a low ebb that nothing could knock them down any more. The only stock that was likely to feel the effect was Elkhorn, but contemporaneously with the drop in silver, the published returns of the month's workings showed an increase in profit, so that the price did not drop.

The stocks that have shown the most activity during the week have been Springdale Golds and Idaho Exploring, and each shows a slight rise. There has been plenty of business also in De Lamars, Harqua Halas, Jay Hawks and other, but the quotations are not altered. Springdale gold shares are sought after a good deal and the mining reports are very promising.

Jan. 30.

During the past week there has been a great deal more business done in the mining stock market in all branches and American stocks have received a good deal of attention. The demand for shares has sprung up in many quarters which have con-

tributed no business for months, and there is a much larger demand than supply. The long continued depression has been shaken off for a time at least. The better class of shares, such as De Lamars, Harqua Halas, etc., are being bought up and, generally speaking, the tone of the market is good. Some of the silver shares became weak when the announcement was made that the India council had abandoned the artificial rupee, but strength soon came back when it was found that this action had no appreciable effect on the silver market.

Harqua Halas are strong and stand at par. The cause of this rise is the news that another new vein has been cut in No. 1 cross-cut, sixth level, 6 in. wide, assaying \$63 in gold, 12 oz. of silver and 30% copper; further news states that another vein has been cut on the sixth level, supposed to belong to the Discovery vein, 6 ft. wide, assaying \$20 per ton free gold. The directors of this company announce that the profits for the quarter ending December 31st, 1893, were sufficient to pay a dividend of 3d per share and provide for expenses for the succeeding two months. They consider it better policy, however, to carry the amount forward to the current quarter. It is expected that the mine and mill will be in full working order again by the end of February.

The Idaho Exploring Company has secured the option of a gold property near the famous Bayley's Reward claim, in the Coolgardie goldfield, in Western Australia. This is a good stroke of policy, for at present West Australian gold mining holds out much more working prospects than silver mining in Idaho.

The directors of the Big Creek Mining Company (Nevada) report that they have practically suspended all operations at their antimony mine and they are not selling any ore. In January, 1891, they sold their ore at £23 a ton on a basis of 50%; whereas their last two shipments realized only £12 and £13 a ton. At the present time the price offered is £10 a ton, which makes mining an impossibility.

The Mingo Mountain Coal and Iron Mining Company and the Fork Ridge Coal Company have gone into the hands of receivers. These companies were organized by the same people who were responsible for the Middlesborough (Ky.) Town Lands Company. The great depression in trade in the United States is the cause of the failures of these companies.

The fact is just at present being recognized in England that Western Australia is on the threshold of an important career as a gold producer. The chief difficulty encountered in these fields is the scarcity of water supply and the severe and continued droughts. Opinion is divided as to the eventual solution of the difficulty. There is a considerable activity in London among inventors and manufacturers with the object of supplying dry concentrators, and the Clarkson-Stanfield concentrator and the Tierra Seca machine of Mr. Metzlar are being inspected and favorably criticised by those who are putting their money into Western Australia. It is, however, the opinion of Mr. Albert F. Calvert, than whom nobody is a better authority on Western Australia, that a copious water supply can be obtained by a judicious system of well sinking.

In the Coolgardie goldfield 360 leases had been taken up January 13th and arrivals in the district continue large. At the Great Dundas mine the reef is 15 ft. wide and the crushings have yielded 2 oz. per ton. Mawsons mine, at Dundas Hills, yielded in one instance 240 oz. of gold out of 120 lbs. of stone, thus showing the existence of rich pockets. Bailey's Reward mine has just sent a consignment of 7,600 oz. of gold to Albany. The 21 shares of this mine are selling as high as £19. At the present time speculation in England is dead and no one can be found who feels it in his power to raise a boom about Western Australia. It would not be at all surprising if the goldfields were developed by legitimate methods without the company promoters and financial operators being given a chance to skin the public.

The New Dberhardt Company announces that it has acquired the Thistle Reef gold mine, in Barberton, Transvaal. Some months ago it was announced in these columns that this company was about to desert the United States and work the above-named mine in South Africa. This negotiation has now been carried through.

DIVIDENDS.

Mercur Mining Company, dividend 4, of 12 1/2 cents per share (\$25,000), payable March 1st, at the office of the company, in Salt Lake City, Utah.

MEETINGS.

Consolidation Coal Company, at the office of the company, No. 44 South street, Baltimore, Md., February 21st, at 12 o'clock noon.

Delaware, Lackawanna & Western Railroad Company, at the office of the company, No. 26 Exchange Place, New York, February 20th, at 11 a. m.

Eureka Hill Mining Company, at the office of the company, Salt Lake City, Utah, February 20th, at 2 p. m.

NEW YORK MINING STOCK QUOTATIONS.

Table with columns for 'DIVIDEND-PAYING MINES' and 'NON-DIVIDEND-PAYING MINES'. Each column contains a list of company names and their stock prices for various dates from Feb. 10 to Feb. 16, 1894. Includes a 'SALES' column for each company.

*Dividend. † dealt in at New York Stock Ex. ‡ Unlisted securities. § Assessments paid. ¶ Dividend shares sold, 4,335. Non-dividend shares sold, 10,300. Total shares sold, 15,191.

BOSTON MINING STOCK QUOTATIONS.

Table with columns for 'NAME OF COMPANY' and 'SALES' for various dates from Feb. 9 to Feb. 15, 1894. Lists mining companies and their stock prices.

Dividend shares sold, 1,344. Non-dividend shares sold, 225. Total shares sold, 1,470.

CURRENT PRICES.

These quotations are for wholesale lots in New York unless otherwise specified. Acid-Acetic, chem. pure... 17¢ @ 19. Commercial, in bbls. and cbs... 01 3/4 @ 02. Carbonic, liquefied, # lb... 18¢ @ 25. Chromic, chem pure, # lb... 1.00 for batteries. Hydrobromic, dilute, U. S. P... 2¢ @ 30. Hydrocyanic, U. S. P... 4¢ @ 30. Hydrofluoric, U. S. P... 2¢ @ 30. Alcohol-95%, # gal... \$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... 04 1/2 @ 05. Lump # ton, Liverpool... 25. Aluminum Chloride-Pure, # lb... \$1.25. Amalgamating solution, # lb... 60. Sulphate, # cwt... \$1.90 @ \$2.50. Ammonia-sal., in bbl. lots... \$4. @ 30. Carbonate, # lb., English and German... 07 1/2 @ 08. Muriate, white, in bbls., # lb... 08 1/2. Aqua Ammonia-(in cogs) 3°... 03 @ 04. 20°... 04 @ 05. 26°... 04 1/2 @ 05. Antimony-Oxymur., # lb... 04 @ 06. Regulus, # lb... 10 @ 11 1/2. Argols-Red, powdered, # lb... 15. Arsenic-White, powdered # lb... 08 @ 09. Red # lb... 08 @ 09. Yellow... 08 @ 09. White at Plymouth, # ton... \$12 @ 26. Asbestos-Canadian, # ton... \$50 @ \$300. Italian, # ton, c. l. f. L'pool, # ton... \$18 @ \$60. Ashes-Pot, 1st sorts, # lb... 4.75 @ 5. Pearl... 05 1/2 @ 06 1/4. Asphaltum-Prime Cuban, # lb... 04 @ 05. Hard Cuban, # ton... \$28.00 @ \$30. Trinidad, refined, # ton... \$30.00 @ \$35.00. Egyptian and Syrian, # lb... 06 @ 07 1/2. 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... 06 1/2 @ 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... \$6. No. 1, Casks, Runcorn, " " " " \$4 @ 10. No. 2, bags, Runcorn, " " " " \$3 @ 15.00. Hauzite-# ton... \$10.00. Bichromate of Potash-Scotch, # lb... 11 @ 12. American, # lb... 11 @ 12. Bichromate of Soda-# lb... 09 1/2 @ 10. Borax-Refined, # lb., in car lots... 06 @ 09. San Francisco... 06 @ 09 1/2. Concentrated, in car lots... 07 1/2 @ 08. Refined, Liverpool # ton... \$2. Bromine-# lb... 55 @ 55. 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... 02 1/2. Cobalt-Oxide, # lb... \$1.90 @ \$1.70. Copper-Sulph. English Wks, # ton... \$20 @ \$21. Vitriol (blue), ordinary, # lb... 03 1/2 @ 03 3/4. extra... 04 1/2. Nitrate, # lb... 40. Copperas-Comm a, # 100 lbs... 25 @ 35. Best, # 100 lbs... \$1.35 @ \$1.50. Liverpool, # ton, in casks... \$2 @ \$2 1/2. Corundum-Powdered, # lb... 04 1/2 @ 09. Flour, # lb... 03. Cryolite-Pow., # lb., bbl. lots... 07 @ 08. Emery-Grain, # lb... 04 1/2 @ 05. Flour, # lb... 02 @ 04. Epsom Salt-# lb... 01 @ 01 1/2. Feldspar-Ground, # ton... \$6.00 @ \$10.00. Crude... \$2.00 @ \$3.00. Fluorspar-Powder, 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 @ 01 1/4. Glass-Ground, # lb... 09 @ 10. Gold-Chloride, pure crystals, # oz... \$2.00. pure, 15 gr., c. v., # doz... \$5.40. a. v., # doz... \$5.50. Chloride and sodium, # oz... \$6.00. 15 gr., c. v., # doz... \$2.75. Oxide, # oz... \$2.25. Gypsum-Calcined, # bbl... \$1.25 @ \$1.50. Land Plaster. Iodine-Resublimed, # oz... 30 @ 33. Iridium-Oxide # lb... 50. Iron-Nitrate, 40°, # lb... 01 @ 01 1/4. 47°, # lb... 02 @ 02 1/4. Kaolin-See China Clay. Kieserite-# ton... \$9 @ \$10. Lead-Red, American, # lb... 06 1/2 @ 07 1/4. White, American, in oil, # lb... 06 1/2 @ 07 1/4. White, English, # lb., in oil... 08 1/2 @ 08 3/4. Acetate, or sugar of, white... 06 @ 06 1/4. Granulated... 09 @ 12. Nitrate... 09 @ 12. Lime Acetate-Am. Brown... 90 @ 95. Gray... \$1.75 @ \$1.87 1/2. Litharge-Powdered, # lb... 05 1/2 @ 07 1/4. English flake, # lb... 06 @ 09 1/4. 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... 02 1/2 @ 06 1/4. Mercuric Chloride-Corrosive Sublimed # lb... 23 @ 24. 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... 01 1/2. Ordinary rock... 02 1/2. Ground, # ton... Naphtha-Black... Nitre Cake-# ton... \$10.00. Ochre-Rochelle, # lb... 01 1/4 @ \$0 1/2. Washed Nat Oxid. Lump, # lb... 06 1/2 @ 06 3/4. Washed Nat Oxid. Powder, # lb... 07 @ 07 1/2. Golden, # lb... 08 @ 08 1/2. Domestic, # ton... \$12 @ \$20. Oils, Mineral-Cylinder, light filtered, # gal... 14 @ 16. Dark filtered, # gal... 10 @ 13. Extra cold test, # gal... 2 @ 24. Dark steam refined, # gal... 17 1/2 @ 19. Phosphorus-# lb... 5 @ 55. Precip. red, # lb... 80 @ 85. white, # lb... 85 @ 90. Platine Chloride-Dry, # oz... \$7. Plumbago-Ceylon, # lb... 04 @ 05. American, # lb... 06 @ 07. Potassium-Cyanide, # lb., C. P... 62. 67 1/2... 70. mining... 28 @ 30. Bromide, domestic, # lb... 28 @ 32. Chlorate, English, # lb... 18 @ 15 1/4. Chlorate, powdered, English, # lb... 18 1/2 @ 19. Carbonate, # lb., by casks, 82 1/2 @ 05. Caustic, # lb., pure slick... 05 1/2 @ 06. Iodide, # lb... \$2.50 @ \$2.80. Nitrate, refined, # lb... 06 @ 08. Bichromate, # lb... 10 @ 11 1/2. Yellow Prussiate, # lb... 21 1/2 @ 22 1/2. Red Prussiate, # lb... 39 @ 40. Pumice Stone-Select lumps, # lb... 03 1/2 @ 05. Original cks., # lb... 01 1/2 @ 02. Powdered, pure, # lb... 01 1/2 @ 01 3/4. Pyrites-Non-cupreous, p. units, 10 @ 11. Quartz-Ground, # ton... \$6.00 @ \$10.00. Rotten Stone, Powdered, # lb... 03 1/2 @ 03 3/4. Lump, # lb... 06 @ 07. Original cks., # lb... 04 1/2 @ 05 1/4. Rubbing stone, # lb... 03 1/2 @ 04. Sal Ammoniac-lump, in bbls., # lb... \$8.00. Salt-Liverpool, ground, # sack... 700. Domestic, fine, # ton... \$7 @ \$7.50. Common, fine, # ton... \$1.50 @ \$1.50. Turk's Island, # bush... 26 @ 28. Salt Cake-# ton... \$10.00 @ \$15.00. Saltpeter-Crude, # lb... 03 1/2 @ 04. Soapstone-Ground, # ton... \$8 @ \$8. Block and slab according to size. Sodium-Prussiate, # lb... 22 @ 24. Phosphate, # lb... 04 @ 05. Stannate, # lb... 06 @ 12. Tungstate, # lb., cwt., in casks... 30 @ 35. Hyposulphite, # lb... \$1.70 @ \$1.80. Strontium-Nitrate, # lb... 08 1/2 @ 08. Sulphur-Roll, # lb... 01 1/2 @ 02 1/4. Flour, # lb... 01 1/2 @ 02. Sylvinit, 27 @ 35, S.O.P., per unit... 3.75. Talc-Ground French, # lb... 01 1/2 @ 01 1/4. American No. 1, # lb... 01 1/2 @ 01 1/4. American No. 2... 06. 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... 30. Muriate, single... 07 @ 12. Double or strong, 64° B... 10 @ 15. Oxymur, or nitro... 19. Vermilion-imp. English, # lb... 87. Am. quicksilver, bulk... 57 @ 59. Am. quicksilver, bags... 58 @ 60. Chinese... 85 @ \$1.00. Trieste... 90 @ 96. American... 114 @ 116. Zinc White-Am. Dry, # lb... 04 1/2 @ 06. Antwerp, Red Seal, # lb... 06 1/2 @ 07. Paris, Red Seal, # lb... 07 1/2 @ 08. Muriate solution... 06. Sulphate crystals, in bbls., # lb... 03 @ 03 1/2.

THE RARE 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 (ix amakam)... 2.12. (per electrol)... 7.75. Bi-muth (metallic), per kilo... 6.25. Cadmium (metallic)... 2.75. Calcium (per electrol)... 5.25. Cerium (pulv.)... 2.25. (fusum in globulis)... 5.50. Chromium (us)... 40. Cobalt (cryst)... 75. Cobalt (metallic), per kilo... 10.00. (pure), per kilo... 40.00. Didymium (pulv.)... 5.50. Erbium-Strontium (oxydat)... 10.00. Gallium (cryst)... 100.00. Germanium (fus.)... 37.50. (pulv.)... 35.00. Glucium (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)... 6.25. Molybdenum (pulv.)... 12 1/2. Niobium (pulv.)... 4.25. Osmium... 1.00. Palladium (wire)... 1.06. (pulv.)... 1.00. Potassium (metal), per kilo... 27.50. Rhodium... 1.63. Rubidium... 2.50. Rutherfordium... 6.25. Strontium (cryst)... 8. Strontium (precipitated)... 62 1/2. Strontium (per electrol)... 7.25. (ex amalgam)... 3.25. Tantalum... 4.75. Tellurium (fusum)... 50. (precipitates)... 22 1/2. Thallium... 03 1/2. Titanium... 1.13. Tungsten (pure)... 04. Uranium... 17.0. Vanadium... 4.00.

DIVIDEND-PAYING MINES.

NON-DIVIDEND-PAYING MINES.

Main table with columns for Name and Location of Company, Capital Stock, Shares, Par, Assessments, Dividends, Date and amount of last, and Name and Location of Company, Capital Stock, Shares, Par, Assessments, Dividends, Date and amount of last.

G., Gold, S., Silver, L., Lead, C., Copper, B., Borax. * Non-assessable. † The Deadwood previously paid \$775,000 in eleven dividends and the Terra \$75,000. ‡ Previous to the consolidation in August, 1884, the California had paid \$11,320,000 in dividends, and the Cons. Virginia \$12,500,000. § 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 \$125,000 in assessments.

COAL AND COAL RAILROAD STOCKS.

Table with columns for stock names, dates (Feb. 10, 12, 13, 14, 15, 16), and sales. Includes stocks like Am. Coal, Buff. R. & P., and various railroad companies.

Total shares sold, 78,750.

INDUSTRIAL AND TRUST STOCKS.

Table with columns for stock names, dates (Feb. 10, 12, 13, 14, 15, 16), and sales. Includes stocks like Adams Express, Am. Cotton Oil, and various industrial trusts.

Total shares sold, 411,571.

CALIFORNIA.

San Francisco.

Table of closing quotations for San Francisco stocks, including Alpha, Belle Isle, and others.

COLORADO.

Aspen.

Table of prices and sales for Aspen stocks, including Argonaut, Aspen Contact, and others.

Colorado Springs, Feb. 10/15

(Specially reported by W. H. McIntyre.) Prices and sales for the week ending February 10th, 1894.

Table of prices and sales for Colorado Springs stocks, including Cripple Creek, Fannie Rawlings, and others.

Denver.

Prices and sales for week ending February 12th.

Table of prices and sales for Denver stocks, including Alamo, Anaconda, and others.

MARYLAND.

Baltimore.

Table of Baltimore stocks, including Ball & N. C., Conrad Hill, and others.

MINNESOTA.

Duluth.

Table of Duluth stocks, including Rivabik M. Iron Co., Cincinnatt Iron Co., and others.

UNLISTED STOCKS.

Table of unlisted stocks, including Adams Iron Co., Ashland Iron Co., and others.

London Quotations.

Table of London quotations for various mining and industrial stocks, including Alaska Treadwell, Harqua Hala, and others.

Paris.

Table of Paris quotations for various mining and industrial stocks, including Helmez, Spain, and others.

New York Mining Stocks.

Table of New York mining stocks, including Alice, Alta, Best & Belcher, and others.

MONTANA.

Helena.

Table of Helena stocks, including Bald Butte, Benton Group, and others.

PENNSYLVANIA.

Philadelphia.

Table of Philadelphia stocks, including Bloomington C. & C., Buck Mountain, and others.

Pittsburg.

Table of Pittsburg stocks, including Bridgewater Gas, Charters Valley Gas, and others.

St. Louis.

Table of St. Louis stocks, including Adams, American & Nettie, and others.

ASSESSMENTS.

Table of assessments for various companies, including Alpha Nev., Alta Nev., Bullion Nev., and others.

CLASSIFIED LIST OF ADVERTISERS.

Address and Calculators
Smith, R. C.

Air Compressors and Rock Drills
American Diamond Rock Boring Co.
Bullock, M. C., Mfg. Co.
Burlingame, W. H.
Clayton Air Compressor Works.
Havenstahl, W.
Ingersoll-Sergeant Rock Drill Co.
McKernan, S. G. & Co.
Morris County Machine & Iron Co.
Norwalk Iron Works Co.
Pena Diamond Drill & Mfg. Co.
Rand Drill Co. (See Diamond Drills)

Aluminum
Columbus Electric, S. & A. Co.

Amalgamator
Bucyrus Steam Shovel & Dredge Co.
Gates Iron Works.

Architects and Builders
Berlin Iron Bridge Co.
Pennybridge & Const. Co.
Pittsburg Bridge Co.
Pollock, Wm. B. & Co.
Scaife, Wm. B. & Sons

Arms and Ammunition
Harley & Graham.

Assayers and Chemists' Supplies
Ainsworth, Wm.
Baker & Adamson.
Baker & Co.
Bergs, J. & H.
Bullock & Crenshaw.
Henry Hill Chem. Co.
Hoskins, Wm.
Overbrook Chem. Co.
Penn Sm. & Ref. Wks.
Penna Salt Mfg. Co.
Queen & Co.
Atorney, McIndoe, H.
Babbitt's Metal
Epping, Carpenter & Co.
Bandell, E.
Bieber & Sohne.
Billings, Robt. & Co.
Grant, R. H.
Handy & Harman.
Hyde, Geo. A.
Mattas, E. C. & Co.

Belting
Groetzinger & Sons.
Hendrie & Johnson Mfg. Co.
Jeffery Mfg. Co.
New York Belting & Packing Co., Ltd.

Blasting Caps and Fuse
Lau, J. H. & Co.
M. Joseph, James, & Co.
Metallic Cap Mfg. Co.

Blowers
Foss Mfg. Co. | Sturtevant, B. F. Co.

Boiler Compound
American Fluoride Co.

Boilers
Babcock & Wilcox Co. | Star Boiler & Sheet
Orr & Sombower, Inc. | Iron Works.
Pollock, Wm. B. & Co. | Stillwell-Bierce &
Scaife, Wm. B. & Sons. | Smith-Valle Co.
Sitting, C. O.

Brass Castings
Epping, Carpenter & Co.

Brass Rolling Machinery
Poole, R., & Son Co.

Brick Machinery
Freese, S. M. & Co.

Bridges
Berlin Bridge Co. | Pittsburg Bridge Co.
Pennybridge & Const. Co. | Scaife, W. B. & Sons.
Buckley

Cable Railways
Poole, R., & Son Co.

Calculators
Smith, R. C.

Calipers
Smith, E. C.

Car Wheels
Whitney, A. & Co.

Chain and Link Belting (See Belting.)

Chemicals
Penn. Salt Mfg. Co.
Baker & Adamson.
Roessler & Hasslachner
Bullock & Crenshaw.
Chemical Co.
Henry Hill Chem. Co.
Solvay Process Co.
Overbrook Chem. Co.
Vandenbergh Laboratory
Clatsche, Friction
Poole, R., & Son Co.

Coal
Haddock, Shonk & Co.
Maryland Coal Co.
Stutz, F. A. & Co.
Stiekney, Conyngham
& Co.
Ward & Olyphant.

Coal Cutters
Ingersoll-Sergeant Drill Co.
Jersey Mfg. Co. (See Machinery.)

Concentrators, Crushers, Pulverizers, Separators, Etc.
Ails, E. P. & Co.
American Mining & Milling Machinery Co.
American Ore Machinery Co.
Beckett Foundry & Machine Co.
Blake, Theo. A.
Colorado Iron Works.
Cope land & Bacon.
Fraser & Chalmers.
Frue Vanner Concentrator.
Gates Iron Works.
Hendrie & Johnson Mfg. Co.
Kron, S. B.
Mechanical Gold Extractor Co.
Pierce & Miller Engineering Co.
Seymour Concentrator Co.
Sturtevant, B. F. Co.
Walburn-Swenson Mfg. Co.

Copper Dealers and Producers
Adopt, Wheelock & Co.
American Metal Co.
Atlantic Mining Co.
Babcock S. & Ref. Co.
Baltimore Cop. Wks.
Boston & Mont. Mfg. Co.
Canadian Copper Co.
Central Mining Co.
Copper Queen Mfg. Co.
Detroit Copper Mfg. Co.
Copper Refining Machinery
Poole, R., & Son Co.

Contractors and Miners' Supplies
Bucyrus Steam Shovel and Dredge Co.
Pollock, Wm. B. & Co.
Frost & Whitney Co. (See Machinery.)

Corrugated Iron
Berlin Iron Bridge Co. | Scaife, W. B. & Sons
Ermaglutine
Groetzinger & Sons.

Diamonds
Bishop, Victor, & Co.
Diamond Drills
American Diamond Rock Boring Co.
Bishop, Victor, & Co.
Bullock Mfg. Co., M. C.
Havenstahl, W.
Pena Diamond Drill & Mfg. Co.
Stearns Bros.
Sullivan Machinery Co.
(See Air Compressors and Rock Drills.)

Dredging Machines
Heller, Chas. S.
Altender, Theo. & Son. | Queen & Co.

Dredges
Bucyrus Steam Shovel & Dredge Co.
Southern & Co.

Dredging Machines
Poole, R., & Son Co.

Dump Cars
Hunt Co., C. W.
Teacher Car & Son Co.

Educational Institutions
Columbian University.
Harvard University.
Mass. Inst. of Technology.
Michigan Mining School
Pennsylvania Military College.
Woolside Seminary.

Electrical Machinery and Supplies
General Electric Co.
Jeffrey Mfg. Co.
Okonite Co., Limited.
Thomson-Houston International Co.

Elevators, Conveyors and Hoisting Machines
Brown Hoisting and Convey. Mach. Co.
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Cooper, Hewitt & Co.
Davis, F. M., Iron Works.
Hunt, C. W., Co.
Jeffrey Manufacturing Co.
Orr & Sombower, Inc.
Scaife, Wm. B. & Sons.
Union Wire Rope Tramway Co.
Vulcan Iron Works.
(See Wire Rope Tramway and Machinery.)

Elevator, Grain, Machinery
Poole, R., & Son Co.

Emery Wheels
New York Belting & Packing Co., Ltd.

Emery Mill Stones
Sturtevant Mill Co.

Employment Bureaus
Engineering Employment Bureau.

Engineers, Chemists, Metallurgists
Jones & Jones.
Kennedy, Julian.
Kent, William
Kerr, Mark B.
Keyes, W. S.
Kirby, E. B.
Lammers, T. L.
Languth, Werner.
Lavagnino, G.
Ledoux & Co.
Leggett, Thomas H.
Loring, Frank C.
Mariner & Hoskins.
Maynard, George W.
McDermott & Dumelf.
Merwin & Richardson
Moore, Gideon.
Newberry, W. E.
Nicholson, Frank
O'Brien, Frank
Osgood, J. O.
Page, Wm. Byrd.
Penrose & Baringer.
Peters, Edward W.
Phillips, W. B.
Poole, Robt., & Son Co.
Porter, J. A.
Potter, William B.
Fries, Thomas & Son.
Sardrop, John, O. F.
Raymond, Rossiter W.
Raymond, R. M.
Rickard, T. A.
Ricketts & Banks.
Robinson, E. J.
Rothwell, John E.
Rothwell, Richard P.
Saunders, W. L.
Schmidt, E. J.
Schwarz, Theodore E.
Snapleigh, W.
Snaw, Thomas.
Skewes, Edward.
Smith, E. C.
Squire, Jos.
Stein, Wm. M.
Stoiber, A. G.
Taylor & Brunton.
Tates, A. H.
Trent, L. C.
Vandenbergh Laboratory
Van Slooten, Wm.
Wannemaker, J. F.
Wardrop, D. Leo.
Wills, J. Latinson
Wilson, J. Howard.
Wyatt & Saarbach.
Yates, H. N.
Young & Park.

Engineers' Instruments
Garley, W. & L. E.
Heller, Chas. S.
Queen & Co.

Engines
Bucyrus Engine Co.
Bullock, M. C., Mfg. Co.
Morris Co. Mach. & Iron Works.

Excavators
Bucyrus Steam Shovel & Dredge Co.
Southern & Co.

Fertilizer Machinery
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Furnaces
Hoskins, Wm. | Moore, S. L., & Son Co.
Pollock, W. B. & Co. | (See Machinery.)

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Pollock, Wm. B. & Co. | Wood, R. D. & C.
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Bristol Mfg. Co.

Gearing
Poole, R., & Son Co.

Grain Elevators
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Greas, & Mazas, Etc.
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Mutual Fire Insurance Co.

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Poole, R., & Son Co.

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Hunt, C. W. Co.
Po ter, H. K., & Co.
Thomson Houston International Co.

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Dixon & Crucible Co.

Machine Moulded Gearing
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Tavor Iron & Steel Co.

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Poole, R., & Son Co.

Machinery
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Ails, Edw. F. & Co.
American Mining & Milling Machinery Co.
Beckett Foundry & Machine Co.
Buckeye Engine Co.
Culwick, W. C., Mfg. Co.
Colorado Iron Works.
Cope land & Bacon.
Davis, F. M., Iron Works Co.
Exeter Machine Works Co.
Fraser & Chalmers.
Griffith & Wedg. Co.
Hendrie & Bolthoff Mfg. Co.
Jeffrey Mfg. Co.
McKernan, S. G. & Co.
Mechanical Gold Extractor Co.
Meeklenburg Iron Works.
Moore, Samuel L., & Son.
Morris County Mach. & I. Co.
Orr & Sombower, Incorp.
Penn Diamond Drill & Mfg. Co.
Pierce & Miller Engineering Co.
Pollock, Wm. B. & Co.
Poole, Robt., & Son Co.
Scaife, W. B. & Sons.
Seymour Concentrator Co.
Sullivan Machinery Co.
Thomson-Houston International Co.
Trenton Iron Co.
Union Iron Works.
Vulcan Iron Works.
Walburn-Swenson Mfg. Co.

Metal Dealers
Adopt, Wheelock & Co.
American Metal Co.
Am. Zinc-Lead Co.
Baker & Co.
Cables, Elec. S. & A.
Aluminum Co.
Eureka Co.
James & Shakspeare.
Metallurgical Works and Ore Purifiers.
American Zinc Lead Co.
Baker & Co.
Babcock Smelting & Refining Co.
Baltimore Copper Works.
Canadian Copper Co.
Cowan Electro. smelt. & Aluminum Co.
Kansas City S. & Ref. Co.
Lecoux & Co.
Mechanical Gold Extractor Co.
Orford Copper Co.
Pennsylvania Salt Mfg. Co.
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Nickel
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Young Lock Nut Co.

Ore Cars
Star Boiler & Sheet Iron Works.

Ore Testing Works
Hunt & Robertson.
Ledoux & Co.
Snelson, W. H., Assaying & Engineering Co.

Packing and Pipe Coverings
Brandt, Sandolph.
Jenkins Bros.
Kensby, Robt.
Wyckoff & Son, A.

Patents
Atkins, J. L.

Perforated Metals
Harrington & King Perforating Co.
Mundt & Sons.

Periodicals
Arms and Explosives.
El Minero Mexicano.
Electrical Plant & Electrical Industry.
Mining Journal.

Phosphates
Trenholm, Paul C.

Phosphorus-Bronze
Paepson-Bronze Smelting Co.

Picks, Miners'
Collins & Co.

Pile Drivers
Bucyrus Steam Shovel and Dredge Co.

Pipes
Pollock Wm. B. & Co. | Wyckoff & Sons, A.

Planed Gearing
Poole, R., & Son Co.

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Baker & Co.
Johnson Mattbey & Co.

Powder
Etna Powder Co. | Laffin & Rand Powder Co.

Pulleys
Poole, R., & Son Co.

Pumps
Blake, Geo. F., Mfg. Co.
Cameron, A. S., Steam
Pump Works.
Epping, Carpenter & Co.
Fulsometer Steam
Pump Co.
Groetzinger, A., & Sons
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Electrical Plant & Electrical Industry
Financial Times
Irish Coal Trades Rev
Mining Journal.
Money of the U. S.
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Sullivan Machinery Co.
Union Wire Rope Tramway Co.

Quicksilver
Eureka Co.

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(See Machinery.)

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Rope Wheels
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New York Belting & Packing Co., Ltd.

Screens
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Mundt & Sons.
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(See Machinery.)

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Crescent Steel Co.
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Chrome Steel Works. | Robinson & Orr.
Crescent Steel Co. | Whitney, A., & Sons.
Exeter Machine Wks. | (See Metal Dealers.)

Tanks
Pollock, Wm. B. & Co.
Scaife, Wm. B. & Sons.
Star Boiler & Sheet Iron Works.
Williams Mfg. Co.

Telegraph Wires and Cables
Okonite Co., The Ltd.

Tin Plate Rolling Machinery
Poole, R., & Son Co.

Tools
Frost & Whitney Co.

Tubes
Pollock, Wm. B. & Co.
Williams Bros.

Tabling-Rubber
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Turbines
James Leffel & Co., The.
Poole, Robt. & Son Co.
Stillwell-Bierce & Smith-Valle Co.

Turbine Water-Wheels
Poole, R., & Son Co.

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Sullivan Machinery Co.
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Harrington & King Perforating Co.
Mundt & Sons.
Ty ar, W. S., Wire Works.

Wire Rope and Wire
Abbott, Wheelock & Co.
California Wire Works.
Cooper, Hewitt & Co.
Hunt, C. W., Co.
Phelps, Dodge & Co.
Roebbling, J. A., Sons & Co.
Ropeways Syndicate, Ltd.
Trenton Iron Co.
Walburn & Woen Mfg. Co.

Wire Rope Tramway
Brown Hoisting and Convey. Machine Co.
California Wire Works.
Colorado Iron Works.
Cooper, Hewitt & Co.
Hunt, C. W., Co.
Roebbling, J. A., Sons & Co.
Trenton Iron Co.
Vulcan Iron Works.

FREE ADVERTISING.

Inquiries from employers in want of Superintendents, Engineers, Metallurgists, Chemists, Mine or Furnace Foremen, or other assistance of this character, will be inserted in this column WITHOUT CHARGE, whether subscribers or not.

The labor and expense involved in ascertaining what positions are open, in gratuitously advertising them and in attending to the correspondence of applicants, are incurred in the interest and for the exclusive benefit of subscribers to the ENGINEERING AND MINING JOURNAL.

Applicants should inclose the necessary postage to insure the forwarding of their letters.

Positions Vacant.

1314 WANTED.—A SKILLED AND PRACTICAL superintendent for copper and silver smelter in Mexico. Must be well rosted 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.

1318 WANTED.—A THOROUGHLY COMPETENT Master Mechanic, to take charge of railway shops in South America. A knowledge of Spanish absolutely necessary. Apply to COLOMBIA, ENGINEERING AND MINING JOURNAL.

1319 WANTED.—PLACER MINER competent to install and operate hydraulic plant in South America. New York references required. Address AMERICAN, ENGINEERING AND MINING JOURNAL.

1320 WANTED.—AN EXPERT PLACER miner to superintend the installation and operation of hydraulic plant in South America. Address COMPETENT, ENGINEERING AND MINING JOURNAL.

Situations Wanted.

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

A POSITION AS SUPERINTENDENT OR chemist of a fertilizer factory by a young man, 27 years old, six years' experience and good references. Address M., ENGINEERING AND MINING JOURNAL. No. 16,084, March 10.

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, Feb. 24.

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.

WANTED.—A POSITION AS CHEMIST OR assistant. Address X, ENGINEERING AND MINING JOURNAL. No. 16,025, Feb. 24.

A PRACTICAL MILLMAN, WITH TWELVE years' experience in managing and working both wet and dry gold and silver 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. No. 15,922, Feb. 24.

WANTED.—FOREMANSHIP; 13 YEARS' EX perience in machine tool building, seven as foreman. Practical education. Can do drafting if required. Address FOREMAN, ENGINEERING AND MINING JOURNAL. No. 16,054, Feb. 24.

RECENT GRADUATE OF TECHNICAL school with experience in railroad building, at present county surveyor, desires position as assayer or assistant to mining engineer or superintendent. Address GEO. B. GILL, Searcy, Ark. No. 16,053, March 17.

METALLURGIST, WITH EXTENSIVE EX perience and one of the best records as superintendent for several years of one of the largest smelting works of this country, wishes a change and position with a solid concern who appreciates good, practical and cheap running of their works. Address EXPERIENCED METALLURGIST, ENGINEERING AND MINING JOURNAL. No. 16,056, March 17.

A MECHANICAL ENGINEER WITH TEN years' experience in the construction, erection and repair of machinery wishes a position. Address F. G., ENGINEERING AND MINING JOURNAL. No. 16,050, Feb. 24.

DESIGNER OF ELECTRICAL MINING Machinery desires to change his present position. Young man. Inventor. Good references. Address DESIGNER, ENGINEERING AND MINING JOURNAL. No. 16,055, Feb. 24.

MECHANICAL ENGINEER DES RES RE- sponsible position. Experience: has been with engines, hoisting and haulage machinery for mines; covers in these lines shopwork, designing, cost, estimating and contracting. Address W. H., ENGINEERING AND MINING JOURNAL. No. 16,052, Feb. 24.

WANTED.—POSITION AS FOREMAN IN quarry where ballast is to be crushed. Thoroughly posted in this business, having had long experience. Can handle men to advantage. Address CRUSHER, ENGINEERING AND MINING JOURNAL. No. 16,049, 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.

YOUNG MAN WANTS SITUATION AS AS- sistant to superintendent. Understands gold mining and milling, assaying and bookkeeping. Speaks Spanish. Address ENSAYADOR, ENGINEERING AND MINING JOURNAL. No. 15,962, March 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. 16,027, March 3.

POSITION WANTED OF ANY KIND CON- nected with mining or railroading. Am a practical, experienced civil and mining engineer, and for the last sixteen years have had responsible positions as mining engineer, manager in and outside of mines, construction of railroads, etc. Have first-class references. Married, 35 years of age; speak three languages fluently. Moderate salary expected. Address PRACTICAL, ENGINEERING AND MINING JOURNAL. No. 16,041, 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.

A MINING ENGINEER, NOW IN CHARGE of 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.

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NEEDING WHEN	RELIABLE	HONEST EXPERIENCE
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THE ENGINEERING EMPLOYMENT BUREAU SYRACUSE N.Y.

Contracts Open.

STEAM HEATING, ETC.—Office Supervising Architect, Washington, D. C.—Sealed proposals will be received at this office until the 7th day of March, 1894 and opened immediately thereafter, for all the labor and materials and fixing in place complete the low pressure, return circulation, steam heating and ventilating apparatus required for the U. S. Post Office, etc., building at San Jose, Cal., in accordance with the drawings and specification, copies of which may be had at this office, or the office of the Superintendent at San Jose, Cal. Each bid must be accompanied by a certified check for a sum not less than 2 per cent. of the amount of the proposal. Proposals must be inclosed in envelopes, sealed and marked "Proposal for the Low Pressure, Return Circulation, Steam Heating and Ventilating Apparatus for the U. S. Post Office, etc., Building at San Jose, Cal.," and addressed to JEREMIAH O'ROURKE, Supervising Architect.

U. S. ENGINEER OFFICE, 537 Congress Street, Portland, Me.—Sealed proposals for removal of ledge in Western approach to channel through Moosabec Bar, Maine, will be received at this office until March 5th, 1894, and then publicly opened. Specifications, blank forms and all available information will be furnished on application to this office. PETER C. HAINS, Lieut. Colonel of Engineers.

U. S. ENGINEER OFFICE, 537 Congress Street, Portland, Me.—Sealed proposals for construction of stone breakwater at Little Harbor, N. H., will be received at this office until March 5th, 1894, and then publicly opened. Specifications, blank forms and all available information will be furnished on application to this office. PETER C. HAINS, Lieut. Colonel of Engineers.

WATER-WORKS.—SEALED PROPOSALS will be received by the city of Greenfield, Ind., until March 21st, 1894, for furnishing the materials and constructing a system of water-works for said city. There will be required about 452 tons of cast iron pipe, 13 tons of special castings, 60 fire hydrants, brick pumping station and chimney, two pumps of combined capacity of 2,000,000 gallons per day, pump well, the necessary valves, valve boxes, etc. Bids will be received for furnishing materials above or for constructing the work complete. Plans may be seen and specifications and blank form of proposal procured at the office of the City Clerk, Greenfield, Ind., or at the office of the Engineers, Voorhees & Wilmer, rooms 65 and 66 Chavin Block, Buffalo N. Y. AMBROSE J. HERRON, Mayor. HARRY G. STRICKLAND, Clerk.

POWDER.—ORDNANCE OFFICE, WAR DEPARTMENT, Washington, February 14th, 1894.—Sealed proposals, in duplicate, will be received at this office until March 3d, 1894, for furnishing this Department with 20,000 pounds of Sphero-Hexagonal Powder for field guns, delivered at Benicia Arsenal, Cal. All information required by bidders can be had upon application to Brig. Gen. D. W. FLAGLER, Chief of Ordnance, U. S. Army.

U. S. ENGINEER OFFICE, WILMINGTON N. C.—Sealed proposals for dredging in the Inland Waterway between Beaufort Harbor and New River, North Carolina, will be received at this office until March 10th, 1894, and then publicly opened. Specifications, blank forms and all available information will be furnished on application to this office. W. S. STANTON, Major Corps of Engineers, U. S. A.

OIL.—Cincinnati, O.—Proposals will be received at this office until March 1st, 1894, for furnishing the 14th Lighthouse district with twenty thousand (20,000) gallons mineral oil, of 150 degrees fire test, during the fiscal year to end June 30th, 1895, to be delivered in good, sound barrels of about fifty gallons each, from time to time as called for by the undersigned. Additional specifications, showing what is required, can be had on applying to this office. The right is reserved to increase or diminish the quantity specified, during the fiscal year, reject any or all bids, and waive defects. F. W. CROCKER, Lieut. Commander U. S. Navy, Lighthouse Inspector, 14th District.

DRILLING ARTESIAN WELLS.—DEPARTMENT of the Interior, Office of Indian Affairs, Washington, D. C.—Sealed proposals indorsed "Proposals for Drilling Artesian Wells," and addressed to the Commissioner of Indian Affairs, Washington, D. C., will be received until April 10, 1894, for furnishing the necessary materials and labor required in drilling one artesian well each on the Pine Ridge, Rosebud and Standing Rock Indian Reservations in South Dakota. Bidders to furnish their own specifications for doing the work, and if possible state the length of time proposed to be consumed in drilling each of the wells. A separate bid for each well is required. Location of the proposed wells, means of transportation, with cost per cwt., and such knowledge of the local conditions of each reservation as is had by the U. S. Indian Agents in charge of the reservations named, will be furnished upon application to said agents, whose postoffice addresses are respectively: Pine Ridge Agency, S. D.; Rosebud Agency, S. D., and Standing Rock Agency, N. D. Proposals will be made to do the work at stated rates per foot, and not for a lump sum. The right is reserved to reject any or all bids or any part of any bid if deemed for the best interests of the service. D. H. BROWNING, Commissioner.

PUMPING ENGINES.—SEALED PROPOSALS will be received by the Winnipeg Water-Works Company, at Winnipeg, at their office in the said city, until March 10th, 1894, for the construction and erection complete, in readiness for operation, upon a suitable foundation to be provided by the water company in a building to be erected for the purpose at the present pumping station of the water-works, of a vertical fly-wheel pumping engine capable of safely, regularly and economically forcing 2,000,000 gallons of water per day from the level of Assiniboine River against a pressure of sixty (60) pounds, with a suction lift of not over twenty (20) feet. Specifications may be obtained on application to the company, at Winnipeg, Manitoba. E. H. BISSETT, Manager.

U. S. ENGINEER OFFICE, WILMINGTON, N. C.—Sealed proposals for dredging at Shad Island Bend, Roanoke River, N. C., will be received at this office until March 10th, 1894, and then publicly opened. Specifications, blank forms and all available information will be furnished on application to this office. W. S. STANTON, Major Corps of Engineers, U. S. A.

DREDGING.—U. S. Engineer Office, 121 Frank- lin Street, Buffalo, N. Y.—Sealed proposals for dredging in Dunkirk Harbor, N. Y., will be received at this office until March 7th, 1894, and then publicly opened. Specifications, blank forms and all available information will be furnished on application to this office. Major E. H. RUFFNER, Corps of Engineers.

The Most Successful Process for the Extraction of Gold. IMPROVED BARREL CHLORINATION.

The undersigned has completed drawings and plans of the latest improvements in Barrel Chlorination, and is open to engagement for the testing of ores, the erection and operation of plants of any capacity. The most successful works in this country were managed by the undersigned.

Correspondence solicited.

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 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 70 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
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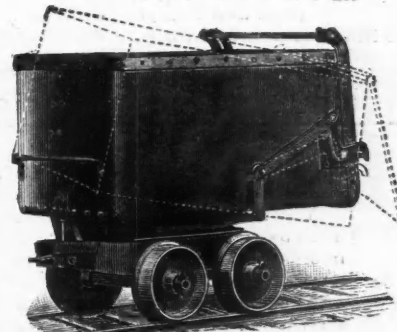
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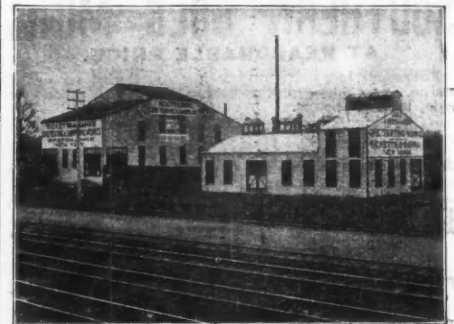
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