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LAKE shipbuilding has shared in the depression which has affected all other business, and on January 1st there were reported under construction in the lake yards only 28 vessels, of an aggregate tonnage of 26,100 tons, against 49 ships of 68,470 tons a year ago. The returns of the past season have not been encouraging; the decrease in iron ore shipments and the sharp competition brought rates so low that very little profit was left for vessel owners, and very little encouragement to add to their fleets. Next season will probably make a better showing.

THE preparations for the International Exposition at Antwerp are now well advanced, and the buildings are to be completed by the end of March. The Exposition is to be opened in May. It is announced that 150,000 square feet of space have been reserved for the United States, which is a larger area than that taken by any other foreign country. France having 120,000 and England 75,000 square feet. One of the separate buildings, or annexes, will be entirely devoted to American exhibits. The Belgian Government gives notice that all goods intended for exhibition may be entered in bond and no payment of duties will be required unless they are sold and remain in the country. The Exposition has assumed larger proportions than was at first expected.

THE returns of the spelter production in the United States in 1892 and 1893 have been revised by each of the producers, and are final as regards 1892, and can change but a few tons as to the output of 1893. In collecting the returns for 1893, each producer was requested to check his returns for 1892, and a few small changes were thus made, increasing the totals from 83,300 tons as reported a year ago in "The Mineral Industry" by 313 tons.

	1892.	1893.
Illinois and Indiana.....	30,227	29,725
Kansas.....	22,953	22,085
Missouri.....	16,169	13,737
Eastern and Southern.....	14,264	10,205
Tons of 2,000 lbs.....	83,613	75,752
Metric tons.....	75,874	68,740

IN view of the discussion over the removal of the duty on coal, a recent report made to the State Department on the cost of Nova Scotia coal is of interest. This report puts the cost of Cape Breton coal at the shipping ports at \$2.50 per long ton for screened coal, \$1.30 for "run of mine" and \$1.10 for slack. The coal averages 25 miles haul to ports, and the wages paid to miners are from 42 to 55 cents per ton. Pictou coal shipped at Pictou costs from 80 cents to \$2.50, and Spring Hill coal at Parrsboro from \$1 to \$2.75. The average freight rates from Nova Scotia ports to Boston, by sailing vessel, are \$1.90 per ton; this could probably be reduced somewhat if large cargoes were assured. Considering the qualities of coal with which it would come in competition, it is probable that only the better grades could be marketed. We may add that our Boston market report this week quotes bituminous coal at \$3.40 to \$3.80 per ton.

THE first practical test of the hydraulic works at Niagara Falls, which have been under construction for three years past, was made January 25th, when the machinery at the Niagara Falls Paper Mills was put in motion. These mills have contracted with the power company for 3,300 H. P., which is to be increased to 6,600 H. P. later. The general power station, where it is expected to begin with dynamos of 5,000 H. P., from which power will be transmitted to purchasers, will be ready by June next. The station has been designed in such a way as to permit of future extension to any amount required.

There has been a good deal of criticism here on the designs of the power plant, which were mainly the work of Swiss engineers, and its workings will be watched closely and with much interest. It is stated that the contract with the paper mills provides for a rental of \$8 per horse-power yearly, which is certainly a moderate rate.

FOR many years there has been a settled local belief in the existence of gold in the trap rock which abounds in the west side of the lower Hudson, and though few have been able or willing to test this belief practically, it still comes forward occasionally. Some 25 years ago a test of a considerable quantity—50 or 60 tons—of rock taken from a point near the lower end of the Palisades, was made, which showed no signs of gold, but emptied the pockets of the owner; and to our knowledge similar tests, but on a smaller scale, have been made on rock taken from the Paterson trap range near Campgaw, in New Jersey; from the South Mountain back of Nyack, and from the Highlands near Fort Montgomery. The latest development of this kind is brought to notice by a dispatch in a daily paper describing a shaft, which is said to have been sunk 100 ft. at the back of High Torne, near Haverstraw, and at the bottom of which the owner has found "decided mineral indications," which a local expert pronounces to be "invariable accompaniments of gold ores." If the shaft is down 100 feet, which is not probable (unless it is intended for a well), it is possible that there are "mineral indications," but it is quite safe to say that gold is not among them, in spite of the "local expert's" authority

THE NEW TARIFF BILL.

THE WILSON tariff bill was finally brought to a vote in the House of Representatives on February 1st, and passed that body by a vote of 204 to 140. In its progress through the House the bill retained substantially the form which it had when it came from the Ways and Means Committee, so far as the metal schedules are concerned. The proposed duties on pig iron and steel rails were each reduced from 25 to 20 per cent.; those on bar and boiler iron from 30 to 25, and on beams and girders from 35 to 30 per cent. On the other hand the duties on wrought iron and steel nails and on screws were increased from 25 to 30 and from 30 to 35 per cent. respectively.

Outside of the metal schedules the only important change made in the bill was the removal of the proposed duty on raw sugar, cutting off a very large source of revenue.

The internal-revenue measure providing for an increased tax on whisky and a tax on incomes over \$4,000 yearly was made a part of the tariff bill instead of a separate measure.

The bill now goes to the Senate for action, and a long discussion may be expected in that body, not only from its usual deliberate methods, but because opposition to special provisions of the bill will be concentrated there. That these discussions may not be too much extended is much to be desired. Rest and certainty are what business needs above all, as we have before remarked, and these can only be secured by a settlement of the tariff question in some manner which will promise to last for a few years at least.

THE END OF A "BOOM TOWN."

The end of one of the Southern "boom" towns came last week when the property of the Fort Payne Coal and Iron Company, representing an investment of about \$5,000,000, largely from New England, in its stock and bonds, was sold under foreclosure for \$60,000. At present the property includes some 30,000 acres of land and controlling interests in various industrial establishments, the latter covered with several years accumulated rust of idleness. There were originally two furnaces in the town, one of them never completed and the other operated for a short period. The first one has been sold and removed, and the latter has been reported as bought with the intention of removing it. If this is true it may be considered as indirectly adding to the value of the property, since if allowed to remain in Fort Payne it would be a constant temptation to the new company, and they might operate it, and, if we may use an expressive slang, "blow in" a good deal more money. It is manifestly impossible for this furnace to produce iron in competition with plants having their own raw materials. The iron ore and coal mines which the original company talked of so proudly amount to absolutely nothing when considered from a practical business point of view.

It will be remembered that when this scheme was first brought out, the ENGINEERING AND MINING JOURNAL cautioned investors to examine into it before placing their money. Like all other "boom" towns the difficulty has not been with actual resources of the place, which have been at all times open to inspection, but with the extravagant falsehoods regarding them which were circulated by the people promoting the company. Fort Payne is never likely to become the seat of great industries working raw materials, simply because, with the exception of a fair fireclay and kaolin, such materials do not exist in sufficient quantities. But it might have been, and may yet become, a thrifty town, using the products of other places and working them into finished shape. If the first company was responsible merely for an error in judgment it might be pardoned for having all but ruined the many New England people who placed their hard-earned savings in its hands, but since the promoters were fully advised at the very outset by competent experts that the very foundation for a successful iron and coal industry were wanting, their subsequent statements amounted to deliberate misrepresentations.

THE IRON INDUSTRY IN COLORADO.

Iron making in Colorado has passed through many vicissitudes since its beginning, and while all of the dreams of the early enthusiasts have not been realized, yet the State has more than held its position as an iron producer, and in the past year, 1893, notwithstanding the depression in the industry, which reduced the country's output over 20 per cent., Colorado increased her production 37 per cent. As yet the vast resources of iron ores have been hardly touched, primarily because the market for them is comparatively limited, and secondarily because transportation facilities have not reached them. But there are large bodies of ore, some of it as rich as the high-grade ores of the Lake regions, which lie close enough to the railroads and to good coking coal, to warrant careful consideration.

In a recent issue of the Gunnison (Colorado) "News" and also the "Rocky Mountain News," there appear well-considered articles upon this subject, giving interesting analyses and also information regarding certain localities. An average analysis of five samples of ore shows: Iron

66.32; silica, 1.10; sulphur, .018; phosphorus, .012. Analysis of the coke shows. Water, 1.12; fixed carbon, 89.08; sulphur, .481; ash 8.76. Limestone: Calcium carbonate, 96.05; magnesium carbonate, 1.70; iron-aluminum, .46; phosphorus, .01; silica 1.56. Manganese ore: Iron, 29.25; manganese, 19.81; phosphorus, .003; lime, 4.46; magnesia, 3.14; silica, 3.40.

The report upon the ores, from which these analyses were taken, states that within 30 miles of Gunnison there are numerous large bodies of high-grade Bessemer ore in close proximity to coal. Near White Pine there is a large deposit of magnetic ore, low in phosphorus and sulphur, which Prof. REGIS CHAUVENET, of the State School of Mines, estimates at 70 ft. in width, about 40 ft. being mineable. A large body of manganese ore occurs on Taylor River, some 27 miles north of Gunnison, where a 35-ft. shaft has been sunk and drifts led out below, in ore for about 10 ft. on each side. The Ceballa ore deposits, in the same county, have been opened by numerous tunnels and shafts, all showing a wide body of ore extending for over one and one-half miles. The Denver Steel Company, which has its chemist, Mr. H. H. TAFT, investigating the iron ores of western Colorado and southern Wyoming, has said that he estimated the cost of making pig iron in Gunnison county at about \$10 per ton, provided that satisfactory freight rates could be secured. In commenting on these figures the Gunnison "News" says that responsible miners will contract to put the White Pine ores on cars for 75 cents per ton, and, adding freight, the cost should not exceed \$1.15 per ton delivered at the furnace. The iron averages 65 per cent. iron. The Ceballa ores can be placed on cars at 50 cents per ton and delivered at a furnace for 80 cents, the ore averaging about 50 per cent. iron. Coke is estimated at \$1.50 per ton at the mines and \$1.70 delivered at furnace, and limestone at 50 cents per ton. On this basis it is estimated that one and three-quarter tons of ore, one ton of coke and two-fifths of a ton of limestone will be needed per ton of pig iron, costing \$3.91. Labor, \$1.57, is added, bringing the total to \$5.48 per ton without repairs, etc.

While this gives a general idea of some of the items of cost, it would not be fair to assume it as one likely to be realized in practice. Assuming the furnace average of the ore at 60%, and the cost, delivered, \$1.50 per ton, the ore per ton iron would cost \$2.70. Coke will likely cost not less than \$2 per ton, and at least one and one-fourth tons be required, or \$2.50 per ton iron. Limestone may safely be assumed at 50 cents per ton iron. This brings the cost of materials to \$5.70 per ton. Adding to this labor, \$1.50; supplies, repairs, and incidentals, \$1.50; the cost would be \$8.70 per ton. This, taking all things into consideration, would probably be as low a figure as iron could be produced for, and it is probable that the cost will be somewhat above it, but this is less than Bessemer iron costs anywhere in the East. Colorado producers have a practical control of the Rocky Mountain and Pacific region, though in the latter would be met imported iron shipped as ballast, as well as the product of the two charcoal furnaces in Washington and Oregon.

There is little doubt but that in time Colorado will become the center of Western iron and steel production. It is the only State in that section in which high-grade iron ores and good coking coals are found in close proximity to each other, and as the West develops this industry must grow to be one of the most important in the State, and will form a very solid and enduring foundation for the establishment of vast industries and a marvellous prosperity.

NEW PUBLICATIONS.

PARLIAMENTARY TACTICS AND RULES FOR DEBATE FOR THE USE OF THE PRESIDING OFFICER AND PUBLIC SPEAKERS. Arranged by Harry W. Hoot. New York; The Scientific Publishing Company. Pages 52. Price 50 cents.

It was a Frenchman, we believe, who said that if three Americans were cast away on an uninhabited island, their first proceeding would be to call a public meeting, organize, and after due debate adopt resolutions appropriate to the occasion. While we know no actual instance of such a proceeding, it is nevertheless true that there is a national passion for organization and debate. Every American of average intelligence, while he may not attain to legislative honors, is pretty sure to belong at some time or other to a club, association or other deliberative body, over whose proceedings he may be called upon to preside; and if not presiding he will often find points on which a knowledge of the accepted rules will be of the greatest service to him. This fact has caused the writing and publication of many treatises, small and large, on parliamentary rules and practice, from the time-honored, but confusing and inconvenient, "Cushing's Manual" up to the latest and best, which is now before us.

In a manual of this kind the first essentials are that it shall be correct and that it shall be brought up to date. In the present book the rules have been formulated after careful study and comparison of authorities and consideration of the latest precedents and great pains have been taken to make it complete, to cover all the points likely to be brought up in such a way as to admit of no doubt nor discussion.

The book presents many points of excellence which are new and deserve especial mention. The rules are clearly and concisely stated, so that their meaning and intent can be readily understood, and are arranged by pages under special headings, so that all applicable to a certain point will be found together. The index—and this is a special feature of the book—is on the margin of the pages, and so presented that when the cover is opened one can see at once

what page to turn to for the desired subject. In short it is admirably arranged for instant use and for quick reference. It is of convenient size for the pocket, and every one who takes part in debate will find it by far the most convenient manual yet published.

The publishers have given the work a good setting, printing it in clear type on good paper with a flexible, handsome cover.

THE CANADIAN ICE AGE. By Sir J. William Dawson, C. M. G., Montreal; William V. Dawson. The Scientific Publishing Co., New York and London, publishers. Pages 302; illustrated. Price, \$2.

The general belief that the northern part of this continent was at one time covered by an extensive ice cap, reaching far down into the interior, and slowly, but steadily moving forward, carving out the physical features of the country, and depositing along its course masses of debris, has been based upon the observations and studies of many able geologists who have, from data collected, evolved two theories by which to account for the remarkable phenomena resulting. On one side it is held that during the Glacial epoch the North American plateau was covered with an enormous sheet of glacier, several thousand feet in thickness, while on the other it is assumed that during this period there was a gradual subsidence and subsequent re-elevation of the continent, during which the action of the sea and currents bearing ice at certain periods of the year produced the results which are credited to glacial action. Sir William Dawson, who is certainly one of the most eminent geologists in this country, and the highest authority living on this special department of geology, has, from abundant observation and careful study of the subject, taken the ground that the first theory, while possibly applicable to other sections, does not explain the drift deposits of eastern America, because, as he says, it requires a series of suppositions unlikely in themselves and not warranted by facts. He then proceeds to explain clearly and comprehensively the observations of others, and his own, extending through a period of many years, placing the data in such a way as to be readily followed and their bearing on the general subject seen. It is shown that to account for the observed phenomena of glacial action much more must be taken into consideration than is usually done. Both land ice and sea ice are agencies which would exert powerful influences, the latter, of course, when into the question is taken that of geological and geographical changes which are as likely to have occurred during that period as at any other. That the last two were important factors is conclusively shown by data beyond question and forming probably the most important argument in the matter. Apart from any discussion as to the theory of glacial action, the book contains a vast fund of information about the geology of Canada, with especial reference to the Pleistocene, its life and climatal conditions, and is a book that every one interested in geology should read.

THE COLLIERY MANAGER'S HANDBOOK: A COMPREHENSIVE TREATISE ON THE LAYING OUT AND WORKING OF COLLIERIES. By Caleb Pameley, Mining Engineer, etc. Second Edition, Revised with Additions. London, England; Crosby Lockwood & Son. Pages 676; illustrated.

This is the second edition of a book which has had a good sale in the United States. In its new form it has three additional chapters, entitled "Mineral Leases and Other Holdings," "The Priestman Oil Engine, Petroleum and Natural Gas" and "Colliery Explosions."

The first of these chapters will have little interest to American readers, as it is chiefly a treatise on European mining royalties. In the second is a description of a new form of engine to use a combination of oil and air instead of steam. This is somewhat after the style of the gas engines, and under some circumstances has done good service and is largely employed for rock drilling and light work generally. The author touches incidentally on the origin and extent of the oil and natural gas fields of this and other countries.

The chapter on "Colliery Explosions" is a resume of all the latest evidence and opinions on the properties of coal-dust and its effect on explosions. Mr. Pameley presents all the available information on this subject without in any way committing himself to any definite opinion.

Regarding the other chapters of this work, we would say that Chapter I., on Geology, is one that is only suitable for English readers, as it deals exclusively with British geology. Chapter II., on the "Search for Coal," treats of the old rigid-rod system of drilling, which has in this country been long superseded by rope drilling, which in turn is now being eclipsed, for holes of small diameter, by the diamond. Chapters IV. and V., on shafts, etc., treat exclusively of the English shaft of circular section, which is never seen in this country. Rectangular shafts are never mentioned. In Chapter VI., on Steam Boilers the Lancashire and Cornish forms of internal flued boilers are discussed, types never used in the United States. Hardly any mention is made of the Babcock & Wilcox or any similar American boiler.

Chapters VII. and VIII., on Timbering, Walling and Methods of Working, are the two best chapters in the book, and are well and profusely illustrated. Perhaps a little more attention might have been paid to steep seams, such as are met in the southern section of our anthracite coal field.

There is nothing new in the chapter on Underground Conveyance, while Chapter X., on Drainage, dwells too much on surface pumping engines of the Cornish or compound differential type, with their unwieldy pump rods in the shaft, and makes no mention of the later improved types of underground pumps, which are doing such good service. The other chapters, on Ventilation, Surveying, Safety Lamps, etc., are identical with those published in the first edition. The book is a useful one, but for American readers it could be modified with advantage.

MACHINERY FOR METALLIFEROUS MINES. By E. Henry Davies, F. G. S. London; Crosby Lockwood & Son, and New York; the D. Van Nostrand Co. Pages 564; illustrated.

This book is designed as a companion volume to "A Treatise on Metalliferous Minerals and Mining," written by the late Mr. D. C. Davies, the present author's father. The work is devoted exclusively to the description of the various machines used in mining, both for the extraction and transportation of the ore and for its concentration and

preparation for the market. In the first chapter, which treats of water as a motive power, the author briefly describes and compares the several kinds of water-wheels and turbines, especially the Felton, wind engines, ventilating machinery, steam boilers, steam and oil engines and hoisting machinery are dealt with in the following chapters:

Chapters 5 and 6, which, by the way, are written by Mr. Philip Argall, of Denver, treat of the drainage of mines and pumping machinery. The Cornish engine is fully described, as well as the American or direct-acting steam pumping engine, and Mr. Argall is very pronounced on the superiority of the latter. Rock drilling and boring machinery is next described. The following nine chapters are devoted to concentrating machinery and rock-breakers, feeders, rolls, stamp, batteries, classifiers, jigs, buddles, vanners, percussion and other tables, etc., are dealt with and illustrated. The remaining chapters are devoted to a description of a gold mill, a silver mill, the leaching processes, drying and roasting machinery, the chlorination and the cyanide processes. Descriptions, with plate illustrations, are given of the dressing floors of the Arrayanes mine, at Linares, Spain, and of that at Neuhof mine, near Tarnowitz, Upper Silesia. Both of the mills were built by the Humboldt company, of Kalk, near Cologne. The Lenares, for argentiferous lead ores, is 500 tons capacity per day. The Neuhof was designed for the concentration of a mixed ore containing argentiferous galena, cerussite and calamine, in a dolomite gangue, and is capable of treating 300 tons in 20 hours. It was built in 1885, and cost £6,500. The plans of the mill will repay a careful study; the whole operation is automatic, the mineral not being touched by hand until it is finished with, while the products fall direct from the jiggers into the tram wagons placed below.

There are also chapters on dry concentration and magnetic separation machinery, in which the Clarkson-Stanfield and Monarch magnetic separators are more especially described. Electricity as a motive power, electric lighting, wire tramways and kindred matters are concisely described in the concluding chapters.

Such a compilation must necessarily contain some matters of interest. The present book, however, while in some parts—notably in the chapters on drainage—it has been brought well up to date, is in others somewhat behind the times. In the chapter on boilers, for instance, the only types described and illustrated are the Cornish and Lancashire. In some other respects also it gives little that is new, although the historical matter is generally well presented. More space, also might have been given to stamp mills with advantage, and also to underground hauling. Rope tramways are quite fully treated. The great trouble with the book, indeed, seems to be a lack of the sense of proportion.

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.

Mineral Resources of Western Australia. By Albert F. Calvert, F. R. G. S. London, England; George Philip & Son. Pages 180.

The Nickel Ores of Sudbury, Canada. By John D. Frossard. London, England; George Philip & Son. Pages 62; with diagrams.

The Discovery of Australia. By Albert F. Calvert, F. R. G. S. London, England; George Philip & Son. Pages 92; with maps and illustrations.

The Mining Manual for 1894. By Walter R. Skinner. Sixth Year. London, England; Walter R. Skinner. Pages 681, Price (in London) 10s. 6d.

A Standard Dictionary of the English Language, Upon Original Plans. Prepared under the supervision of Isaac K. Funk, D. D., Editor in Chief, New York; The Funk & Wagnalls Company. Volume I., A to L, inclusive. Pages 1060; illustrated. Price (for two volumes), \$15.00.

Engineering Education: Proceedings of Section E of the World's Engineering Congress in Chicago. Edited by De Volson Wood, Ira O. Baker and J. B. Johnson. St. Louis; published by the Society for the Promotion of Engineering Education, Prof. J. B. Johnson, Secretary. Pages 342. Price \$2.50.

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.

Silver Mine Dividends.

EDITOR ENGINEERING AND MINING JOURNAL:

Sir: In your last issue you speak of the Horn-Silver mine as being the last of the silver mines to pay dividends in the United States. I would like to call your attention to the Aspen mine, which is paying regular dividends, although not issued or incorporated; also the Smuggler Mining Company, both of Aspen. The Smuggler Mining Company is paying regular dividends of \$50,000 per month, and, in addition to the enormous reserve in sight, is doing prospecting and developing work at the rate of 5,000 ft. per year, running the concentrator one shift per day, and working 75 tons daily therein in addition to the regular shipping ore sent directly to the smelter. The Smuggler mine is next to the Mollie Gibson, the north end line of that mine being the south end line of the Smuggler. The mine is incorporated but not listed.

S. H. ALLETT.

ASPEN, Colo., Jan. 24, 1894.

Furnace Improvements.

EDITOR ENGINEERING AND MINING JOURNAL:

Sir: "There is nothing new under the sun." Certainly the device described by Mr. Lane for the withdrawal of a bar from the tapping-hole of a furnace, in your issue of December 30th, is not new,

though his blacksmith, Pier, had very likely reinvented it. I saw it in use in works in Wales 12 years ago and it was then an old device. It was not a ring that was used; it was more oval in shape, so that the wider part slipped over the knob, or flattened head, of the bar. The bar was then brought over the narrower portion and a wedge inserted as described by Mr. Lang. The arrangement was locally known as a "bulldog," why I do not know, unless it be due to the fact, as Mr. Lang says, "it never lets go."

Another thing I have recently seen alluded to as novel is the use of water-cooled slag-spouts in lead furnaces. I fancy this is old, too, though I have not seen these spouts in use except in my own practice. I put them on my furnaces 10 years ago to prevent the eating away of the spouts by the metal blowing out with the slag and have had them in use ever since.

NEWCASTLE-ON-TYNE, JAN. 8, 1891.

W. M. HUTCHINGS.

The Deepest Gold Mine.

EDITOR ENGINEERING AND MINING JOURNAL:

Sir: In a recent issue you referred to the new shaft of the Tamarack Mining Company in Michigan as the deepest metal mine in the world. This statement is interesting, and in connection with it your readers may like to know that while the supremacy of the Tamarack shaft is for this moment, the deepest gold mine now in the world is to be found in Australia, where the "180" mine, owned by Mr. Lansell, has reached a point below 3,000 ft. in vertical depth. It has for several years been the deepest gold quartz mine, though not with out some exceptions, for at Deodoro, Australia, there are now in addition to the "180," no less than 25 mines exceeding 2,000 ft. in depth and six exceeding 2,500 ft.

The following figures may be of further interest. At Charters Towers, in Queensland, the "Brilliant Extended" has just reached 2,000 ft. in vertical depth. In California the deepest shaft is that of the Idaho, at Grass Valley, which is 3,050 ft. on the dip of the vein and 2,182 ft. vertically. In Colorado, the old California main shaft, at Central City, leads the way with 2,200 ft. on the vein, or 2,040 ft. vertical.

DENVER, Colo., Jan. 25, 1894.

T. A. RICKARD.

THE SILVER MINES OF COLQUECHACA, BOLIVIA.

Written for the Engineering and Mining Journal by Prof. Robert Peete, Jr.

(Concluded from page 79.)

HANDLING THE ORE.

During the writer's visit to the mines nearly two years ago, the method of handling the ore was the following: The coarse, rich material was hand sorted roughly in the mines, put into sacks, and conveyed to the surface, where it was again spalled and sorted. The rich fines, of which there is a large amount from the friable ruby-silver, were also brought to the surface in sacks, spread upon large sheets of canvas to dry in the sun and sized by hand sieves. Six sizes were made, the finest of which, being usually the richest, was exported without further treatment. The other five sizes were concentrated by hand jigs, from which were obtained headings carrying say from 800 to 1,200 oz. per ton,* which were combined with the rich shipping ore, and a series of lower grade products, some of which were re-treated. At the Aullagas mine a small auxiliary concentration plant was in use. It consisted of Cornish hand jigs, buddles, dolly-tubs, and tipping slime-tables, and treated a class of material formerly thrown over the dump. On account of lack of water this plant could be operated only during, and just after, the rainy season—say five to six months of the year. It produced a concentrate, part of which, containing from 500 to 900 oz. per ton, was exported, and part, carrying from 125 to 150 oz., was sent to the amalgamation works. The amount of product was small (about 20,000 oz. per year), but the running expenses were trifling, and as the silver saved would otherwise have gone over the waste dump, the result is worth recording.

The cobbled ore, fines, and concentrates were sampled and mixed in such a way as to prevent too much variation in the value of the shipments, which usually assayed from 1,800 to 2,500 oz. per ton of 2,000 lbs. This first class product was sewed up in double thickness rawhide sacks, and exported to Europe. The coarser and poorer products from the jig, together with the cobblings and sorted material from the first class ore—in short, everything under 300 oz. per ton—were carried by mules to several amalgamation works in the valleys near Colquechaca.

It is unnecessary to point out that this method of handling is poor practice. A high grade shipping product is made, but a large amount of material is thrown upon the amalgamation works, which give very unsatisfactory returns, as will be seen later. If it be impossible to maintain good amalgamation mills near the mines, there is, at least, no good reason why the shipping ore should not be increased in quantity and reduced in assay value by mixing with it much of the lower grade stuff.

AMALGAMATION WORKS.

The Ayoma Reduction Works, which treated the ore from the Aullagas mine, are in a valley 24 miles from Colquechaca, and will serve as a type of the old style Bolivian amalgamation works. The process is chloridizing—roasting and amalgamation.

Stamp Battery.—This consists of eleven 400-lb. stamps, driven by a slow overshot waterwheel. Crushing capacity, in the wet season, with plenty of water, 8 tons per 24 hours; in the dry season, 4½ tons. Speed, with high water, 48 drops per minute; at low water, 30 drops; height of drop, 10 to 12 in.

* The value of silver ore is reckoned in Bolivia in "marcos" per "cajon"; the "marco" being equal to 7.395 oz. Troy, and the "cajon" 5,000 lbs. Spanish, or 5,000 lbs. Avoirdupois. For rough calculations: (marcos per cajon) × 3 = Troy ozs. per ton of 2,000 lbs.

Roasting Furnaces.—There are six short reverberatories. Single hearth furnaces take six charges; double hearth, seven charges of 400 lbs., in 24 hours. Salt, 12½% of weight of ore, is charged 2½ to 3 hours after the ore. The fuel consists of "Yareta" and "Taquia."* For each furnace charge, 350 lbs. of either fuel are used, costing 18c. per 100 lbs. Labor costs 35c., and salt 40c. per charge.

Amalgamating "Fondos."—These are copper pots, set in the top of rude furnaces, in which a slow fire is maintained. There are 12 fondos, each taking a charge of 150 lbs. ore and 50 lbs. salt every three hours. Labor costs 25c., fuel, 23c., and salt 40c. per charge. From 10 to 12 lbs. of quicksilver are used for each 250 oz. silver in the ore. The loss of quicksilver is said to be ½ oz. per oz. silver produced. This is a loss of 8 lbs. quicksilver, worth on the spot \$7.50 per ton of ore, and indicates extremely poor or careless working.

Amalgamating Barrels.—There are 8 wooden barrels, taking charges of 600 lbs. ore, and 200 lbs. tailings. It is said that better results are obtained by adding the tailings, but no good reason is assigned. Time of charge: For 120 to 150 oz. ore, six to eight hours; for ore of 250 oz. and over, 15 hours. In each barrel, 25 to 30 copper balls, weighing 1½ lbs. each, are used, to mix the charge. The salt used per charge is 125 lbs., worth, \$1; the quicksilver charge is 1 to 1¼ per oz. silver contained in the ore. The barrels give a higher extraction than the fondos. Labor costs 35c. per charge; 50 lbs. fuel for steam heat, 10c.; salt, 90c.; total cost, including loss of quicksilver, and wear and tear, per charge of 600 lbs. ore, \$1.75. The ore treated generally carries 250 to 290 oz. per ton. The loss in tailings is from 25% to 33%, average say 30% of value of raw ore. A large part of this loss is in roasting, probably arising in great measure from charging the salt too soon. Amalgamating pans have since been erected, on the pattern of the "Tina" of Francke's process, in use at Huanchaca, and elsewhere in Bolivia. No data are at hand, but some improvement in extraction and cost is undoubtedly effected.

The cost to the Aullagas Company for treatment at these custom works was formerly about \$60 per ton of 2,000 lbs., a very high charge, especially in view of the heavy loss in tailings. The actual cost of treatment per ton was approximately as follows per ton—1. Crushing, per ton: Labor, \$1.50; repairs, etc., \$0.75; total, \$2.25. Roasting: Labor, \$1.75; salt, \$2; fuel, \$3; repairs, etc., \$0.50; total, \$7.25. Barrel Amalgamation: Labor, \$1.20; salt, \$3; fuel, \$0.35; loss of quicksilver, \$3.50; repairs and loss of copper, \$1.50; total, \$9.55. Retorting, etc., \$1.50; superintendence and office expenses, on basis of 150 tons per month, \$3; general expenses and interest, \$2; total cost of treatment with barrel amalgamation, \$25.55. 11. Amalgamation in fondos: Labor, \$3.30; salt, \$5.25; fuel, \$3.10; repairs, \$0.50; loss of quicksilver, \$7.50; total, \$19.65. Deducting cost of barrel amalgamation, as above, \$9.55, leaves \$10.00 difference in cost of fondo amalgamation, making total cost of treatment, when fondos are used, \$35.65.

In the Bolivian reduction works no attempt is made to locate the various buildings and machinery so as to take advantage of gravity in handling the ore and other material. As a rule, everything is on a level, and the ore is transported by hand from one part of the works to another. This is rarely, if ever, necessary, but purely the result of custom.

Government Tax on Ores and Bullion.—A tax is levied upon all silver produced, whether contained in ore and exported in that form, or in the shape of bar silver and "pina" (crude retort metal). This tax is as follows in cents (United States currency) per oz. troy: Ores, up to 150 oz. per 2,000 lbs., 2.82c.; from 150 to 300 oz. 3.23c.; from 300 to 450 oz., 3.63c.; from 450 to 600 oz., 4.04c.; from 600 to 750 oz., 4.44c.; from 750 to 900 oz., 4.85c.; from 900 to 1,050 oz., 5.25c.; from 1,050 to 1,200 oz., 5.65c.; from 1,200 oz., upward, 6.00c.; bar silver and retort metal ("pina"), 6.00c. The law requires also that one-fifth of the total silver product shall be sent to the Government mint for coinage, the coined silver being returned to owner without further charge.

Mine Labor at Colquechaca.—Mine labor, which is of fairly good quality—from the standpoint of native labor—is paid at the following rates, given in United States currency: Skilled miners, \$1.25; ore handlers and sorters, \$0.85; unskilled laborers and boys, \$0.60; car-men, \$1.20; windlass men, \$1 to \$1.20; mule drivers (on whims), \$1.35 to \$1.60; dump men, \$0.85; masons (underground), \$1.20 to \$2; masons (surface), \$2.50; helpers, \$0.60; blacksmiths' helpers, \$0.75 to \$1.80; carpenters' helpers, \$0.75 to \$1.50; chief blacksmiths, per month, \$125; chief carpenters, per month, \$75. In the mines which produce rich ore, there is still another class of employees whose duty is to prevent stealing. They receive from \$40 to \$50 per month.

Stealing Rich Ore.—The stealing of rich ore is a world-wide evil in all mines producing high-grade ore, but in Colquechaca, and other Bolivian mining districts, the laborers have developed an aptitude for making way with rich mineral remarkable for its varied ingenuity. Apparently, no amount of surveillance can prevent it. At these mines numerous watchmen, and other employees, are maintained with but dubious results. With the idea of reducing stealing to a minimum, the laborers in some of the mines are kept underground, and nominally at work, for 24 hours each alternate day. For this they receive two days' wages, though the actual working time is usually less than 21 hours, and it goes without saying that no man can work effectively for so many consecutive hours, especially at the great altitude of Colquechaca. The theory is that every time a laborer comes out of the mine he carries with him some portion of stolen mineral, and therefore the fewer times he has occasion to go to the surface, the less he is able to steal. This seems sound, but the mining companies undoubtedly lose more in paying for work that is not done than is gained by the adoption of this method for preventing theft. The laborers seem destitute of moral sense, and are marvellously adept in the art of stealing. Their fertility in the devising of new methods for carrying off rich pieces of ore, in spite of careful watching and systematic searching, is shown in numerous ways, some of which are indescribable.

Pure ruby-silver is ground to powder, sewn up in tiny muslin bags or pads, and concealed in the lining of clothing; powdered ruby is

* Yareta has been described in a former footnote. Taquia is the dried dung of the llama, and forms a valuable fuel, in the absence of wood or coal, both for boilers and for metallurgical use.

rubbed in the hair—of which the Bolivian Indian has a very heavy growth—the hair and scalp being first generously anointed with lamp oil or candle grease; the whole body is sometimes covered with oil or grease, and the precious ruby rubbed in, to be removed afterward by a hot bath; small masses, or crystals of ruby-silver are concealed under the tongue, in cavities of the teeth, in the cheeks, ears, nose, or other parts of the body. A bit of mine timber, or the broken handle of a pick or hammer, is sometimes hollowed out, and pieces of stolen mineral put in, the opening being carefully concealed by a well-fitting wooden plug. These pieces of wood are then thrown into a car of waste; a confederate, at a distance outside, notes where the stick lodges as it goes over the dump, and watches his chance to recover it. This method is possible on account of the very small amount of timber used in these mines, so that a bit thrown on the waste dump is a conspicuous object. At Colquechaca the writer was shown the sawed-off end of a stick of timber which, judging from its battered appearance, must have performed its trips in and out of the mine many times before it was discovered. Less ingenious miners still resort sometimes to mixing rich pulverized mineral with remnants of food, in the clay, or iron pots in which they carry their meals, but this, as well as some of the devices mentioned above, is now well understood by the mine officers, and it would be amusing, if it were not disgusting, to see an occasional miner disgorge his booty under the hands of the searchers. The cold climate of Colquechaca makes heavy clothing necessary, and the thick homespun of sheep or llama wool is well adapted for concealing specimens. These miners wear an amount of clothing not less astonishing for its quantity than for its complexity of design. In the search-house, which is warmed for the purpose, they strip off enough coats, trousers, shirts and socks, to serve, according to more civilized ideas, for two or three men. The operation of searching is therefore no easy matter.

It is usual to provide the mine tunnels and manways with doors made of slats or iron gratings. These are kept locked, and only opened by the door tender when necessary for mine traffic, or to permit the passage of properly authorized persons. In order to prevent the

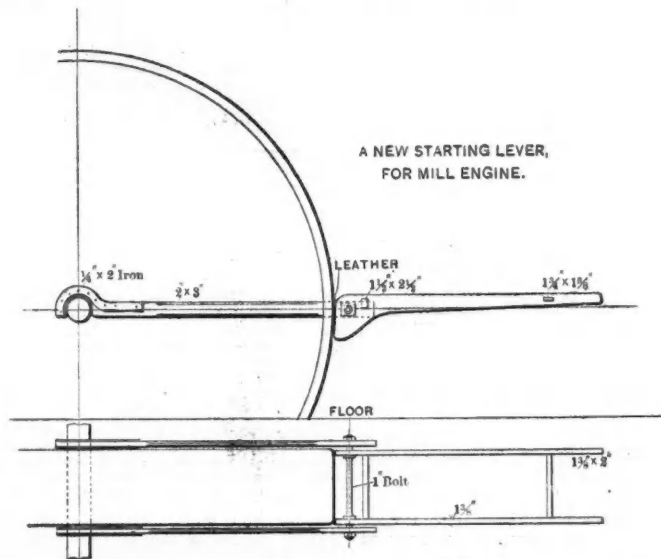
A NEW STARTING LEVER FOR MILL ENGINES.

Written for the Engineering and Mining Journal by R. Hirota, Engineer Ogoya Copper Mine, Japan.

Many steam engines of moderate size, which are imported to this country, are without any starting device, and it is often troublesome for the engineer to work with such engines. Big engines generally have a special device fitted by the builder, or a small starting engine, while a small engine will have no use for them, for it is light enough to be moved by hand. But, with the engines of nearly 100 H. P., or a little less, it is awkward to start without a special device.

I have recently erected an American Corliss engine of 98 I. H. P. at this mine. It is a single cylinder, high-pressure engine, with a flywheel 12 ft. in diameter. As the engine had no starting device, I contrived a very simple lever, shown in the annexed drawing, by means of which two or three engine room attendants could easily turn the flywheel round, and set the crank in the right position for starting. But without this lever it was necessary to call several men and let them cling round the flywheel, which is a very awkward and dangerous job.

The lever consists of two sets of wooden links on each side of the wheel, joined together by horizontal pieces. The front links have their ends bent like a hook, so as to catch the crank-shaft but not stick fast; the back links are joined to them by an iron bolt or pin, which serves as a fulcrum. The end of the back link is cam-shaped, so as to bite the face of the wheel when the lever is pressed down, but will loosen itself when a lever is raised or the wheel turns by itself. In order to prevent slipping, the cam end is covered with leather. When the lever is made sufficiently long, great power can be exerted on the rim of the flywheel. The lever is chiefly made of wood; it is light, simple and effective, and can be immediately and cheaply made on the spot. The lever which I had made is now doing its service excellently.



laborers from passing ore through these lattice doors to confederates outside, two and even three doors are often put in, at some distance apart. The most effectual remedy for stealing would be prompt discharge upon conviction, which has been impossible hitherto, but which now, under the consolidation, can be applied with the best results. Formerly, owing to the limited number of laborers in the district, a man discharged from one mine was at once engaged by another, regardless of his past record.

Stealing at these mines is of course made unusually easy by the occurrence of large amounts of ruby and native silver. And the extent of the evil has been long indicated by the existence, in and near Colquechaca, of a number of small, independent, contraband reduction works, from which, previous to last year, it was calculated that at least \$300,000 worth of silver was annually shipped.

British Coal Exports.—Exports of coal, coke, cinder and patent fuel from Great Britain in 1893 were 29,045,114 tons, a decrease of 1,408,859 tons, or 4.6%, from 1892.

Aluminum Yachts.—Two examples of aluminum-built yachts are at present to be seen in French waters. One is the 10-ton yacht "Vendessa," launched from the stocks of the Societe de Chantiers de la Loire, and now being fitted out for next season. The other is a 33-ft. sailing boat, now on exhibition on the Seine. The former craft has been built for the well known French yachtsman Comte de Chabannes, from the designs of M. V. Greilloux. It is computed that if this vessel had been constructed of steel frame and wood planking, like other boats of her class, her hull would have weighed some 9,500 lbs., but in aluminum the weight is only some 5,150 lbs. The other craft referred to is named the "Jules Davoust," and with it Lieutenant Hourst intends to set out on a survey expedition on the Niger. This craft will afford a good test of the suitability of aluminum as the structural material for boats intended for exceptional purposes, such as river survey and exploration.

The same device can be applied to a rope flywheel, in which case it is only necessary to make the gripping end of the lever of the proper shape to fit the grooves.

GOLD MILLING IN AUSTRALASIA.

Written for the Engineering and Mining Journal by T. A. Eckard.

Wet methods of ore reduction still hold the field in the great gold regions of the southern hemisphere. In America it is already otherwise. As the railway octopus slowly spreads out its iron tentacles there is a tendency for the smelter to supplant the mill for fine reduction processes to replace wet methods of gold extraction. In Australia, however, the smelter as yet rules only over the limited territories of the silver regions. Elsewhere the stamp mill reigns supreme. This condition of the metallurgical practice of the colonies is of course in the first place due to the character of the gold ores themselves, for if the treatment appear primitive it is due to the fact that in most of the large producing mining centers the very simple nature of the millstuff has not called for complicated methods, but it is also traceable to the absence in convenient neighborhood to the gold mines of such deposits of copper or lead as would render profitable the smelting of siliceous gold ores. Simple gold-bearing quartz, such as is ordinarily termed "free milling," yields the bulk of the gold production of Australasia.

Victoria, which produces 40% of the total yield, is as yet mining and milling only the simplest ores. There are, it is true, valuable deposits of metallic material, especially in the northeast in the form of the colony, but at present they make no noteworthy contribution to the general output.

Somewhat similar conditions obtain in New South Wales, where gold was first discovered in Australia, and which now yields 7% of the total production of Australasia. In the central parts of the colony, in the Lachlan and Bathurst districts, gold is being obtained from millstuff carrying a notable percentage of pyrites and other sulphides,

requiring some grinding process after ordinary plate amalgamation. Around Armidale, in the northeast, the association of antimonial minerals with the gold has often proved a source of annoyance. Notwithstanding these and other exceptional occurrences the yield of New South Wales as a whole can be said to come from comparatively docile ores and by means of simple methods of extraction.

In Queensland, which produces nearly as much gold as Victoria, many metallurgical problems have arisen within recent years. In some cases a successful solution has been reached. At Mt. Morgan, for instance, barrel chlorination has proved a triumph over difficulties which stamp milling was powerless to overcome. At Charters Towers, at the present time, the leading gold producing district of Australia, the ore treatment has presented many difficulties. Ordinary stamp milling, followed by a whole paraphernalia of concentrators and pans, holds the field, but its position is being strongly assailed by chlorination. At Ravenswood, a neighboring locality famous for its refractory ores, the cyanide process is struggling against many obstacles.

New Zealand, producing nearly 15% of the Australasian gold output, has a great variety of ores, a fact which would suggest a more marked diversity in the methods of treatment than actually obtains. On the west coast of the south island, at Reefton, more especially, the gold comes from quartz ores of comparative simplicity, and the stamp mill does fairly good work. The same may be said of the southern province of Otago, though in the latter region much value has been forever lost by a decision to save the pyrites, by concentration, after ordinary battery and plate amalgamation. In the north island, at Hauraki or the Thames, the ores are very complex and the stamp mill is in vain attempting to do satisfactory work under almost hopeless conditions. Wet methods of reduction have survived long after they were fitted to obtain an economic extraction of the values in the ore. In the neighboring districts the cyanide process has been employed with very varying success.

By way of summary it may therefore be said that the millstuff of Australia is for the most part a simple quartz, containing from 0.5 to 2% of pyrite, mixed with a varying proportion of country rock—slate, schist or sandstone—but that within its wide confines there occur ores in every gradation from the most docile to the most refractory.

The accompanying table will give at a glance the general characteristics of the stamp mills of six of the most representative mining centers. It will serve as a text for the remarks which follow.

COMPARATIVE TABLE OF STAMP MILLS.

	Average contents of the ore.		Average number of stamps.	Weight of stamps.	Number of drops per minute.	Height of drop.	Depth of discharge.	Crushing capacity per stamp.	Capacity of mill.	Variety of screen.	Number of holes per sq. in.	Percentage of concentrates.		Average gold contents.	Return percentage.	Fineness of bullion.	Life of screen.	Loss of mercury per ton of ore.	Consumption of water per stamp per minute.
	Dwts.	Cents.										%	Ozs.							%	P'r 1000	Days	Dwts.	Gals.
Clunes, Victoria	9	59	60	890	80	8	4 1/2	2 1/2	150	Perforated copper plate.	100	3 1/2	3	40	970	25	1	8	
Ballarat, "	8 1/2	56	40	950	70	8	3	2	80	R'd punched Russia iron.	160	2	48	968	12	3	5 1/2		
Bendigo, "	9 1/2	58	40	900	72	9	3 1/2	2 1/2	90	Same.	143	1	4 1/2	50	955	11	7 1/2	6 1/2	
Otago, New Zealand	10	70	20	800	77	7 1/2	3 1/2	1 1/2	30	Same and steel cloth.	140	3	41	930	7	4			
The Thames, New Zealand	9 1/2	95	30	700	70	8 1/2	2 1/2	1 1/2	52	R'd punched Russia iron.	160	1	42	965	6	4			
Charters Towers, Queensland	25	300	30	950	74	8	2	2 1/2	75	Perforated charcoal iron.	225	11	35	790	5	5			

* Pyrites not saved as a rule. † Very variable. Saved by blankets and treated in pans. ‡ Mercury usually attained a loss of 12 to 20 dwts. § Very variable. ¶ Very variable. From 1 1/2 to 70%. From 2 to 20 ozs. †† Differ widely according to the number of pans and concentrators.

The first stamp mill erected in Australasia was that of the Port Phillip & Colonial Gold Mining Company, which commenced work at Clunes in May, 1857. The stamps, 20 in number, had square heads. The process of treatment at the commencement of operations was largely founded upon that of tin dressing as conducted in Cornwall, but the enterprise and good sense of the management were abundantly shown in the succeeding years by the changes made in their methods and by the modification of the treatment to suit the ores of their own mines.*

The ore broken from the veins at Clunes is of a very simple kind. It is a white, rather friable, quartz traversed by numerous fractures and cavities in which the gold occurs and from which it is readily detached by the blow of the stamp. Metallic sulphides are present in very small percentage and do not appear to be intimately associated with the gold.

The methods employed in this district are of the simplest kind. Blankets and mercury traps (or wells) do the work usually accomplished by amalgamated copper plates. The concentration of the pyrite is done by Cornish buddles of an improved type. The concentrates are roasted in an ordinary reverberatory and then treated in a Chilean mill, at a total cost of \$9 per ton. The work accomplished by the mills has been of the most satisfactory character. The Port Phillip used to extract, as shown by accurate sampling and careful tests, from 85 to 90% of the value in the ore. There are few milling centers where there is so little room for adverse criticism.

At Bendigo the ore is also a comparatively simple quartz, but it is harder than that mined at Clunes, and it contains an increased percentage of pyrites and other sulphides. The finer crushing which the ore requires indicates these conditions. The character of a millstuff is, however, also determined by the amount and kind of country rock mixed up in it. The Clunes ore is fairly clean quartz while that of Bendigo carries a large proportion of included sandstone and slate. Too much of the latter makes slimes and is inimical to successful amalgamation.

The milling practice of Bendigo is likewise simple. Ordinary plate amalgamation is followed by a short length of blanket strakes succeeded by concentrators. The latter are percussion tables of an imperfect type. The concentrates thus obtained go to the "pyrites works" where they are roasted and then either treated by grinding in arrastras or by chlorina-

tion. The Plattner or vat method has given place to that form of the barrel process which goes by the names of Newberry and Vautin. Ordinary reverberatory and mechanical (both revolving cylinders and vertical shaft furnaces) roasters can be seen working side by side. The rate for treatment is £3 or \$15 per load. A "load" of Bendigo pyrites weighs, on an average, 30 cwt.

At the neighboring district of Ballarat much the same conditions prevail. The ores contain an increased amount of sulphides, due to the presence of a little more galena and blende, but in spite of this the percentage remains very small when compared to that of other mining centers in Australia and America.

The stamp mills are very similar* in arrangement to those at Bendigo. The blanket washings are usually treated in Berdams, Prussian tables, which are not self-discharging, are in general use for collecting the pyrites. Frue vanners have been very successfully used at the North Cornish Company's mill, at Daylesford. The concentrates go to chlorination works, using the barrel process.

The three leading milling centers of Victoria, which have just been passed in review, have many features in common, but Clunes is the only one which can show a mill at all completely equipped. There are no rock breakers and no automatic ore feeders in use either in the Bendigo or the Ballarat districts, though at Clunes they were introduced as early as 1865. The absence of these very necessary parts of a complete stamp mill is an evidence of an obstinate disregard of modern progress in milling methods which is as regrettable as it is inexplicable.

In New Zealand, Otago and the Thames, one in the south and the other in the north island, are in strong contrast. The southern province uses methods which originated largely from the experience obtained at Clunes; Gold saving by blankets can be seen contrasted with the more modern plate amalgamation.† The ore carries a noteworthy percentage of pyrite which in many instances is known to lock up value. The not infrequent absence of any attempt at concentration is therefore very noticeable. It is, however, largely explained by the fact that there are no works in the island which treat concentrates, and as a consequence they have to be sent to Australia at a cost in shipping charges, etc., which is almost prohibitory.

Going to the north island we find the reductio ad absurdum of stamp milling in the treatment of the complex gold and silver ores of the Thames district.‡ Here the millstuff carries free gold, native silver, native arsenic, sulphides of silver and of antimony, arsenical pyrite, galena, blende, tellurides of gold and silver and other minerals in great complexity and variety. This material is subjected to stamp milling, followed by blankets whose washings are treated by grinding and amal-

gation in pans. The result of this process is that barely 50% of the values are saved, and the subsequent treatment of the tailings is almost as remunerative as that of the ore itself. This is an instance of the blind disregard of the first axiom of all successful milling, namely, to adapt the process to the ore.

The north island of New Zealand contains many very valuable repositories of the precious metals, but they are too often found locked up in refractory matrices. At Kuastunu, Karangahake, Te Aroha, Waihi, Waiorongomai, Puhī-puhī, Kapanga and other localities with picturesque native (Maori) names, there are ore deposits which have, as yet, baffled the best metallurgical ingenuity. In this mining region, as has been the case elsewhere the wide world over, large and costly plants have been erected before those in charge had proper assurance of the capability of the mine to supply the ore required by the mill, or of the capability of the mill to satisfactorily treat the ore. The handsome concentrating and leaching (cyanide) plant of the Sylvia Company, on Taram Creek, is an instance of the former; and what little now remains of the extensive concentrating and smelting plant of the Te Aroha Gold and Silver Company at Waiorongomai is an example of the latter.

The cyanide process has been struggling here for many years. It was first introduced at the Crown mine, Karangahake, and battled in vain against incompetence and ill luck. At the present time it is being used with varying success at several milling establishments in this region, but in addition to the ordinary difficulties common to new leaching processes it has to bear the incubus of an extortionate royalty.

(To be Continued.)

The Swedish Iron Industry.—For the nine months to September 30th the production of steel and iron in Sweden is reported by the Association of Swedish Ironworkers as follows: Pig iron, 317,170 tons, a decrease of 87%, as compared with 1892.

* See "Engineering and Mining Journal," April 29 and May 6, 1893.

† See "Engineering and Mining Journal," March 11 and 18, 1893.

‡ See "Engineering and Mining Journal," December 3 and 10, 1892.

§ This is a statement made by the writer in the second of the articles referred to in the previous note. It has since been confirmed by careful tests under the direction of a government official. See "Engineering and Mining Journal," June 17, 1893.

* See "Engineering and Mining Journal," January 28th, and February 4th, 1893.

NOTES ON ARIZONA MINES—I. SILVER.

Written for the Engineering and Mining Journal by Dr. Theo. B. Comstock.

Few people realize what a vast and varied area is comprised within the boundaries of Arizona. The ruggedness of the topography is a great surprise to those who have only general knowledge of the existence of the Territory, as such. Superficial information, based upon imperfect tests and a limited page of history, has given erroneous ideas of the resources available and inadequate conceptions of the capabilities of the region as a mining field.

The payment of dividends by a number of mining companies, amounting in the aggregate to many millions of dollars, is offset in the minds of some by what is accepted as fact, the restriction to production set by nature. In other words, Eastern investors are very generally imbued with the idea that Arizona mines are shallow though often exceedingly rich at surface. The latter part of this postulate is correct, but the developments made in even the abandoned mines do not by any means bear out the first part of the statement. The true situation, as I have learned by personal studies in different quarters of the Territory, is decidedly otherwise. The surface ores of certain kinds have given out at the permanent water level; there are some cases of very irregular and uncertain ore bodies and the average grade of precious metal may be less below the oxidized zone in a number of prominent instances. Nevertheless, considering the region as a whole, there are few mining districts which present a more favorable outlook for the business of ore extraction, at least with the conditions of transportation and price of product, what they must be to make mining profitable anywhere.

The exhaustion of the free milling surface ores is frequently supposed to imply the extinction of ore in the mines themselves. Such, however, is very rarely the case. Except in a few erratic veins, the ores continue beyond the water level indefinitely, but, of course, they are not suitable for reduction by the original milling process. The history of Tombstone affords a striking illustration of the enforced adaptation of mining to circumstances, and its present activity in the face of adverse market conditions is a proof of the point I desire to make, that the mining industry in Arizona is not extinct, but that it is being transformed by the logic of circumstances from a milling center to an ore-shipping district, or perhaps, eventually to a smelting center. Many mills are lying idle without hopes of being again put in operation to work ores from the mines for which they were erected. But there is a vital difference between the conditions here and in some other regions where the mills have been failures from the start. Arizona mills have mostly had their day of profitable operation. Perhaps in some instances they have not paid their cost; but more frequently they have returned largely upon the investment properly chargeable to construction. When they were built, the feeding mines were actually producing ore in quality and quantity seeming to justify their establishment. The chief faults in them have been the additions of appliances not required by the free ores, apparently because similar apparatus was used for baser ores in regions from which the models and the operators were imported. The process-monger still thrives upon the credulity of the investor, and by "making mountains out of mole-hills" in metallurgy. About one-half of the money squandered in this way would be saved were it not for the ignorance of both vendor and purchaser regarding the nature of ores and their treatment.

Because the ores in depth are becoming more desirable for smelting, it is not proper to conclude that local smelters, or even those so located as to command a wide range of raw materials, are now demanded by the situation. Arizona is peculiarly placed in this regard, natural mining supplies being less uniformly distributed than in some other areas. Trunk line railroads cross her surface without aiding in the development of her resources as they have done elsewhere. Communication between the north and south is not free as yet, and the grand forests which exist within our borders do not figure in home markets. We import mine timber from Oregon and California, with liberal quantities of excellent quality lying within easy reach of rail facilities in future. The prospect of change in this particular within the year is now next to assurance.

Meanwhile the low price of silver must be responsible for the inactivity of many mines which might be profitably worked under conditions existing ten years ago. There are other reasons for the shutting down of these properties, as has already been stated, but those who are most prone to condemn the quality of the unworked ores have really made no vigorous effort to ascertain their marketable values. Such practical developments as have been made are certainly favorable, and we should have to-day a very large number of good mines if the owners had not been spoiled by the enormous returns from surface ores. As Director of the Arizona School of Mines, I have given much study to the deposits in different parts of the Territory. Without becoming an enthusiast, it is proper to state that the real situation has been a most agreeable surprise. The too general impression in the East, which I had also imbibed with my ideas of the geology of this region, is that the ore deposits of the country are almost wholly superficial, or that they occur in pockets or caverns in limestone, as contact veins. Without examination on the spot, the history of some important enterprises might lend color to this notion. But again, the very careful consideration of numerous other mines, not on paper, but in the records of shafts and drifts as they stand affords proof conclusive that the surface conditions are almost invariably results of secondary action upon deeper seated ore bodies, and what is more to the point from a business outlook, the deeper seated ore bodies themselves do exist and are vulnerable to attacks from skilled operators. The surface deposits, already worked out in many instances, were so easy to treat and withal so fabulously rich,

that dividends were possible without due regard to skillful mining or milling. It has, therefore, become a habit to seek similar deposits, and many which in other regions would be regarded as workable veins have been abandoned as soon as non-milling ores and the necessity for pumping have become evident.

There are causes for the stagnant condition of other Arizona enterprises, which are not as often the fault of ores and veins as many have been led to believe. Certain plants are idle chiefly because some one or another person has been scheming to "freeze out" his fellow stockholders. This is a calamity which always reflects upon legitimate mining, but not with justice. Some enterprises have failed or will fail by reason of ignorance of the art of metallurgy on the part of projectors. This is a calamity also which reflects upon legitimate industry, but without strict justice. Some schemes have proved disastrous to investors for want of intelligent study of the business situation, leading to efforts to accomplish great things with meagre capital, or to reduce ores where the trade conditions are unfavorable, or to force one process to work all ores or such as are not adapted to the method selected. These failures are calamities which, unfortunately, hurt the rational business of mining, but not justly so. Besides, in these respects Arizona has not been a sinner above other States and Territories, nor have her citizens been more credulous or less sensible than those who have invested unwisely either without competent advice or in opposition to its edicts. There will continue to be wonderful "strikes" in this Territory, and nothing that wisdom and experience can dictate will be of any avail in stopping the reckless squandering of money in bonanza mines from mere surface indications. I am merely saying that there are very many better investments in strictly business propositions and that the veins are not what they have often been reported from hasty observation or careless working.

It is unprofitable now to write much of our silver mines, although we have not a few which could be made to pay something above expenses were facilities available for cheap transportation or for near-by reduction. It may serve to point most forcibly my moral and the moral of my past correspondence with the "Journal," to record the history, in part, of one group of mines in the very district which has undeservedly given the "black eye" to our mining industry. The Tombstone Mill and Mining Company had a "bonanza" record. Its first dividend period closed April, 1892, after pouring \$1,250,000 into the coffers of its stockholders, of which about \$200,000 is reported to have been advanced by the sanguine directors to tide over an epoch of reduced reduction, and of natural change in quality of the ore in depth. My present purpose does not require an explicit statement nor an explanation of other periods of this company's history; but its local agents have been remarkable for one important faculty, that of adapting themselves to circumstances. This, in my opinion, is the one saving quality of the true successful engineer. So it has come to pass that, as the conditions have changed, the Tombstone Company has several times altered its methods of marketing ore, until now it is shipping the product to the smelters. And, in spite of all the discouragements which have practically ruined the silver mining industry in Arizona, Mr. W. F. Staunton, the superintendent, is still making small gains by the exercise of economy and business sense, guided by engineering knowledge. We have other instances in Arizona of the value and necessity of the trained mining engineer's work, the history of the Silver King and the Phoenix mines standing out prominently as two among many examples which might be given. Arizona has abundant stores of silver ore readily accessible, and in large part associated with lead. Heretofore, a notable percentage of our gold product has come from the same source, and the free-milling and sulphureted gold ores have been practically neglected. It has been marvelous to me that the extensive resources of this character which we possess have not been further developed. But the discussion of the subject must be left to another article. The depression in the silver market has had the effect of directing attention to the matter, and interesting results are soon to follow.

Iron and Steel in Shipbuilding.—It would appear that the advance in the use of steel for shipbuilding has continued during the last few months of dullness, says the London "Engineer," and now there is in the returns an almost exclusive use of steel by some of the largest users. For instance, of the three firms which stood at the head of the builders in Great Britain for last year, the return shows that out of 60 vessels built in the yards of these firms, steam and sailing, every one is recorded as built of steel. The tonnage so returned was over 162,000 tons. But at the same time a few vessels of moderate size continue to be built of iron; and it is certain that there are still some shipowners who believe that corrosion is most marked in the case of steel steamers, and that for some trades a liberal use of iron in construction is essential. In one or two instances it may be believed that there are grounds for the opinion that at least in parts of steamers iron has its use, and will continue there to be preferred to steel. But we are gaining experience with the latter material daily, and we should be able soon to define the quality and temper of the metal that is best adapted for various uses, and especially for use in different parts of the vessels where there are varying tests of endurance during the life of the vessel. The cheapness of steel may be a danger, for it is evident that the price is now so low that there can be very little profit to the manufacturers, except where the production is enormous; and the limited profit is found too often to point to attempts either to use an undue proportion of too cheap material, or what is even worse, to lessen the amount of the work that is put into the metal. There is now so large a fleet of merchant vessels built of steel, that a complete test is being afforded of its power not only of standing stress and strains of all kinds, but also to endure the corrosive effect that the sea is found to have.

TREATMENT OF GALENA ORE IN JOPLIN MO.

Written for the Engineering and Mining Journal by C. V. Petraeus.

The Picher Lead Company treats the high grade lead ores (Galena) of Southwest Missouri and Southeast Kansas in a special manner so as to produce partially metallic lead and partially a white pigment. "Sublimed White Lead" The details of the treatment are described in Hofman's "Metallurgy of Lead." The process consists in a treatment of the lead ore in a modified Scotch hearth (the Moffet ore-hearth) which produces in pig lead about 60% of the lead in the ore, and a large quantity of a rich lead slag and lead fumes, the latter being thoroughly condensed in a bag condenser.

The reasons for this treatment is to produce a material poorer in sulphur than the original ore, and more suitable for the particular pigment furnace used. The slag and fumes, together with considerable second-grade ore of this district, are there treated by the Lewis-Bartlett process in the pigment furnaces, which are water-jacketed low cupola blast furnaces. The charge of lead material and coke with certain fluxes produces in these furnaces a portion of metallic lead and a large quantity of the lead or sulphide of lead volatilizes. The vapors are oxidized and form a pigment which is drawn by a fan through conducting pipes into a bag condenser, and from this it is packed in barrels containing 500 lbs. and shipped to the paint grinders. This sublimed white lead consists mainly of an amorphous sulphate and oxide of lead incidentally containing from 4% to 5% oxide of zinc, the latter caused by some zinc ore associated with the lead ore of this district. The Picher Lead Company does not attempt to eliminate the small per cent. of zinc, as it is not detrimental to the quality of the pigment. The sublimed white lead serves as an admirable basis for a paint, either in a pure state or in mixed paints, and serves better than any other lead material in the manufacture of rubber goods.

It is claimed, all the properties of corroded white lead; it covers as well as the paint, does not crack nor peel white; its texture is more firm and the painted surface becomes much smoother, and it is claimed, will outlast any other lead paint. It is also less noxious and is not discolored by fumes or by heat.

The paint manufactured from this sublimed white lead is in such demand that it has been necessary for the Picher Lead Company to increase its production to meet the demand. In 1890 the production was 3,500,000 lbs., in 1893 it was 8,000,000 lbs., and a further increase is prepared for by changes in the mode of working the ore.

LITHOGRAPHIC STORE IN ARIZONA.

Written for the Engineering and Mining Journal by John F. Blandy.

Lithographic stone has been found at several places in Arizona, but I have seen samples from only one that I considered of value. This quarry is situated on the east slope of the Verde Range, about two miles south of Squaw Peak; elevation 4,200 ft. above tide and about 1,200 ft. above the Verde Valley and river, $\frac{3}{8}$ mile due east of Prescott, and about 40 miles by wagon road. Geologically the strata are in the Upper Carboniferous, a few hundred feet below the upper strata visible at that place. This formation caps this range from a point a short distance north of Jerome (United Verde copper mines), southward to a point a few miles south of Squaw Peak, a distance of over 30 miles. The carboniferous strata are much broken, but are not shown much out of a horizontal position. The highest point of the range, on the Black Hills, reaches an elevation of 7,400 ft. above tide.

Two quarries have been opened in the same strata about 1,000 ft. apart, and the belt is easily traced from one opening to the other, and for some distance in either direction beyond. At the two points they do not, however, retain the same thickness. At the eastern opening two layers, each between 3 and 4 ft. in thickness, have been exposed and in the other three, the bottom one 3 ft. middle 10 ft., and upper one 8 ft. At the first opening the upper layer has not been stripped, so I cannot say whether a third layer exists there or not. The exposures are in a very steep mountain side, about 350 ft. above the bottom of the side gulch or canyon. The quality or grain of the several bands varies very little, and the shale varies slightly. To an unskilled eye very little difference would be noticed. The layers have been but little affected by weathering; in fact, it may be said that the only influence has been to separate the layer by vertical cracks into blocks of varying lengths. There are no horizontal lines visible in the blocks.

No doubt when they have gone further under the cover of the hill these weather cracks will disappear, and longer stones will be obtained. At present these vertical cracks are from 1 ft. to 4 and 5 ft. apart in the narrow strata, and from 4 to 6 ft. apart in the thicker beds. Much stone has been broken up into fragments in the attempt to get it into slabs, which cannot be done owing to the very conchoidal nature of the fractures. A good water-power can be had in the gulch below the quarry, and saws could be placed immediately at the quarry. Probably a large percentage of the stone could be utilized.

So far very little of the stone has been sent away, and that only to advertise it, and in small pieces of 10 to 15 in. face. Large pieces could have been sent but for the extreme difficulty of bringing or packing large blocks from such an inaccessible place. The owners and discoverers have not had the means requisite to build a road about four miles long over the mountain from the west side, which will be necessary before active work can be done. I have not yet obtained an analysis of it.

Many samples of this stone have been tested by well known lithographers, who have spoken highly of its qualities, some pronouncing it equal to the Bavarian. I have seen specimens of printing and engraving done with it which are excellent. Upon one specimen I counted 120 lines of shading to the inch, every line being fine and clear and without a blot between them. When the quarries are properly opened I am satisfied that stones of 6 and 8 ft. square will be obtained, and of any requisite thickness. As it is not a question of quantity or kind I think I can look forward to the time when this stone will be a profitable product of the Territory. Many samples have been brought in from other localities—I do not know whether from the same strata or formation—but all those which I have seen have been defective in general character, or else only good in spots and giving but small pieces of fine grain.

ABSTRACTS OF OFFICIAL REPORTS.

NEW CENTRAL COAL COMPANY, MARYLAND.

The company's report for the year ending December 31st, 1893, shows that during the year it mined 223,506 tons, an increase of 22,075 tons, or 10.9%, over 1892. The receipts for the year on coal account were \$535,388, an average of \$2.39 per ton. Adding \$10,553, value of coal on hand, the total receipts were \$545,941. The payments for mining, freight and other charges were \$505,597 (or \$2.26 per ton), leaving \$40,344 as profit for the year. To this is to be added \$211,062 balance at the opening of the year, making a total of \$251,406. Deductions are: \$13,140, charged off for depreciation, etc., and \$50,000 dividends paid, a total of \$63,140, leaving the balance at the close of the year, \$188,266. The dividends paid were 1% on the stock.

DELAWARE AND HUDSON CANAL COMPANY.

This company has issued a brief preliminary statement of its operations for the year ending December 31st. The statement for 1893 compares with that for 1892 as follows:

	1892	1893	Change
Receipts from coal	\$949,223	\$979,647	Inc. \$30,424
" railroads	10,306,141	10,912,113	Inc. 605,812
Miscellaneous	42,761	520, 58	Inc. 477,817
Total receipts	\$9,998,125	\$12,812,318	Inc. \$2,814,193
Operating expenses	13,977,757	14,950,131	Inc. 972,374
Net earnings	\$5,467,784	\$6,679,186	Inc. \$1,211,402
Interest and rentals	3,425,370	3,407,438	Dec. 17,932
Balance	\$1,955,464	\$3,214,543	Inc. \$1,259,079

The balance for 1893 amounted to 10.7% on the stock. The dividends paid were 7%, the balance being carried to surplus account.

The company mined during 1893 a total of 4,467,346 tons of coal. In addition to this it transported over its railroad lines for other parties 1,710,313 tons, making a total of 6,177,659 tons of coal brought to market.

DELAWARE, LACKAWANNA & WESTERN RAILROAD COMPANY.

The brief report issued by this company contains only a statement of its gross earnings and expenses, not distinguishing those derived from its railroad lines from those of the canal properties. For this reason it presents little interest, except as it shows the net results obtained. The report for the year ending December 31st shows the total liabilities as follows: Stock, \$26,200,000; funded debt, \$3,667,000; surplus account, \$18,002,418; total, \$47,269,418. The assets, as stated, are: Railroads, coal lands, etc., \$34,340,522; stocks and bonds owned, \$9,519,689; materials and fuel on hand, \$1,603,568; surplus of current assets over current liabilities, \$1,745,630; total, \$47,269,418. The current assets include coal on hand valued at \$1,542,816. The earnings for the year compare with those of 1892 as follows:

	1892	1893	Change
Gross receipts	\$14,226,223	\$13,771,973	Dec. \$454,250
Total expenses	38,243,420	40,537,372	Inc. 2,294,152
Net receipts	\$7,079,643	\$8,352,470	Inc. \$1,272,827
Interest and rentals	5,363,406	5,350,499	Dec. 13,147
Surplus	\$2,616,237	\$2,999,971	Inc. \$383,734

The surplus in 1893 amounted to 11.04% on the stock, against 9.08% in 1892. The dividends paid last year were 7%, or \$1,834,000, leaving a balance of \$1,058,911 to be added to surplus account.

British Iron and Steel Trade.—The exports of iron and steel from Great Britain in 1893 were 2,884,979 tons (of 2,240 lbs.), an increase of 144,062 tons, or 5.3%, over 1892. The exports were made up as follows: Pig iron, 839,869 tons; rails, 558,826 tons; hoops, sheets and plates, 195,370 tons; bars, angles and rods, 148,931 tons; iron, cast or wrought, 280,578 tons; steel, unwrought, 169,764 tons; tinplates, 370,233 tons; wire, 37,137 tons; old iron, 118,551 tons; manufactures of iron and steel, 18,531 tons.

Imports of iron and steel in 1893 were 207,773 tons, a decrease of 3,584 tons, or 1.7%, from 1892. The imports of iron ore in 1893 were 4,065,863 tons, being 287,210 tons, or 7.6%, greater than in 1892.

Warships Launched in 1893.—The warships, exclusive of torpedo-boats, launched during the year 1893 for the various navies, with their tonnage and estimated speed, were as follows, according to "Engineering": Argentine Republic: Gun-vessel, 1,183 tons, 18 knots. Austria-Hungary: Protected cruiser, 5,100 tons, 19 knots; gun-vessel, 500 tons, 20.5 knots. Brazil (purchased from Schichau, of Elbing): Five torpedo-boat destroyers, 190 tons, 26 knots. Chili: Protected cruiser, 4,400 tons, 23 knots. China: Protected cruiser, 1,040 tons, 16 knots. Denmark: Torpedo-boat destroyers, each 120 tons, 20 knots. France: First-class battleships—"Charles Martel," 11,800 tons, 17.5 knots; "Jaureguiberry," 11,820 tons, 18 knots; second-class battleship for coast defence, "Trehouart," 6,610 tons, 17 knots; armored cruiser, "Charner," 4,750 tons, 19 knots; protected cruisers—"Bugeaud," 3,720 tons, 19.5 knots; "Chasseloup Laubat," 3,720 tons, 19.5 knots; "Friant," 3,720 tons, 19.5 knots; "Suehet," 3,430 tons, 20 knots; gun-vessels—"D'Herbville," 925 tons, 21.5 knots; "Fleurbaey," 1,310 tons, 17 knots; torpedo-boat destroyers—"Lansquenec," 138 tons, 26 knots; "Archer," 120 tons, 20.5 knots; "Mousquetiere," 125 tons, 24.7 knots. Germany: Protected cruiser, 5,000 tons, 20 knots. Italy: Protected cruiser, 2,245 tons, 18.5 knots. Russia: First-class battleship, 12,000 tons, 17.5 knots; third-class battleship for coast defence, 4,126 tons, 16 knots; gun-vessels, three each, 400 tons, 21 knots. United States: First-class battleships—"Indiana," "Massachusetts," and "Oregon," each 10,200 tons, 16.2 knots; ram cruiser, "Katahdin," 2,100 tons, 17 knots; protected cruiser, "Minneapolis," 7,350 tons, 21 knots. Hayti: Gunboats, two each 200 tons, 14 knots. The total warship tonnage launched by each of the more active naval powers was thus: France, 52,188; United States, 40,050; Great Britain, 28,020; Russia, 17,326.

AN INDICATOR FOR ELECTRIC PLANTS.

With the great use of alternating current machines and with our modern ideas of central station practice, it is frequently desirable to run alternators—single-phase and polyphase machines—in parallel. Although alternators have not hitherto been run in parallel as a general thing on this side, the practice is not infrequent in Europe, where it has been made the subject of much study. The operation of alternators in parallel is, however, receiving more attention here, and a device to indicate in the most delicate, yet effective manner the exact point of synchronism in speed and the coincidence of phase of two alternators has become a necessity. The requirement is met by the acoustic synchronizer, which the General Electric Company has recently brought out, and which is shown in Fig. 1. It

precipitation. It was a development in his own field of acoustics and showed how electricity and acoustics could work together for scientific benefit.

One of the latest, the three-phase power transmission plant, was installed by the General Electric Company, at Redlands, Cal. Fig. 2 shows the switchboard fitted up with its different regulating and controlling apparatus. The synchronizer, which the irreverent Californians have labeled the "growler," is shown in the upper left hand portion of the board. Its operation is perfect and it has not been known to fail in its functions even once.

Gold Mining in England.—Endeavors continue to be made to revive gold mining in the British Islands. One of the most energetic

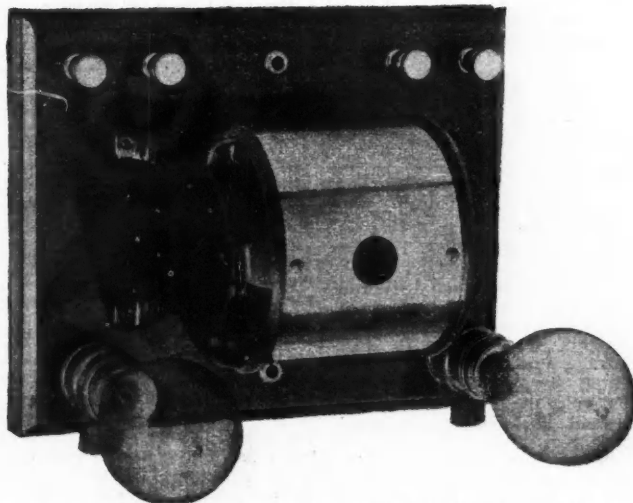


FIG. 1.—ACOUSTIC SYNCHRONIZER FOR ELECTRIC ALTERNATORS.

consists merely of a cylindrical iron case with an aperture in the side, each end being closed by flexible diaphragms, each of which has opposite its center the pole of an electromagnet. In using this device one of the magnets is connected in circuit through a transformer with each of the machines to be run in synchronism. The current is then turned into the magnet coils, and the diaphragms emit a loud clear note. As the machines approach synchronism, the notes from the diaphragms approach closer in period and begin that loud, periodic sound, known in music as beats. As the two machines

supporters of the schemes for working the gold veins in Wales and Ireland is Mr. Molloy, M. P., who is well known in connection with the development of the South African mines, and whose name is identified with a gold extraction process. Mr. Molloy is indefatigable in trying to induce the government to allow the opening up of the mines on the Crown lands in Wales, and he is continually urging the officials, both privately and publicly, to take the matter up in earnest. In reply to one of his questions in the House of Commons, the Chancellor of the Exchequer stated that during the past

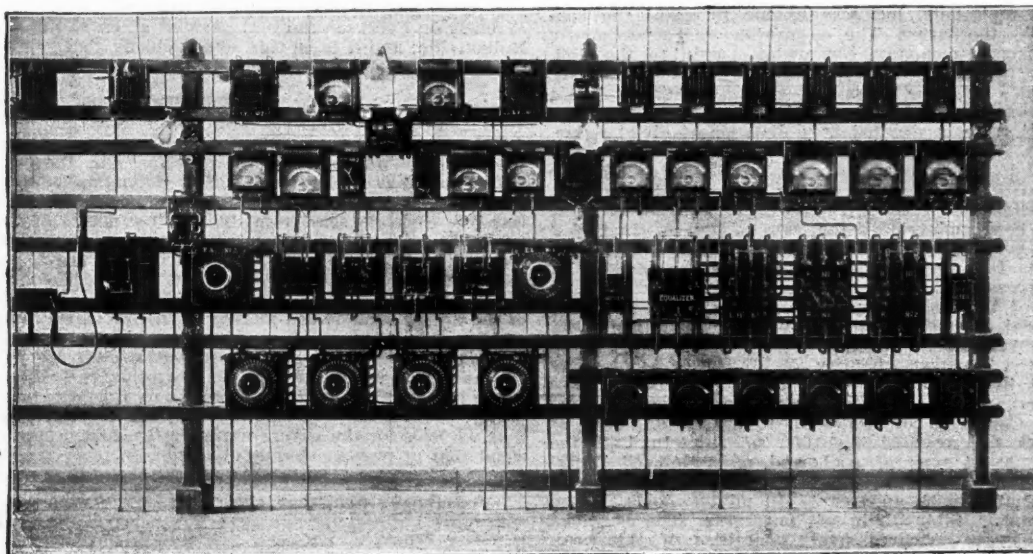


FIG. 2.—SWITCHBOARD FOR ELECTRIC PLANT AT REDLANDS, CAL.

more nearly approach synchronous speed, the beats grow slower and slower, until finally the diaphragms fall into unison and each gives out the same low, clear note. At this moment, which is sharply marked, the switch connecting the two machines should be thrown in. So sensitive and distinct is the indication of approach of synchronism, that it is impossible to throw two machines together with hardly a quiver upon the ammeter in actual circuit.

The superiority of this acoustic apparatus over the old phase lamp device cannot be disputed. It is much more sensitive, indicating distinctly the small differences from synchronism which the phase lamp fails to detect. The synchronizer was shown by the General Electric Company in its power and mining department at the Chicago Exposition, where it attracted considerable attention, especially from foreign electricians. When it was shown to Professor Von Helmholtz and its operation explained, he expressed his ap-

20 years 43,600 tons of ore had been crushed in North Wales, yielding 23,716 oz. of gold, and that during 1893 there were 4,300 tons crushed, the contents of which were not at present known. The average yield has therefore been about 11 dwts. per ton. The government expresses its willingness to carefully consider definite proposals to work the fields, and to all appearance it is more favorably disposed toward the work than in previous years when every obstacle was put in the way of the miner. It is a generally accepted fact that agriculture is not a profitable business in Great Britain and that it is still rapidly declining. Any other possible source of income to be derived from the land should therefore be gladly received. It is commonly said that in Great Britain the only profit out of land in agricultural districts is derived from the rent paid by advertisers for the accommodation of their hideous erections along the routes of railroads and at the sides of the highway.

THE MINING INDUSTRY OF BULGARIA.

At the first Bulgarian Agricultural Industrial Exhibition, which was inaugurated at Philippopolis by Prince Ferdinand on August 27, 1892, a small building was provided by the government to contain specimens of the various stones and minerals found in the country. The only mine worked with any success is the coal mine of Pernik, which yields annually about 17,000 tons of inferior coal. A large block of this, weighing between three and four tons, was exhibited and virtually represented the mining industry of the country; for though iron is extracted in the neighborhood of Samakov, the expenses of working are so great that imported iron can be bought cheaper, and the workings are gradually being abandoned. Bulgaria is said, however, to be rich in minerals of various kinds, and has not yet been thoroughly prospected.

Many of the specimens of marble and other stones were remarkably fine, but the quarries are, for the most part, at too great a distance from a railroad to be worked at a profit. Deficient means of transport, want of fuel and lack of capital combine to render the development of the mining industry of Bulgaria a matter of considerable difficulty for some time to come.

MINERAL RESOURCES OF SERBIA.

A recent British consular report says that there are in Serbia at present six large groups of mines under State management: 1. That of Maidanpek, which was known to the ancient Romans, and on which it is estimated that about \$1,200,000 were expended between 1847 and 1855 without any return. British and French companies have turned their attention to this mine with equal ill-success. Servian efforts have hitherto been confined to the extraction of copper, with such small quantities of iron as may have been required for the arsenal at Kragujevatz. A new manager has lately been appointed, and it is stated that the prospects of the undertaking are more favorable.

2. The coal mine at Senie was discovered in 1853, and a small supply of coal sent the following year to Kragujevatz. As far as is known the coal area covers a tract of country 30 km. long by 12 km. broad. The mineral is described as excellent and abundant, and as making good coke. The mine has been placed, at a cost of over \$300,000, in connection with the main Servian railway line at Tchupria, by a line of rail between 20 and 30 km. long. Arrangements have been made for the output of coal in sufficient quantities not only for the supply of the State railways, but also for private consumption. As a large proportion of the coal hitherto employed on the railway has been purchased abroad, the development of this mine should prove a source of considerable saving to the country.

3. The lead and silver mines at Kosmaj show the existence of very extensive remains of Roman and Austrian works. Owing to the rude conditions under which the ore was then extracted, rich quantities of mineral still remain in the debris which was cast aside after smelting. The Servian Government in 1877 offered this ore for sale to certain capitalists, but was unable to grant the conditions demanded by the latter. The enterprise was subsequently taken over by a private company, but owing partly to the difficulties of transport caused by the badness of the roads was shortly abandoned. Some two or three years ago the Skupstina voted a sum of \$16,000 for explorations in these mines.

4. The Alexar coal mine is situated at a distance of about 6 km. from Brza Palanka. Some \$3,000 have been expended on experimental cuttings, and the prospects of the mine are said to be favorable.

5. The Podrina mines of antimony, lead, zinc and lithographic stone have hitherto been undeveloped for want of means. In 1891 a sum of \$22,560 was spent upon them, and lead ore was extracted to the value of \$17,500. It is estimated that the proper development of these mines will necessitate an expenditure of \$110,000.

6. The coal mine of Misach is now being explored.

The amount of coal extracted from the various government and private mines in 1891 amounted to 100,263 tons, to which the Senie mine contributed the greatest quantity—58,769 tons. Among the coal mines worked by companies or private capitalists the best known is that of Vrska Chuka. This property is in the hands of the Servian Industrial Company, of Brussels. It covers an area of 262 mining fields (a mining field is 10,000 sq. m.). In 1891 the company extracted 20,434 tons of coal, and manufactured 20,293 tons of briquettes. These are chiefly used on the lower Danube. The Dobra Sretcha mine, with an area of 10 mining fields, is the property of Mr. Stephen Sibinovitch, of Knajevatz. The barracks and forges of Knajevatz consume small quantities of this coal, which is also sold at Nisch and Kragujevatz. The mineral is easily separated by hand from a very rich oil shale, with which it is found combined, and which apparently contains great reserves of wealth for future development. The Podvis mine is, like the former, situated near Knajevatz, and consists of 24 mining fields. Two galleries were cut into this mine in 1890 to a total length of 750 m.

Like all the mines situated in the Timok Valley the fortune of the Timok mine hangs upon the eventual construction of a line of railway from the Danube to Nisch, or to some other point of junction with the Servian main line. The Kamenatz lignite mine belongs to Messrs. Baillon & Sons. The Alexander lignite mine is worked by the Pojarevatz company. This mine is situated at a distance of only 3 km. from the Danube. The Kraljevatz mine, belonging to Mr. Apel of Alexinatz, and Dr. Djoka Dimitrijevitich, of Belgrade, is very rich in oil shale, and has been the object of attention on the part of British capitalists, to whom a concession for the extraction of paraffine was granted. The enterprise, however, was not prosecuted, and the concession lapsed. The mine is at a short distance from the town of Alexinatz, and within easy reach of the main

railway line. The Kostolatz lignite mine lies close to the Danube, where docks have been constructed for the shipping of the mineral direct from the mining wagons. In the Sisevatz-Vrchitch mine preliminary surface work only has been undertaken. The coal is described as of fairly good quality. The mine is situated close to the main road, and could be easily placed in connection with the new Senie Railway by a short line of from 5 to 6 km. The Sikole mine and the Jeklov are both in the hands of Belgrade concessionaires. The coal is in the tertiary formation. The Dobranski mine was taken over by Mr. Ozerovitch, of Belgrade, in 1887. The coal is in the lias formation. The property lies on the Danube, opposite the Hungarian mine at Drenka. This coal is of so friable a nature that it will be necessary, for commercial purposes, to manufacture it into briquettes. Experiments in this direction have already been made.

The total area of private coal mines in Serbia in 1891 was 964 mining fields; 876 workmen were employed in coal mining, and 600 workmen in other mines—in all 1,476 miners.

THE BULLIONVILLE AND FERGUSON DISTRICTS IN NEVADA.

Written for the Engineering and Mining Journal by W. S. Godbe.

Some three years ago, under the impetus given by the advance in silver and the hopeful outlook consequent thereon, over a quarter of a million dollars was expended by the Pioche Consolidated Company for a smelting plant and a narrow gauge railroad connecting the same with the principal mines in the district. This expenditure, in view of the expected completion of the Union Pacific to Pioche, seemed, and undoubtedly was, at that time abundantly justified, but now, with but little prospect of railroad communication, and with silver utterly demoralized, it is not strange that the company should be not only disappointed but discouraged, since it is impossible to work the mines except at a loss. Everything, therefore, is now practically shut down at Pioche, and that once flourishing town has taken on a look of desolation. It is true that a certain amount of work is being done under leases, particularly in the Yuba, Mazeppa and Poorman, the miners themselves taking their pay mostly in "tribute" instead of wages. In this way the wolf is kept from the door from a limited number who otherwise would suffer with the rest. The output from these mines, however, is necessarily confined to first-class, or such ore as will pay to send by wagon over 100 miles to Milford, and thence by rail to the Salt Lake smelters, as the second-class material, at present prices, will not pay to ship or mill on the ground.

At Bullionville, it will be remembered that the extensive reduction works, costing about \$250,000, were completely destroyed by fire last summer. We have since succeeded in putting up a section of a new chloridizing and amalgamating plant—practically fireproof—for treating the old Raymond & Ely and the Meadow Valley tailings. These tailings, aggregating nearly 150,000 tons and containing from 10 to 16 ozs. silver and \$3 gold per ton, being the result of raw amalgamation only, can be readily chloridized with salt in the usual way and then amalgamated. Preparation is likewise being made to work custom ores, particularly the richer gold ores from the new Monkey Wrench, or Ferguson district, situated about 45 miles southwest from Bullionville; and it is on this source chiefly that reliance is placed for the success of the undertaking, at least until something shall be done for silver.

The Ferguson District, although still in the incipient stage of development, gives abundant promise of becoming a great gold producer. Large shipments of gold quartz are now being steadily made by teams to Milford, 150 miles distant, and thence by rail to Salt Lake, the proceeds of which, after deducting hauling and smelting charges, still leaves a margin of profits to the mine owners. The last few carloads sent from the Monitor netted at the mine \$75 per ton. The quantity of second-class ore already uncovered, carrying from \$20 to \$60 gold per ton, is undoubtedly great, and with suitable milling facilities at or near the mine, would yield large returns. The opportunity for the district now is to secure the largest and richest of the mines, such as the Monitor, Jimcrow, April Fool and Magnolia, and provide adequate means for the cheap transportation and reduction of their ores, which the present owners are unable to do. An 80-stamp modern mill would not be too large to begin with, the returns from which would be such as to warrant more of similar capacity. The district is entirely new and very extensive. It is there that we look for the silver or rather the golden "lining" to the dark cloud that at present obscures our horizon.

RECENT DECISIONS AFFECTING THE MINING INDUSTRY.

United States Supreme Court.

Construction of Mining Lease.

A provision in a mining lease that if the specified royalties produce less than \$1,000 for any year the lessees shall nevertheless pay that sum, and that if they fail to do so because of inability to find sufficient ores, the lessor may terminate the lease, requires payment of at least \$1,000 per year, whether sufficient ores can be found or not, so long as the lease is not terminated.—Lehigh Zinc & Iron Company vs. Bamford.

United States Circuit Court, District of Nevada.

When Relocations of Mining Claims Cannot Be Made.

Mining claims are not open to relocation until the rights of the former locator have come to an end. No relocater of a mining claim can avail himself of the mineral in the public land, which another has discovered until the prior locator has in fact abandoned the ground, or, under the provisions of the mining law, has forfeited his right thereto.—Book vs. Justice Mining Company. 58 Fed. Rep.

Value of Expert Testimony as to What Constitutes a Vein or Lode.

The value of the testimony of experts as to what constitutes a vein or lode depends to a great extent upon the strength or weakness of the reasons given in support of the conclusions reached. An expert witness testified that he would not call any discovery or rock bearing mineral a vein or lode, unless gold or silver was found in sufficient quantities to pay all the expenses of extracting, removing, and milling the ore therefrom, and leave a profit to the owner. The statute is not susceptible of any such construction. The words "vein or lode" as used in the United States Statutes, and as understood by miners, are applicable to any body or belt of mineralized rock lying within clearly defined boundaries, separating it from the country or no mineral rock.—Book vs. Justice Mining Company. 58 Fed. Rep.

Supreme Court of Appeals of West Virginia.
Liability for Presence of Gas in Mine.

It is the duty of the operator of every coal mine to provide ample means of ventilation, and to cause air to be circulated through the headings and working places, so as to dilute, render harmless, and carry off dangerous and noxious gas if known to exist, or if liable to exist. It is also his duty to employ a competent mining boss to keep careful watch over the ventilating apparatus and the airways, traveling ways, pumps and drainage, and to see that proper breakthroughs are made, as required by law, and that all loose coal, slate or rock overhead in the working places and along the haulways be removed or carefully secured, so as to prevent danger to persons employed in the mine, and to provide props and timbers for the mine, and perform other duties required of him by law. Omission of these duties is negligence in the operator, and renders him liable to his employe for injury resulting from such omission of duty. While the general rule of law is that an employe, knowing of defects in machinery, appliances, or in his working place, and still continuing in service, assumes risks, and cannot recover from his employer damages for injury arising from such defects, yet the rule is not without exception. Mere continuance in service with such knowledge is not by itself considered negligence in the employe. He need not stop work in every instance of knowledge of a defect, but may run some risk by continuing service, provided the defects are not plainly dangerous, or are not such as ought to induce a prudent, careful man to believe that accident would likely ensue, and that, looking to his safety, he ought not to continue the work. Where an employe knows of defects in machinery, appliances or his working place, and is by words, acts or conduct of his employer lulled into a sense of security, and continues in service, and is injured by reason of such defects, he is not precluded thereby from recovery of damages from his employer, if the danger is not so plain and obvious that a prudent, careful man, anxious for his safety, ought not to risk it.—Graham vs. Newburg Orrel Coal & Coke Company.

Proposed Changes in the Patent Law.—House bill No. 5,014, now under consideration by the Committee on Patents of the House of Representatives, contains some new provisions affecting holders of patents. The important sections of the bill are the following:

"No person shall be debarred from receiving a patent for his invention or discovery, nor shall any patent be declared invalid by reason of its having been patented or caused to be patented in a foreign country less than two years prior to the application for a patent on the same invention in this country, but every such patent hereafter granted shall be limited in duration to the term of 17 years from the time when the earliest foreign patent commences to run.

"That Section 4921 of the Revised Statutes be amended by adding the following: but hereafter, whenever a patent is alleged to be infringed, patentee or his representatives shall seek remedy by bringing suit against manufacturer or vendor of the article alleged to infringe said patent, and shall in no case bring suit against any individual who shall have purchased, in good faith, article of a regular dealer in the open market for his own use until the patent has been sustained by the court; provided, that such individual purchaser shall give to patentee or his representative, at his request, the name and residence of the party from whom said article was purchased; and where the damage so claimed is less than \$50, plaintiff shall pay costs of suits of both defendant and plaintiff; and, provided, also that this exemption from liability of individual purchasers shall not apply to any corporation or party as to any patented machine or process made or used by them. Actions at law or suits in equity for infringements of patent rights may be brought where the infringement occurs, whether defendant be domiciled therein or elsewhere."

A Novel Railroad Ferry.—At the last meeting of the Engineers' Association of the South Mr. Hunter McDonald gave an interesting account of the Hobbs Island car ferry, on one of the lines of the Nashville, Chattanooga & St. Louis Railroad. Hobbs Island and Guntersville, Ala., are 20 miles apart, on opposite banks of the Tennessee River. This gap is closed by the Hobbs Island transfer. The transfer plant consists of two stern-wheel steamboats, of 40 and 90 tons burden, and two double-track barges, one for four and the other for six cars; the lighter boat conveys the passengers and the other, with the barges, the freight. The time between Hobbs Island and Guntersville is two hours for the passenger boat and 2½ hours for the freight. At each of the termini is an incline, at the foot of which is a cradle, movable along the incline, so the cars can be run upon the barges at all stages of the water. The river has a rise and fall of 40 ft. at Hobbs Island and 47 ft. at Guntersville. The inclines are a 3½% grade, on earth fill, pile trestle, riprap bank, and at the bottom a crib, where the nature of the river bed prevented driving

piles. The incline at Guntersville is, in part, on a 10° curve. The cribs are built of 12 x 12 in. timbers, layers of 12 ft. lengths (8 ft. centers) crossing layers of 25 ft. lengths (3-ft. centers), all drift bolted. These cribs were loaded with stone, then capped by 12 x 12 in. stringers, laid to grades and bearing the 8 x 9 x 10 ft. ties, doweled, the rails and the 5 x 9 in. guard-rails. The cradle at Guntersville is novel, in that it is constructed to move on a 10° curve, as well as on a tangent. It consists of eight sections on wheels and two on slides, each about 16 ft. long, the first section carrying a 20-ft. apron and the last a feather rail. The sections are not rigidly connected, but by a bolt, allowing about 5 in. play. The rails are laid with opposite joints, spiked only at the joints and held together by tiebars. The rails outside on the curves are 1½ in. longer than those on the inside; on tangent the openings thus formed between the shorter rails are each filled by a short section of rail inserted and held by a split key passing through its web and the splice plates. The bolt holes in the rails are slotted. The cradle at Hobbs Island is on a tangent. The cradles are moved along the incline by a locomotive or a steamboat. The connection between the apron and the barge is unusual. The ends of the rails on the apron are turned outward at about 30° at the junction, while the rails on the barge are at the end, beveled at the same angle. The latter are held together by five tie-rods, the one nearest the beveled ends having a turnbuckle. Just back of this rod a lever is arranged to lift the beveled rails clear of the apron, till the windlass has drawn the nose on the barge into the V on the apron, the gauge having been lessened by the turnbuckle. Then the beveled rails are lowered into place and the gauge restored by the turnbuckle, making the rails continuous from the barge to the cradle. The cost of the steamboats and barges was \$30,368; that of the crib and cradle at Hobbs Island \$4,343 and \$887, respectively, and at Guntersville \$3,045 and \$961, respectively.

PATENTS GRANTED BY THE UNITED STATES PATENT OFFICE.

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

TUESDAY, JANUARY 23d, 1894.

- 513,070. Smoke-Consuming Furnace. Ira W. Beckwith, Hayes Centre, Neb.
- 513,082. Hoisting and Conveying Machine. Daniel L. Calhoun, Chicago, Ill., Assignor to Clara S. Calhoun, same place.
- 513,084. Intercepting Valve. Byron B. Carter, Chicago, Ill., Assignor to the M. C. Bullock Manufacturing Company, same place.
- 513,098. Method of and Apparatus for Mixing Materials. Thomas A. Edison, Llewellyn Park, N. J.
- 513,099. Metallurgical Plant. Edward L. Ford, Youngstown, O.
- 513,100. Furnace. Edward L. Ford, Youngstown, O.
- 513,114. Rock Crusher. Horace L. Kent, Birmingham, Assignor to the Kent Pulverizer Company, Derby, Conn.
- 513,130. Apparatus for the Production of White Lead. Norman K. Morris and John W. Bailey, Denver, Colo.
- 513,133. Mechanism for Controlling the Operation of Hydraulic Presses, Shears, etc. Ernest W. Naylor, Cleveland, O.
- 513,140. Machine for Dressing and Finishing Tiles. Joseph Rapp, New Philadelphia, O.
- 513,154. Smoke-Preventing Furnace. Charles L. Stacy, Covington, Ky.
- 513,158. Apparatus for Amalgamating and Concentrating. Angelo Tornaghi, Sydney, New South Wales.
- 513,163. Method of Making Steel Castings. Nathan Washburn, Boston, Mass.
- 513,174. Apparatus for Precipitating Gold and Silver from Cyanide Solutions. Charles Carter and Alfred H. Bell, Tooele County, Utah, and Carl T. Boehm, New York, N. Y.
- 513,196. Stonecutter's Bush Hammer. James O'Donnell, Toronto, Canada, Assignor of one-fourth to Charles Watson, same place.
- 513,197. Crushing or Grinding Mill. Henry J. R. Pamphilon, Congleton, England.
- 513,204. Process of Making Pure Sulfonic Compounds. Ernst W. R. Schroter, Hamburg, Germany, Assignor to Ichthyol Gesellschaft, Cordes, Hermann & Co., same place.
- 513,216. Belt for Ore-Concentrators. Henry J. Summerhayes, San Francisco, Cal.
- 513,218. Machine for Making Taper Tubes from Hollow Ingots. Stephen P. M. Tasker, Philadelphia, Pa.
- 513,240. Well-Drilling Machine. Samuel MacEachen, Scranton, Pa., Assignor to the National Boring and Drilling Company, same place.
- 513,244. Mechanical Stoker Furnace. Robert Newton, Providence, R. I.
- 513,254. Hydraulic Air-Pump. Edward H. Weatherhead, Cleveland, O., Assignor to the Cleveland Faucet Company, same place.
- 513,257. Coke-Oven. Theodor Bauer, Berlin, Germany.
- 513,270. Process of and Apparatus for Melting Metals by Means of Electricity. August F. W. Kreinsen, Hamburg, Germany.
- 513,276. Conveyor. Lemuel Patterson, Allegheny, Assignor of one-half to George H. Albertson, Pittsburg, Pa.
- 513,294. Electrical Apparatus for Firing Submarine Mines. Giulio Betilini, Venice, Italy.
- 513,296. Mining Machine. Joseph L. Beury and John T. Cressey, Beury, W. Va.
- 513,315. Pump. Charles E. Funk, Chicago, Ill.
- 513,320. Coal-Drill. Martin Hardsegg, Ottumwa, Iowa.
- 513,324. Process of Precipitating Metal Sulphide from Hyposulphite Solutions. Henry Hirschling, Salt Lake City, Utah, Assignor of one-half to Thomas R. Ellerbeck, same place.
- 513,326. Power Hammer. Leonard D. Howard, St. Johnsbury, Vt.
- 513,332. Rolling-Mill. John G. Laurie, Chicago, Ill., Assignor to the Illinois Steel Company, same place.
- 513,373. Grate Bar. Carl Turnofsky, Berlin, Germany.

DIVIDENDS PAID BY MINING COMPANIES DURING JANUARY, 1894.

NAME OF COMPANY.	Paid, January.	NAME OF COMPANY.	Paid, January.
Bald Butte, Mont.....	\$5,000	Mayflower Gravel, Cal ...	\$10,000
Belden Mica, N. H.....	5,000	Morning Star Drift, Cal.....	4,800
Champion, Cal.....	3,400	Omaha, Cal.....	3,600
De Lamar, Idaho.....	100,000	Rico-Aspen, Colo.....	50,000
Elkton, Colo.....	5,000	Smuggler, Colo.....	50,000
Franklin, Mich.....	80,000	Trinity River Hydraulic, Cal.....	2,500
Golden Reward, S. Dak.....	5,000	Victor, Colo.....	15,000
Homestead, S. Dak.....	18,750	W. Y. O. D., Cal.....	3,000
Iron Mountain, Mont.....	10,000		
Kennedy, Cal.....	48,000	Total.....	\$368,050

Readers of the "Engineering and Mining Journal" will confer a favor on the publishers if they will notify the "Journal" of any errors or omissions in the above table.

PERSONALS.

Mr. Henry Lavelle, president of the Independence Mining Company, at Boulder, Mont., recently returned to that place from a visit to the East.

Mr. Albion Cole, formerly in charge of the Swanton mine, at Barton, Md., is now employed as consulting engineer by the Pocahontas Coal Company.

Mr. E. Farey, of Paris, president, and Mr. P. Levy, consulting engineer, of the Compagnie des Phosphates de France, are now visiting the company's property in Florida.

Mr. W. D. Roes, of Cleveland, who is general manager of the Republic and Lake Superior mines, on the Marquette Range, has been given the management of the Ashland mine at Ironwood, Mich.

Capt. T. R. Dunn has resigned the office of superintendent of the Virginia-Florida Phosphate Company, and Mr. J. Gardner, of the United States Phosphate Company, will have charge of the Virginia-Florida mines.

Mr. John Fulton, long connected with the Cambria Iron Company, has established an office in Johnstown, Pa., as consulting engineer. Mr. Fulton has had a wide experience in coal and iron mining and in iron and steel metallurgy.

Messrs. Frank Work, H. McK. Twombly and H. C. Fahnestock will, it is stated, replace W. H. Apolton, R. F. Bellamy and A. H. McClintock as directors of the Delaware, Lackawanna & Western Railroad Company at the annual meeting February 20th. The new directors will represent the Vanderbilt interest in the stock.

Mr. F. V. J. Skiff, who had charge of the mines and mining exhibit at the Columbian Exposition, has been appointed director in chief of Chicago's permanent Columbian Museum. The executive committee, which made the selection, believes that a better director could not have been found; an opinion which will be approved by those who were connected with the mining exhibit during the continuance of the Fair.

Mr. James Platt, of Gloucester, England, member of the Iron and Steel Institute of Great Britain, has just arrived in this country for a two-months visit. Mr. Platt was here with the Iron and Steel Institute on its visit to this country and is well known to many of our engineers and iron manufacturers. He comes here, hoping to renew many pleasant acquaintances. He is interested in a new process for the manufacture of armor plate.

The President has appointed the following Assay Commission for 1894: Hon. D. W. Voorhees, United States Senate; Hon. R. P. Bird, House of Representatives; Sigourney Butler, Boston, Mass.; George Foster Peabody, New York; Horatio C. Renshaw, Freeport, Ill.; Henry D. Welch, Philadelphia, Pa.; Prof. J. Q. Adams, Lexington, Va.; Prof. Frederick Prime, Philadelphia, Pa.; Andrew Mason, New York; Cabell Whitehead, Bureau of the Mint; Girault Farrar, New Orleans, La.; James W. Ellsworth, Chicago; Prof. George T. Winston, Chapel Hill, N. C.; Prof. A. L. Perry, Winstons-town, Mass.; L. Clarke Davis, Philadelphia, Pa.

OBITUARY.

William Gilpin, a pioneer and ex-Governor of Colorado, died at Denver on January 29th.

George H. Ely, of Cleveland, O., died last week at Washington, D. C., aged 68 years. He was well known in connection with the Lake Superior iron ore interests. He began business in Cleveland in 1863 with H. B. Tuttle, but had been interested in the Minnesota iron mining business for several years previous to that time. In company with his brothers, Samuel P. Ely and Heman B. Ely, he constructed the Iron Mountain Railroad, which is now a part of the Duluth, South Shore & Atlantic. Both Geo. H. Ely and Samuel P. Ely had already invested heavily in iron ore lands. The partnership with H. B. Tuttle in Cleveland continued until 1878, when Mr. Tuttle died and the title of the company was changed to Geo. H. & S. P. Ely. A few years later the iron mining interests in the Minnesota range were sold to the corporation now controlling them, the Minnesota Iron Company, but both of the Messrs. Ely retained stock interests of moderate value in other Lake Superior properties. Shortly after the sale of the Minnesota mines, they took up, with New York and Philadelphia capitalists, the development of valuable mineral lands in Cuba. The late Mr. Ely two years ago attended a congress on inland navigation in France as one of the representatives of associated engineers of the United States. At the time of his death he was president of the Western Iron Ore Association, president of the Central National Bank of Cleveland and a director in several large corporations of Cleveland.

SOCIETIES AND TECHNICAL SCHOOLS.

Western Foundrymen's Association.—At the regular meeting in Chicago, January 24th, Mr. C. K. Pittman read an interesting paper on "Coke,"

which called out a long discussion and many statements of experience and opinion.

Societe d'Encouragement pour l'Industrie Nationale.—At the regular meeting in Paris, France, January 12th, the following officers were chosen for 1894: President, M. Tisserand; vice-presidents, MM. Colonel Pierre, Davanne, Mascart and G. Roy; secretaries, MM. Collignon and Aime Girard; editors, MM. Legrand and Bordet; treasurer, M. Goupil de Prefeln.

Engineers' Club of Minneapolis.—At the annual meeting on January 15th officers were elected as follows: President, F. W. Cappelun; vice-president, J. M. Hazen; secretary and treasurer, E. Bert Nexsen; librarian, A. B. Coe; member of the board of managers of the Associated Engineering Societies, W. A. Pike. After the business proceedings Mr. Andrews stated that he proposed to give the results of some radiator tests.

Harvard Engineering Society.—The students and instructors of Harvard University interested in engineering met January 22d and completed an organization called the Harvard Engineering Society, the members of which are principally from the Lawrence Scientific School, but any member of the university who is interested in engineering is eligible to membership. The charter membership consists of six instructors, 30 students taking electrical engineering, 20 civil engineering, 8 mechanical engineering and 4 architecture and mining engineering. The following officers were elected: President, Prof. I. N. Hollis; secretary, A. N. Johnson; treasurer, J. F. Vaughan.

Cornell University.—One of the largest screw-testing machines yet built is being erected at the College of Civil Engineering. It is designed for direct tension and compression and transverse strains. Its extreme dimensions are: Height, 20 ft.; width, 5 ft., and length, 15½ ft. Its weight is about 33,000 lbs. It will admit bars for tension and columns for compression of any length up to 12 ft. The capacity of the machine is 40,000 lbs. for tension and compression, and 100,000 lbs. for transverse strain. The machine was made by Riehle, of Philadelphia, and the beam is provided with the Riehle traveling vernier poise, adjusted to standard weight and moving automatically.

Engineers' Club of Cincinnati.—The sixth annual meeting was held December 21st. The secretary and treasurer presented reports for the fiscal year just ended, showing the club to be in a flourishing condition. Ten meetings were held during the year with an average attendance of 24. Interesting papers were read at all meetings. Nine new members were added, making the total number 115. The financial report showed all bills paid and a small balance in the treasury. Officers elected for the ensuing year were as follows: President, W. B. Ruggles; vice-president, H. J. Stanley; directors, Chas. A. Ewing, R. L. Engle and C. E. Lindsley; secretary and treasurer, J. F. Wilson. The retiring president, Col. Latham Anderson, addressed the club on the subject of "Engineering Progress During the Past Year."

Illinois Society of Engineers and Surveyors.—The ninth annual meeting was held at the University of Illinois, at Champaign. At the afternoon session on Wednesday reports of the officers were submitted, and papers read by D. W. Mead on the "Historical Geology of Illinois," and by Emil Rudolph on the topic, "What Can Be Done to Elevate the Standard of the Surveying Profession?" About 25 papers in all have been prepared for this meeting. The titles of some of these follow: "Crisis and Retaining Walls," by E. M. Benson; "Methods of Stake Driving," by J. W. Alford; "Experience with Creeping Rails," by W. D. Pence; "Mechanical Aids in Computing," by Prof. L. O. Baker; "Bridge Erection," by W. F. Kendall; "Transportation Problem of the Future," by Frank Ballou; "Cost of Work," by Edwin A. Hill; "Present Status of the Metric System," by Samuel S. Gree; "South America and Young Engineers," by P. Mogenson; "Notes on Foundations of Granite Viaduct," by E. I. Cantine. A number of topical questions of interest were taken up for discussion, among these being "Effect of Frost on Materials and Structures" and "Abolition of Grade Crossings in Illinois."

Boston Society of Civil Engineers.—A regular meeting was held January 24th. A committee to nominate officers for the ensuing year was elected, consisting of Henry Manley, E. S. Dorr, C. F. Allen, T. H. Barnes and F. W. Holgdon. It was voted to have the usual annual dinner and the arrangement of the same was referred to the board of government. The dinner will take place at Young's Hotel on Tuesday, March 6th. A memoir of the late Joseph Coulson prepared by a committee was read by the secretary. The discussion of the evening was in continuation of that of the last meeting, namely, "The Organization of a City Engineer's Office and the Best Methods of Carrying on its Work." It was carried on by Messrs. A. F. Noyes, L. M. Hastings and W. E. McClintock. A description of the organization of the city engineer's office at Providence, R. I., prepared by Mr. O. F. Clapp, was read. Mr. G. A. Kimball read a paper on the subject which was discussed. Mr. John C. Olmsted read a paper on the "Relations of the City Engineer to the Landscape Archi-

tect and to Public Parks." Mr. W. E. McClintock read the last paper of the evening on "City Surveys and Maps," and Mr. Fred. Brooks spoke of rectangular co-ordinates and a form of datum plane of levels in their relation to municipal surveys.

Engineers' Society of Western Pennsylvania.—At the annual meeting held at Pittsburg, January 16th, Mr. M. J. Becker, the retiring president, made an address in regard to the urgent necessity of improving the water supply of that city, the impure condition of which is the cause of the high death rate from typhoid fever in Pittsburg and Allegheny. The secretary's report showed a membership of 473. The following officers were elected: President, Charles Davis; vice-president, William G. Wilkins; treasurer, A. E. Frost; secretary, Daniel Carhart; directors, Julian Kennedy and Thomas P. Roberts.

The second annual meeting of the chemical section was held January 23d. Committees reported progress. The secretary read the following report for 1893: Number of meetings, 10; average attendance, 28; number of papers read, 13; addresses, 3; communications, 5. The following officers for 1894 were duly elected by ballot: Chairman, Walter E. Koch; vice-chairman, James M. Camp; secretary, Abram T. Eastwick; additional directors, Prof. F. C. Phillips and James O. Handy. At the regular meeting held the same date a paper on "The Well, Spring and River Waters of McKeesport and Vicinity," by H. B. Carnahan and Fred. Crabtree, was read. Discussion followed by Messrs. Koch, Camp, Handy, Roberts, Clark and Professor Phillips. Professor Phillips exhibited some mounted specimens of artificial crystals.

Armour Institute, Chicago.—We have before referred to the plans of this institute, founded by Mr. P. D. Armour, and its complete plans for future usefulness. The department of mining and metallurgy is under the directorship of Herman Haupt, Jr., M. D., Ph. D., son of the eminent engineer of the same name. As the training received in this department is to be full and thorough, a high degree of proficiency in academic studies is necessary before the student is enrolled. The course is a graded one and includes advanced chemistry, metallurgy, geology, the study of ores and ore-bearing veins. Then follow assaying and blowpipe analysis, succeeded by drawing in the geological laboratory, and a study of the most approved methods of reducing ores and extracting metals. Lectures and demonstrations in the halls of the institute are augmented by practical talks to the classes given by specialists. The theoretical training is to be supplemented by field work and the students will have practices in mine surveying, topography, prospecting and practical geology and instruction in mining law. In addition to the studies enumerated the course includes instruction in the mechanical department in forging and the other principles of mechanical engineering. Applications of electricity, mining and metallurgy will be carefully studied in the department of electrical engineering. In the laboratories, as far as possible, practical results will be obtained in the several branches of science coming under the jurisdiction of the department. The various products of the mines, quarries, oil and salt wells, etc., will be taken and examined in a thoroughly practical way and the results reported. These examinations will be made for miners upon the remittance of a small fee which is charged to maintain the laboratory and pay expenses. In all branches of the subject the director is glad to receive specimens and correspondence. The cabinet already contains several thousand specimens of ores and mine products, which are open to inspection of the public as well as the students and are classified in districts, States and counties. It is the aim of the directors to add from time to time specimens from new districts, and all such specimens will be carefully preserved.

Ohio Society of Surveyors and Civil Engineers.—The fifteenth annual meeting was held at the Hollenden, Cleveland, O., being opened Tuesday evening, January 16th, by addresses of welcome from Mr. Robert Blee, mayor, and Mr. Walter P. Rice, chief engineer department of public works. Mr. W. H. Searles, M. Am. Soc. C. E., read an interesting paper on "The Legal Status of the Civil Engineer." Wednesday morning was mainly taken up by reports of officers and committees. Mr. J. M. Harper, of the Committee on Legislation, showed that Ohio was very unfortunate in its legislation for engineers, and a new committee was appointed for the purpose of collecting opinions from engineers as to what legislation was most needed to give a proper legal status to the profession. Mr. J. W. Holmes, of Batavia, N. Y., showed and described a solar transit theodolite. President J. B. Weddell delivered an address and Prof. W. R. Warner gave a lecture on "The Modern Observatory." On Thursday morning Mr. G. R. Stattleman, of Dayton, O., described a hoist bridge across the Miami River at that city. Mr. R. A. Bryan, Portsmouth, O., read a paper on "The Future of the Canal." Mr. W. B. Gerrish, city engineer of Oberlin, described the separate system of sewers built in that town. A paper by Mr. F. M. Lillie, city engineer of Youngstown, gave information of the pavements there. In the afternoon several committee reports were presented, and Mr. W. W. Kingsley, superintendent of Cleveland Waterworks, described the building of the new tunnel at Cleve-

land. On Thursday evening Mr. J. A. Hanlon, Coshocton, read a paper entitled "Some Phases of Railway Work." President Cady Staley, of the Case School of Applied Science, called the attention of surveyors to the necessity for more accuracy of measurements, and explained some of the ways by which accuracy could be attained. A committee on program was appointed with instructions to have reports and papers printed and distributed at least four weeks before the next annual meeting. On Friday the following papers were presented: "Demonstration of Technical Points in a Survey," by Mr. J. B. Weddell, Galion, O.; "Location of Boundaries and Streams," by H. M. Gates, Columbus, O.; "Standardizing of Steel Tapes," Mr. T. C. Mendenhall, U. S. Coast and Geodetic Survey. The next annual meeting is to be held at Cincinnati. The following officers were elected for the ensuing year: President, J. M. Harper; vice-president, Homer White; secretary, C. A. Judson; trustees, J. B. Davis, F. M. Lillie, H. M. Gates, C. S. Davis and F. M. Turner. The report of the secretary showed that there were 114 members on the roll, while a much larger number than usual were elected at this meeting.

Engineers' Club of Philadelphia.—At the annual meeting, January 20th, the tellers reported that Messrs. Hugo S. Hund, E. A. W. Jeffries, Andrew Callahan, Jr., and Thomas J. Carlile had been elected to active membership, and Messrs. George F. Payne and De Louie Tice to associate membership. The report of the board of directors gave a general summary of the proceedings during the year; there have been 18 regular meetings of the Club, at which there was an average attendance of 46; the maximum attendance being 68, and the minimum 32. At the meetings many interesting papers were read and discussed. The appointment by the president of delegates to represent the Club in the Union Committee appointed to procure an authoritative expression of public opinion with regard to water supply, street cleaning, etc., which, although so far resulting in nothing tangible, is a step toward interesting the Club in the affairs of the city, which the board hope will be carried much farther in the future. A committee of the Club was also appointed to complete the Chicago fund; \$850 was paid to the committee in Chicago, and the balance of \$49.50 still remains in the trustees' hands for disposition. The headquarters in Chicago were well maintained and were of assistance to visiting engineers, both American and foreign. The publication committee during the year issued four numbers of the "Proceedings." The question of allowing papers to be printed in advance of their appearing in the "Proceedings" has been discussed, but no definite rule adopted. The cost of the "Proceedings" to those intending purchase at the beginning of the year was 75 cents a number to 100 members and 50 cents to members, and this latter price has been reduced by the committee to 35 cents, except where numbers are rare. The committee has also decided that, instead of reprinting papers, hereafter members reading papers can procure 25 copies, or more if ordered in advance, at the net cost to the Club, which is practically at the same rate, or even less, than that for which reprints could have been obtained. The committee has now on hand the preparation of an index to the "Proceedings," extending over 10 years. The membership roll shows 1 honorary, 431 active and 17 associate members; a total of 452, of whom 284 are resident and 168 non-resident. Four members died during the year. The treasurer's report shows total receipts of \$6,858; expenditures, \$6,791, leaving a balance of \$65 on hand. Mr. John Birkinbine then delivered the annual address, in which he referred to the large manufacturing and industrial interests of Philadelphia, in which engineers are interested, and showed the advantages of having an engineering organization such as ours in the city. He also gave some very interesting statistics as to the amount of railways, sewers, water and gas pipe, telephone and telegraph wires, etc., in the city limits. The tellers reported that 128 legal votes had been cast, and the following candidates were declared elected: President, John C. Trautwine, Jr.; vice-president, A. Falkena; secretary, L. F. Rondella; treasurer, George T. Gwilliam; directors, Edward K. Landis, Silas G. Comfort, Charles L. Price. Mr. John Birkinbine, retiring president, then introduced the president-elect, M. John C. Trautwine, Jr., who made a few appropriate remarks.

American Association of Inventors and Manufacturers.—The third annual convention was held in Washington, D. C., January 16th and 17th. President Gatling delivered an address, showing the progress of the Association during the year. There has been a decided increase in the membership of the Association. Mr. Gardiner G. Hubbard, chairman of the Committee on the World's Columbian Exposition, made report of the work of his committee and the successful results attained, and Arthur Steuart, who was the Association's special representative at the Congress of Patents and Trade-Marks, at Chicago, presented an interesting report. The Committee on Legislation, of which W. C. Doige, of Washington, is chairman, reported as to patent bills pending in Congress. Fourteen bills have already been introduced, two of them radical in character. One to change the lifetime of a patent from 17 to 7 years, and the other gives the govern-

ment the right to cancel any patent upon payment to the inventor or owner of not less than \$25,000 or more than \$100,000. The Association opposes these bills, and their passage is not probable. As a general thing the Association approves measures recommended by the Commissioner of Patents, and cooperates with him. House bill No. 5,014 contains some amendments to the patent law prepared by the Association after conference with the Chicago Patent Bar Association and other interested parties throughout the country, and its passage is urged by the Association. A letter was read from A. S. Hallidie, of San Francisco, in which the writer urged the establishment of a branch of the Patent Office in San Francisco, where the government officers could receive and forward applications for patents, and deliver documents from the Patent Office in Washington. A number of important papers were read before the Association, notably the following: "Needed Modifications of Our Patent Laws," by Walter S. Logan, of New York; "The Right of Property in an Idea," by Allen R. Foote, of Washington, which paper dealt with the question from an economic standpoint; "Improvements in the Personnel of the Patent Office," by Arthur Steuart, of Baltimore, in the course of which paper he urged that appointments in the Patent Office should be removed from politics. He thought also that a system of grades and of pensions would contribute to the efficiency of the office, for it would attract men of ability. Other papers read were, "The Material Influence of the Patent System Upon the Farmer, and His Duty to Uphold It," by John W. Fairfield; "The Patent Office," by Thomas Ewing, of New York; "Procedure in Patent Cases," by Richard Henry Gatling, of New York; "Proposed Repeal of the Caveat Laws," by F. A. Seely, examiner in the Patent Office; "Suggested Reform in Patent Practice Concerning the Question of Invention," by Charles M. Higginson. The following officers were elected: President, R. J. Gatling, Hartford, Conn.; first vice-president, Gardiner G. Hubbard, Washington, D. C.; second vice-president, George Harding, Philadelphia, Pa.; third vice-president, J. C. Anderson, Chicago, Ill.; fourth vice-president, B. H. Warner, Washington, D. C.; secretary and treasurer, Geo. C. Maynard, Washington, D. C.; directors, F. A. Seely, Washington, D. C.; F. A. Pratt, Hartford, Conn.; R. S. Munger, Birmingham, Ala.; Marvin C. Stone, Washington, D. C.; Arthur Steuart, Baltimore, Md.; Albert A. Pope, Boston, Mass.; L. W. Serrell, New York City; John V. Rice, Jr., Edgewater Park, N. J.; Ward W. Willits, Chicago, Ill.

INDUSTRIAL NOTES.

The Howard-Harrison Pipe Works, Birmingham, Ala., have taken a large contract for iron pipe for the waterworks at Austin, Tex.

A dispatch from Greensburg, Pa., says that the Latrobe Steel Works Company last June reduced the wages of their employees 25% and on January 29th made an additional reduction of 25%.

The Spang Steel and Iron Company, of Pittsburgh, Pa., started up on January 29th with a full force and sufficient orders for a steady run of several weeks. About 250 men are employed.

Jenkins Brothers, New York, issue an illustrated catalogue showing a great variety of valves, stuffing-boxes, safety and blow-off valves, steam traps, water gauges, gauge cocks and other boiler fittings.

The Edgar Thomson Steel Works, at Braddock, Pa., after making steel rails for some time past, returned on January 29th to the manufacture of billets. A number of men were laid off until work on rails is resumed.

The Bristol's Manufacturing Company, at Waterbury, Conn., has been incorporated under the new name of the Bristol Company. The company reports that the demand for its recording pressure gauges, voltmeters and also for its low-range gauges is increasing rapidly.

The striking flint glass workers who have been employed at Factory P, of the United States Glass Company, at Pittsburg, Pa., called at the plant and carried out their tools. Preparations to start the factory will be pushed by the officials of the company, and the resumption will likely take place within the next two weeks.

The Pittsburg Wire Works, at Braddock, Pa., began running in full on both turns on January 29th. The strike of rod-rippers and wire-drawers there about 10 days ago did not hinder the operation of the plant, as new men were easily secured last week to put the works in full operation. The company has plenty of orders and will be able to keep its plant in operation all through the winter.

J. & R. Melly's Lebanon Valley furnaces at Lebanon, Pa., were put into blast on January 28th, giving employment to 75 men who have been out of work for several months. The wages are, however, lower by 10% than they were previous to the present financial stringency. The workmen have nearly completed the repairs to the No. 1 Sheridan furnace, and it will be put into blast about February 10th. The No. 2 furnace will be rebuilt and is expected to resume operations in the spring.

The latest catalogue of the Buffalo Forge Company, Buffalo, N. Y., is a handsome volume of nearly 300 pages, containing full descriptions and illustrations of the wide range of appliances manufactured by the company. These include steam and pulley fans, hot blast steam heating apparatus, blowers and exhausters, disk ventilating fans, horizontal and upright steam engines, hand and power blacksmith drills, punches, shears and bar cutters, stationary and portable forges, heating forges and a number of others. The company's heating apparatus is now in use in many important buildings.

Messrs. James Macbeth & Co., manufacturers of the well known "Pull-Up" electric blasting machine and Victor electric fuses, have recently enlarged their headquarters at 128 Maiden Lane, New York City, where the main offices are now located on the ground floor, giving them advantages for handling their large business with convenience and dispatch. The factory at Jamaica, Long Island, N. Y., is running full time with full force of hands and the company report a steady demand for their goods. A patent infringement suit which has been pending for three years past in the United States Circuit Court, brought against this firm by H. Julius Smith, for illegal infringement of his patent for magneto-electric machine for firing fuses in blasting, has just been decided by Judge Wheeler in favor of Messrs. James Macbeth & Co.

MACHINERY AND SUPPLIES WANTED.

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

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

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

GENERAL MINING NEWS.

ALABAMA.

Walker County.

Press dispatches say that the coal miners at Corona, who have been on a strike for several weeks on account of differences as to wages and prices of material and rents, returned to work January 31st, a compromise having been agreed upon.

ARIZONA.

Maricopa County.

(From our Special Correspondent.)

Ten miles from Gila City a very rich vein of gold ore was struck last week. It is 3 ft. wide and shows free gold all through the rock, also some galena.

Gold Nugget Mine, Gila City.—The mine is showing wonderfully rich in free gold and the new mill having arrived and now being in course of erection, crushing will be commenced at once. While the mine has shown up well from the grass roots down it is at a depth of 200 ft. that the richest ore is now being found.

Yavapai County.

Henrietta.—The Henrietta mill has been started up. There are between 900 and 1,000 tons of ore in reserve and 14 men are employed in the mine. There are 30 men employed in all at mill and mine.

United Verde Copper Company.—A report from Prescott states that Mr. W. A. Clark, the well known mining man of Butte, Mont., and an owner of this company's mines at Jerome, has placed a corps of engineers in the field to survey a line for a narrow gauge road from a point on the Santa Fe, Prescott & Phoenix Railway to the mines, a distance of 28 miles. He expects to complete the road during the present year.

CALIFORNIA.

(From our Special Correspondent.)

The California Miners' Association has appointed T. L. Ford and C. G. Yale to proceed to Washington and there represent the miners' and mining interests of the State. One matter of importance to be attended to is with reference to an appropriation made by the last legislature of \$250,000 for the erection of a restraining dam on the Yuba River, above Marysville. The appropriation was conditional on an equal sum being granted by Congress this spring. Messrs. Ford and Yale will endeavor to have this appropriation made although the deficit in the treasury of this particular department does not warrant the belief that the efforts put forth will be crowned with success.

Other important measures will be taken care of, among others the bill drafted on the same basis as the Stewart bill. Some of the main points in the bill are: Whenever land is found in a mineral belt it is presumed to be mineral until the contrary is proved. At present the burden of proof is on the miner.

Again, if mineral is found in an adjoining claim the claim in contest is presumed to be mineral. If mineral is found in any claim it is presumed that

it always has been mineral land, unless it has gone so far as to be patented.

Amador County.

Gover.—This mine, 2,500 ft. north of the Mayflower, is developing well. Within the past year the management has opened out a large body of high-grade ore on the 800-ft., 900-ft. and 1,000-ft. levels (perpendicular). Very little stoping has been done as yet, but connections have been made with the different levels, so it is known to be one continuous ore body. The vein has opened out in places 30 to 40 ft. wide. At present there is only a 20-stamp mill on the property, but it is said a larger mill will be built in the spring. The superintendent said recently that he could keep 80 stamps running if he had them.

Keystone.—This property, in Amador City, is still keeping up its reputation as a gold producer. The owners have what is equal to 50 stamps, having added a Huntington roller mill to their 40 stamps. They find the roller mill a valuable addition as they can run the softer material through it at less expense than through the regular batteries. The operating expenses have been reduced under the management of Mr. Hale.

South Spring Hill Mining Company.—This property, adjoining the Keystone on the south, is running its 40-stamp mill right along. It is a large property, made up of the South Spring Hill, Talisman and Median Consolidated.

Calaveras County.

(From our Special Correspondent.)

Dora Mine, Esmerelda.—A five-stamp mill is being erected and a road has been graded leading from the mine to the mill. The ledge in the mine is about 2 ft. wide, the road being very rich. A tunnel is to be run into the hill from a shaft adjacent to the mill which will tap the ledge about 400 ft. from the surface.

Placer County.

The following items showing the condition of the mining industry in the upper part of this county are from the Colfax "Sentinel": The mine on Brushy Canyon, near Forest Hill, is paying well. The Gold Ring mine, at Green Valley, promises well. It is expected the mill will be all ready for work in about a week. The Golden Eagle, at Shady Run, is also pushing ahead. At present a new tunnel is being run to tap the gravel so that it may be worked to better advantage. The Redstone quartz mine, at Blue Canyon, has resumed work and it is now being worked in a systematic way. The Mayflower mine is working a full force of men and is paying as well as ever. The Dardanelles mine prospects well, but some trouble with the machinery has of late interfered with its workings. The Big Dipper mine, at Iowa Hill, is developing well. The gravel is said to be rich and the machinery works well. About 40 men are employed at present. Considerable development is promised in the Black Canyon section and near Sailor Canyon and Bald Mountain the coming summer. The Morning Star mine, at Iowa Hill, has declared another dividend of \$3 a share.

Tuolumne County.

(From an Occasional Correspondent.)

The past year has been a prosperous one for the mines of this county and the outlook for gold mining at present is extremely good. On the Mother lode the Rawhide has turned out some rich rock and this fact, with the success of the Utica mines in Calaveras County, is inducing others to commence work on the App and other adjoining mines on the same vein.

The Ham & Birney, Belleview and Black Oak mines have been running during the year and numerous smaller properties are being vigorously prospected. A fine exhibit of native gold and "specimen" quartz from the placers and pocket mines as well as milling rock will be sent to the Midwinter Fair.

On the north fork of the Stanislaus River the Kelvin group of mines is being actively worked by the Leechman Prospecting Company. Both the new and the old mills are at work on rock which has hitherto averaged over \$9 per ton. The Kelvin is worked entirely by tunnels; the lowest on the level of the mills gives over 700 ft. of backs. A tunnel run in from the river on the Dagmar or northernmost extension would command double this amount of backs on a vein averaging from 3 to 4 ft. The total length of the string of mines is over 1½ miles on the vein.

Golden Gate.—Although in the hands of a receiver pending litigation among the owners, this property has been working continuously, as has also the Consolidated Eureka and Dead Horse.

COLORADO.

Mineral surveys approved by the United States Surveyor-General for Colorado during the week ending January 20th, 1894:

8619 (Pueblo)—Phoenix.
8728 (Leadville)—Norway.
8641 (Garfield)—Undine No. 2, Undine, Kershaw and City of Detroit lodes.
8661 (Pueblo)—Mollie Kathleen.
8437 (Pueblo)—Gold Dust.
8608 (Durango)—Magpie, Sunlight and Alameda lodes.
8646 (Pueblo)—Temple.

8700 (Pueblo)—Ada Bell.
8680 (Pueblo)—Diamond.
8722 (Central City)—Standard mill site.
8495 (Durango)—Baker's Bridge placer.
8689 (Pueblo)—Sabina.
8743 (Garfield)—Jessie D.

El Paso County.

A press dispatch from Colorado Springs says that a completely equipped corps of surveyors is at work between Colorado Springs and Cripple Creek along the route of Bear Creek Canyon. The distance is only 25 miles. The gold camp is reached only by the Santa Fe road through the Midland terminal, while the Denver & Rio Grande is building from Florence. The Rock Island controls the new route now being surveyed. Its completion into the camp will secure three railways and cheap rates.

Great Mogul vs. Prince Albert.—The notable mining suit was brought to an end in the district court at Colorado Springs on January 25th. It was entitled Pritchard & Brothers vs. J. M. Parker et. al.; the Great Mogul vs. the Prince Albert, in which the former sought to secure all right, title and interest in the Great Mogul claim. The plaintiffs claimed that they had simply allowed the Prince Albert people to go ahead and work out a contract for them. The contention of the Prince Albert people was that the Great Mogul owners had never made a valid location. The case consumed two weeks and has cost much money. The jury decided in favor of the Great Mogul people. The case will probably be taken to the Supreme Court.

Work Mining Company.—A special meeting of the stockholders of this company was held at Colorado Springs on January 26th. Over 800,000 shares of the stock were represented, and the majority of this stock was cast in favor of the plan of levying an assessment of 1 cent per share upon the stock of the company, instead of bonding and leasing its claims.

Lake County.

(From our Special Correspondent.)

Cases in Court.—Considerable important mining litigation is being carried on in the courts here at present. One of the principal suits is that of Robert Cary and J. S. Jones vs. F. F. D'Avignon in which the former claim a one-fourth interest in the celebrated Orion lease. Cary claims that there was a verbal agreement for a one-fourth interest, but when he asked for his share of the month's profits he was only given a one-eighth interest. Much testimony was introduced on both sides. The trial was before Judge Dickson, who has taken the matter under advisement and will render a decision next week.

The suit of E. J. Denver vs. J. R. Champion et. al., involving \$12,000, is to test the effect of a verbal agreement. Plaintiff claims that he was to have a one-fourth interest in the Henriett lease, but after striking gold mineral he was only allowed a one-eighth interest.

In the case of W. C. Hendrie and others vs. the Maud Hicks Mining Company, it was decided that plaintiffs are the rightful owners of the Maud Hicks mine and defendants were ordered to make out quit claim deed for property.

Fanny Rawlings.—This mine is fast developing into as good a gold mine as the Little Johnnie. All the ore so far extracted has come from one slope in a single drift of the property. During the past eight months 2,960 tons of ore have been shipped valued at \$50,436, four-fifths of this value is gold. The ore carries from 5 to 10% iron and is steadily improving in grade.

Maid and Henriett.—After several months' pumping work, raising 1,728,000 gallons of water daily, the Maid and Henriett people have finally reached the bottom of their shaft again and a station is being cut and compound pump placed in position. In the Maid shaft about 450 tons a month high-grade sulphide is being taken out of the quartzite level. In the other shafts iron and carbonates are being mined. About 40 tons of carbonate ore is the daily shipment from the Harker shaft. The old Sullivan concentrating mill is a recent acquisition of the Maid and Henriett. This will be started up next week and the low-grade ore handled. A concentrate of about 90 oz. silver will be produced.

Mikado.—This company met with a serious loss this week by fire, which is supposed to be the work of incendiaries. The entire ground buildings were destroyed and much of the machinery ruined while the fire burned about 25 ft. down the shaft. The Mikado plant was one of the finest in the State and the loss will be about \$40,000 with only \$10,000 insurance.

Olga.—The shaft is down 365 ft. in the Cambrian quartzite. Drifting for a deep seated fissure vein is going forward.

Twin Lakes Placers (Limited).—The directors of the Twin Lakes Placers (Limited), London, England, have filed resolutions with the county clerk setting forth that they intend to carry on operations in the counties of Lake and Chaffee and that their authorized agent is Charles Harvey. The president of the corporation is N. Herbert Smith; secretary, V. Herbert Smith.

Union Leasing Company.—These people operating through the Olive Branch, have cleaned out the drifts into the Alpha ground into the rich ore chute.

The long drift of the El Paso will be extended to this line and the ore mined through that drift.

Ypsilanti.—A drift is being run on the parting quartzite where a body of galena has been opened up.

San Miguel County.

The Telluride "Republican" publishes the following figures giving the daily capacity in tons of the mills now built in San Miguel County that will be in operation during 1894: San Miguel Consolidated, 300; Gold King, 100; Smuggler-Union, 120; Suffolk, 100; Tomboy, 65; Hector, 50; Columbia, 25; Beattie, 30; Turkey Creek, 50; Prospect Creek, 25; Pinch Brothers & Wilbur, 10; San Bernardo, 60; Ilium, 25; Silver Pick, 30. A total of 990 tons per day. An estimate of ore treated of \$10 is conservative.

FLORIDA.

The total production of phosphates of all kinds from the Florida mines is given by "Florida" as follows: Port shipments, Fernandina, 126,694 tons (of 2,240 lbs.); Tampa, 104,407; Punta Gorda, 88,467; Savannah, Ga., 36,507; Brunswick, Ga., 8,000; total port shipments, 364,075 tons; railroad shipments (estimated), 40,000; consumed in State (estimated), 7,000; total production, 411,075 tons. This compares with 354,327 tons in 1892, showing an increase of 56,748 tons, or 16% last year.

Citrus County.

Florida Syndicates, Limited.—This company is putting up a very complete plant at its mines near Anita. This plant includes a 100-H. P. boiler, 75-H. P. engine, a crusher, two double log-washers, two cylindrical dryers with hoists, conveyors, screens, etc. The plant is furnished by the W. T. Adams Machine Company, of Corinth, Miss.

Marion County.

Alachua Phosphate Company.—Work on this company's mines, at Rock Springs, was begun in June last. Since that time all current expenses have been paid with some \$5,000 for new developments. The directors at a recent meeting voted to declare a dividend of 5% on the stock from the profits.

IDAHO.

Alturas County.

Red Cloud.—The tunnel which is being driven to the Red Cloud vein, says the Hailey "Times," is to be 1,800 ft., or thereabouts, in length and will cut the vein at a depth of 1,200 to 1,300 ft. from the surface. As seven levels have been exploited from the surface or short tunnels, the new adit will only give an additional depth of 550 ft. vertically, but backs of 700 ft. or more. The tunnel, barring accidents, is expected to be completed before April. If ore is cut into, Superintendent Price says that in future he will have no hand work done at the mine when it can be avoided. He expects that four men, with machine drills, will break 50 to 60 tons of ore per day, or as much as the mill can put through. He has power enough to run 16 drills at once, but expects to employ 20 or more drillmen.

Star Mine.—The time for the final payment on this mine, which was sold last summer to Salt Lake parties, has passed, but it is said that an extension has been granted.

Canyon County.

A hill of cement formation at Cove has been located by John Condron and others, according to the Boise City "Statesman." It is claimed that the cement will yield from \$2 to \$10 per ton in gold, and various methods of treatment are to be tried.

Some 40 placer claims have been located on Snake River, near Caldwell, since January 1st.

Lincoln.—On this claim, in Willow Creek district, W. P. Carter has a tunnel in 27 ft., and is now on the vein. He has already taken out some high-grade ore.

Owyhee County.

Trade Dollar Mining Company.—This company, according to the Boise City "Statesman," has bought a group of mines adjoining its present property, comprising the Sierra Nevada, Standard and Colorado, the consideration being \$65,000. All the mines of the group are old time properties. The Sierra Nevada and Standard are gold mines and the Colorado gold and silver. All the ledges are large and the ore assays well. It is estimated at least \$300,000 has been taken from the Sierra Nevada alone. The mines are extensions of the Trade Dollar and Black Jack, the great value of which has already been established, while to the west are the Alpine and Little Chief.

Shoshone County.

Moming Mining Company.—This company's property was sold in Milwaukee, Wis., January 27th, at receiver's sale. It was bought by C. F. Pfister for account of the stockholders, who will organize a new company. The price paid was \$176,000, which, added to a mortgage existing, makes the total cost \$251,000.

INDIANA.

It is said that when the present agreement, under which the general price for mining coal is 70 cents per ton, expires, the operators will propose a scale of 55 cents per ton. The present price of 80 cents per ton for mining block coal will also be reduced.

IOWA.

According to an apparently careful correspondent of the Chicago "Herald," in Iowa, at the present time there are no serious troubles existing between coal miners and operators. The difficulty which arose in the Des Moines district over wages last week was adjusted through a compromise by which the miners accepted a 10% cut in wages and returned to work. Not all the miners can find work, either in this or other sections of the State. State Mine Inspector Morgan Thomas, of the third district, estimates that of the 10,000 coal miners in Iowa only an average of 3,500 are receiving work. In what is known as the third district of the State, comprising the coal producing counties of Adair, Boone, Dallas, Green, Guthrie, Marion, Polk and Webster, the mines have not averaged more than two days' work a week for the last two months. In the second district, which includes the immense coalfields of Mahaska and Keokuk counties, the number of men given employment is being constantly reduced. Reports from the first district, containing Appanoose and other southern Iowa counties, show that the mining industry is correspondingly dull there. As a sample of the situation in the first district, it is reported that the nine mines at Brazil averaged eight days' work each from April 1st to August 1st; they averaged eight days in August, five days in September, three days in October, four days in November, five days in December, and January shows no improvement in the situation. The Appanoose County miners have accepted a 20% cut which affected 2,000 men. Most of the miners in the third district have accepted a 10% cut and cuts are being made in the second district. The average price paid for coal mining during 1893 in the first district was 93 cents per ton, in the second 78 cents per ton and in the third 93 cents. The lower price in the second district is due to the superiority of the coal from the miners' standpoint and the wider veins. The reasons which have brought about this result are all more or less intimately connected with the hard times. Consumption in all quarters has decreased. The railroads of the State are all big customers of the Iowa mines and own many of them, but they are only using about one-half as much coal as at the corresponding time of last year. Many factories and machine shops are closed, or running short time, and hence do not require the ordinary amount of fuel. The great agricultural section of northwestern Iowa, embracing one-quarter of the State, is without coal beds and practically without natural timber. This section has developed an extensive market for the coal from the central and southern counties. But this year the farmers have practically ceased buying coal. Most of them have not marketed their wheat on account of the low price and are without ready money to expend for fuel. The mine operators are thus shut off from two markets, the farmer and the railroads, for when the farmers' produce does not go to market the railroads do not need so much coal. The most important mining measure now before the legislature is the bill introduced by Mr. Jay, of Monroe County, for a general revision of the mining laws. The existing laws have been passed at different sessions of the legislature, and they sometimes conflict and are not always intelligible. The Jay bill provides for dividing the State into four inspection districts, instead of three, as at present, with an inspector for each district. It provides that mine bosses must possess certificates of competency obtained from the State Board of Examiners who now examine the candidates for inspectorships. Mine bosses who have held their present positions for a year, and who have been engaged in mining for five years, are not required to secure certificates. The bill provides that all the escape shafts shall be 300 ft. from the main shafts, and that escape shafts must be sunk within a year from the time mines are opened. The present law gives the operators three years' time. The bill empowers the mine inspectors to examine witnesses under oath in case of fatal accident. It provides for a better system of securing mine maps for the use of inspectors; provides that stairways in escape shafts shall not be less than 2 ft. wide; increases the amount of ventilation required from 100 to 200 cu. ft. per minute; limits the service of safety catches on cages to six months; defines more clearly the duties and responsibilities of mine bosses, and makes the requirement that all coal be weighed at the mouth of the mine a part of the general law. It further provides that the weighing of coal cannot be avoided by contract between the miners and employers.

KENTUCKY.

Martin County.

Tug River Salt and Coal Company.—Suit has been begun to foreclose the mortgage on this company's property on account of non-payment of interest. The company owns some 20,000 acres of land.

MARYLAND.

The total coal production of the State in 1893, as reported by Mine Inspector F. J. McMahon, was 3,327,749 tons (of 2,240 lbs.), an increase over 1892 of 263,840 tons, or 8.0%; an excellent showing.

MICHIGAN.

Copper.

Mason Mining Company.—This company has been incorporated at Ontonagon, Mich. The capital

stock is \$500,000, divided into 20,000 shares. No cash has been paid in on the capital stock nor has any property been conveyed contemporaneously, but it is the purpose of the parties interested to issue the 20,000 shares of capital stock in exchange for mining property. The stockholders are: Thos. F. Mason, T. Henry Mason and W. Hart Smith. These gentlemen are all connected with the Quincy. Tamarack, Jr., Mining Company.—Cross-cutting is now going on toward the Osceola amygdaloid belt.

Iron—Gogebic Range.

Aurora Mining Company.—The old directors have been re-elected as follows: Charles L. Colby, Edwin H. Abbot, Colgate Hoyt, Joseph L. Colby, Charles H. Ropes, L. H. Severance and W. J. Olcott.

Norrie Iron Mine.—The force in this mine and the East Norrie has been increased by 200 men.

Iron—Marquette Range.

Metropolitan Land and Iron Company.—This company has elected S. S. Curry, president; L. J. Petit, treasurer; H. S. Hazelton, secretary.

Republic Iron Company.—At the recent annual meeting the directors were re-elected as follows: Samuel Mather, W. D. Rees and J. V. Painter, Cleveland; G. W. R. Matteson, Providence, R. I.; Abraham Hart and W. F. Dummer, Chicago; Peter White and N. M. Kaufman, Marquette, Mich.; H. B. Perkins, Warren, O. The officers were also re-elected: W. D. Rees, president and treasurer; H. B. Perkins, vice-president; W. B. Castle, secretary; Douglas Perkins, auditor. No further steps have been taken by the directors toward acquiring property in other portions of the Lake Superior region.

Swanzy.—A force of 20 men has been put at work on the new shaft, which is down about 135 ft., and is to be sunk 120 ft. farther.

MISSOURI.

Jasper County.

(From our Special Correspondent.)

Joplin, Jan. 29.

The extreme cold weather and blizzard of last week caused many mines to entirely suspend operations, so that production of ore was very light. The price of zinc ore still remains low and the market showed but little change from the previous week, being from \$15 to \$17 per ton; some companies report having been offered \$18. Lead ore valued at \$16.75 per thousand. Following are the sales of ore from the different camps: Joplin, 634,270 lbs. of zinc ore and 119,810 lead, value \$7,112; Webb City, 597,370 lbs. of zinc ore and 14,510 lead, value \$4,942; Cartersville, 760,130 lbs. of zinc ore and 158,920 lead, value \$9,083; Zincite, 3,590 lbs. of lead ore, value \$60.25; Oronogo, 11,810 lbs. of lead ore, value \$150.75; Galena, Kan., 602,000 lbs. of zinc ore and 430,000 lead, value \$12,212; district's total value \$33,560; Peoria, I. T., 13,220 lbs. of lead ore, value \$222; Newton County, 402,660 lbs. of zinc ore and 53,000 lead, value \$4,100; Aurora, Lawrence County, 714,310 lbs. of zinc ore and 180,640 lead, value \$7,512; lead and zinc belt's total value \$45,394.

Margerie Mining Company.—The large pump plant recently erected by Shellenbach Brothers, of Joplin, on this company's land has been started up this week and now works to perfection. It is a pleasure to see a large and powerful pump draining a mine of water, as in the past small pumps have been expected to do the work of a large plant, and as a result breakdowns and repairs were common and expensive.

Mound City Mining Co.—The St. Louis stockholders visited the property at Cartersville last week and are said to be contemplating making some improvements and additions to their plant of machinery. This property is located in the south part of Cartersville on 80 acres of the Thomas Connor land and is under the management of Mr. Louis Helm, who during the past two years has done a large amount of development work and produced a large quantity of high-grade zinc ore. Mr. Helm is also operating a very promising lead property south of Oronogo, on the Center Creek bottom.

MONTANA.

Jefferson County.

Considerable excitement was created last week, says the Marysville "Mountaineer," among the mining men of Basin over the strike made in a shaft that had been sunk by J. C. Kelly. Kelly has been sinking a shaft on the flat adjoining the Katie ground. Thursday afternoon the men struck what at present appears to be the Katie lead. The ore struck is of a good grade and at present looks rich. The striking of this lead will probably lead to a big lawsuit on account of being on a soldier's patented scrip ground.

Midwinter Mining Company.—This company has filed articles of incorporation. The capital stock of the company is placed at \$300,000, divided into shares of \$1 each. The stock is assessable. The life of the corporation is to be 40 years. The company will operate principally in Jefferson County, in the vicinity of Basin, but the headquarters will be in Butte. Charles F. Booth, D. M. Newbro, Elias Seigel, Walter Mackay, George H. Casey and Charles E. Gable are named as trustees.

NEVADA.

Elko County.

Del Monte Mining Company.—At the annual meeting of this company held last week the following directors and officers were elected: E. Scott, president; C. A. Berlin, vice-president; and P. C. Hyman, George W. Grayson and Thomas W. Pheby, directors. J. W. Pew was re-elected secretary.

Eureka County.

Eureka District.—In a review of the mining industry in Eureka County, the Eureka "Sentinel" says: Since its discovery in 1864 and the commencement of its active development in 1870, the district has yielded in gold, silver and lead in the neighborhood of \$125,000,000, and in 1878 produced in gold and silver alone \$5,500,000 from 238 mines, big and little, then under active development. The average value per ton in gold and silver of all the ore that was mined in Eureka County during that year was \$45.40. During 1893 there were only 30 producing mines and three prospects under development in the entire county. Among them, the Diamond mine was the only one that cut any figure in active development or the employment of miners on days' pay. The yield of ore from all the producing mines of the county during 1893 aggregated 14,606½ tons, with an approximate gross value of \$26 per ton, and 14,515 tons out of the entire yield of the county came from the mines of Eureka district. Up to the present date one-fifth of the bulk of ore mined in Eureka district was lead; of the gold and silver products the former furnished in value over 30%. The promise of an increase in the production of gold may become an incentive toward further explorations and development below the water level. The nature of the ore might be different to that we are used to here. If it should prove as Professor King thought, the increase of gold would be found in arsenical pyrites, and a change of treatment would consist of milling instead of smelting operations, and the cost would be considerably lessened.

Lincoln County.

The following Piche items are from the "Lode": About 140 owners of mining claims took advantage of the exemption law at Helena.

Condor Mill.—There are now fully 400 tons of ore on the dump at the Condor mill, which will resume operations as soon as the weather permits.

Millionaire.—Some development work is being done on the Millionaire, which shows up well. The large croppings on the west end of this property give an average assay of 19 oz. silver and a few dollars in gold, while the east end of the property averages \$60 gold.

Monitor.—An important development was made last week on Monitor ground on the surface about 100 ft. north of the face of the tunnel. In the vicinity of this discovery much prospecting has been done, but apparently a little too far to the west. The character of the ore is the same as the large ore chute in the tunnel; developments so far prove it to be a distinct chute. Two carloads of ore from this mine recently returned 6 oz. gold and 6 oz. silver to the ton.

Poorman.—About 12 men are at work on this property and about the same number in the Yuba.

Lyon County.

Red Jacket.—A recent milling test of 40 tons of ore from this mine of Silver City gave the following results: 127.20 oz. of bullion valued at \$1,308.68, of which \$1,228.06 was gold and \$80.68 silver. The average yield was about \$31 per ton.

Storey County—Comstock Lode.

Belcher Mining Company.—The latest weekly official letter says: We have resumed work on the 800 level and have cleaned out and repaired 30 ft. of the north drift. Connection will be made with the 900-ft. level, and this section of the mine thoroughly prospected. It was on the 850-ft. level that the large body of ore was first discovered. From this level up to the 600-ft. level no work has ever been done, consequently there is considerable ground yet to be explored in this part of the mine. We have hoisted during the week 11 tons of fair-grade ore.

Crown Point Mining Company.—The latest weekly official letter says: We are still engaged in working in the raise from the 300-ft. level, but with no change to report during the past week. The raise from No. 2 cross-cut on the 700-ft. level is now up 64 ft. The top is in a mixture of quartz and porphyry.

Kentuck Consolidated Mining Company.—The latest weekly official letter says: On the 1,100 level the south drift in the east ledge has been extended to the south line of the mine and an east cross-cut has been started on the line. From the top of the upraise started in the north cross-cut we have started an east cross-cut in ore of fair quality.

Occidental Consolidated Mining Company.—The latest weekly official letter says: From the west ledge above the 400 level we continue to extract about eight tons of ore per week of the assay value of \$48 per ton. The west cross-cut from No. 2 upraise, started at a point 75 ft. below the 300 level, is now in 300 ft.; face in quartz and porphyry.

Savage Mining Company.—The latest weekly official letter says: We have hoisted 225 cars of ore from the 950, 1,050 and 1,100 level stopes; shipped to the Nevada mill 210 tons and mined 40 tons. Car samples average \$27.50. Battery samples average \$19.32. Bullion yield for the week, \$324,176. The west cross-cut from the north drift started at a point 112 north from the north station was advanced 25 ft.; total length 49 ft., face in low-grade quartz, clay and porphyry. On the 1,050 level we are stoping ore of fair quality from the face of the southeast drift started from the east drift at a point 120 ft. from the shaft station. Have men repairing the south drift, 1,300 level.

Segregated Belcher & Mads Mining Company.—The latest weekly official letter says: The raise from the south drift run from the 1,200 level is now up a total distance of 18 ft. The top is in vein material composed of porphyry and quartz showing spots of ore. We are still engaged in putting in another compartment to the 1,200 raise and are now up 36 ft. The raise from No. 1 south drift on the 1,100 level was advanced to a total height of 44 ft. and stopped. From this raise, just above the drift, have started south on a small streak of quartz.

Following are extracts from the latest weekly official letters of the superintendent of Comstock mining companies:

Andes Mining Company.—In the 420 level we timbered north drift from west cross-cut No. 2 and advanced the north drift from this cross-cut 8 ft., continuing in ore of good assay value.

Hale & Norcross Mining Company.—We continue stoping out ore from the winz below the 1,300 level, and extracted during the week 14 cars of ore assaying \$30.25 per ton per car sample, and 10 cars of ore, average assay per car sample, \$19.60 per ton.

West Consolidated Virginia & California Company.—During the past week we have cleaned out and timbered the north drift on the 1,000 level 130 ft., and in the southwest drift have advanced 6 ft. Have stopped the southwest drift for the present in order to reach the west cross-cut 320 ft. north of the shaft as soon as possible, and which will be reached during next week.

(From our Special Correspondent.)

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

Mines.	Ore Hoist'd	Car Sample Assav.	Ore Milled	Av. Bat'ry Assay.	Bullion for Week.	Total.
Belcher, Con. Cal. & Va.	110	.....	.....	.....	.....	.....
Chollar, Va.	48	28 11	.....	.....	.....	.....
Hale & Norcross	104	34 36	12 1/2	20 3/32	.....	.....
Savage ...	11 1/2	30 23	.....	.....	.....	.....
	11 1/2	19 63	.....	.....	.....	.....
	226 1/2	27 50	240	19 32	\$3,245.76	.....

^o Fair grade. ^{1 2 3 4} Cars.

NEW MEXICO.

Grant County.

Ivanhoe Copper Mining and Smelting Company.—This company has made arrangements to replace the smelting plant burned a few months ago with another of greater capacity. The company had already made two shipments of its product before the destruction of the plant by fire. The ore body in the mine has been developed sufficiently to guarantee at least two years' run for the smelter, says the Silver City "Enterprise." Where the vein has been cross-cut it shows a width of 20 ft. of clean ore ready for smelting as soon as broken, no assorting being required. It is said to average about 20% copper and carries gold and silver.

Pyramid Silver Mining Company.—This company's mine, mill, assay office, store, dwellings and entire property have been sold by the sheriff, under an execution in favor of W. B. Duffy, of New York. The property was bought by Mr. H. E. Huffman as agent for Walter B. Duffy. A new company has been organized and the property will be handled in a more systematic manner than heretofore. Work will soon be resumed upon the mines, and the mill will be started again.

Taos County.

Amizett District.—The Santa Fe "New Mexican" publishes the following about this mining district: Amizett is situated about 35 miles east of the D. & R. G. Railroad. Tres Piedras is its nearest railroad point. A railroad line was surveyed from Maxwell to Taos last fall, it is presumed by the Rock Island, but nothing definite is known as to when construction will begin. The titles to Amizett town property and also to the neighboring mining properties are derived direct from the owners of the confirmed Arroyo Hondo grant. Ten or twelve mines are being steadily worked this winter. Among the principal are the Gold King, the Navajo and the Lillian, on Gold Hill. A tunnel has been driven 140 ft. on the Gold King and it has been connected with the surface by shafts. The other properties have been developed by tunnels and drifts on the veins. All these properties are said to show well. The Taos Mining Company, of which Gen. Nelson A. Miles, of Chicago, is president and William Frazer is superintendent,

has decided at once to resume work on the Lone Star, which is located in the edge of Amizett. A steam hoister and a 100-ton mill will be put in. Two hundred feet of development work has been done on this property, and a 12-ft. vein of quartz with mineral scattered all through it has been exposed. Four feet of the vein will run from \$30 to \$80 to the ton in gold and silver. A Denver company has a five-stamp mill on the ground and will enlarge it in the spring. The Gold King company, of which Mr. Kittridge, of Denver, is president, is talking of putting a 25-stamp mill on its property in the spring. The Rockingham company, of which Mr. Tuttle, of Denver, is president, is developing some fine prospects. This company is preparing to begin hydraulic mining in the spring. The ore of the camp will run from \$30 to \$100. Mill run tests made in Denver have shown as high as \$486. The placer ground on the Arroyo Hondo to the R. Grande will be worked in the spring. A big ditch has been taken out for the purpose. The ground is said to run 25 cents per yard and upward. Mr. Lacome is developing the Red River, the Cumberland and the Jumbo. The former is an extension of the Gold King.

NORTH CAROLINA.

Gaston County.

(From our Special Correspondent.)

Kings Mountain.—Considerable local excitement exists here over the discovery of a small diamond by a negro a few days ago. It was found on the water's edge of a small stream and carried to Mr. Carpenter, who suspected it to be a diamond and sent it to Tiffany & Co. He was much surprised to receive a check for \$14 for it a few days later; accompanying it was a letter stating that Mr. Geo. F. Kunz, their gem expert, would be down at an early date to examine into the reported find. Since then a smaller stone has also been found. Mr. King's report is anxiously awaited; in the meantime an individual and unsystematic search is being carried on.

Piedmont Mineral Company.—This company has for several months been exploiting the supposed tin leads of this section. It will be remembered that several years ago, Dr. Ledoux and others thoroughly (as was supposed) prospected these properties with a diamond drill. A concentration plant was erected and arrangements made for systematic work. The drill did not show up satisfactory results, however, and the scheme was finally abandoned. Mr. Horton, of the company, states that they now conclude that the former work was on wrong lines; also that Dr. Ledoux is about ready to accept the new conclusions. It is therefore appropriate to give the present state of this interesting property as outlined by the manager in a statement appearing in the Charlotte "Observer" as follows: The theory has prevailed that the tin veins, if found, would be found interlaminated with the slates of the country and conform to their stratification. This theory was seconded by the fact that considerable pockets of tin ore were found interlaminated with the slates, and coinciding with the slates in their course and dip. In every instance, however, where these pockets were investigated they gave out at a very shallow depth leaving no trace of their origin. It did not appear to occur to the minds of those interested in the work that these seams and pockets could have been thrown off from a lode or fissure traversing the formation in the immediate vicinity. This would have readily and satisfactorily accounted for the phenomena, as similar conditions have been met with in a great number of instances. This idea being presented, a careful examination of surface indications gave so many corroborative proofs of the validity of this vein that a company was organized to make examinations on the line of this new theory, and work was begun upon two outcrops nearly six miles apart. The outcrops were not more promising than 20 others occurring along the same belt, but convenience for working them, more than anything else, was the consideration that led to the selection of these two, and furthermore, the two being so widely separated, they would serve as representative veins of the whole series. A shaft 40 ft. deep, down to water level, was sunk on one of these outcrops and a vein of tin ore 4 ft. thick, running N. 65° W., was encountered. The vein at this depth is mostly decomposed, although specimens of the rock weighing 200 and 300 lbs. were met with. The walls of the vein are nearly vertical, and a band of compact silicious rock borders the vein on either side. This silicious lining is impregnated with schorl, traces of country rock and sometimes tin, apparently conforming to the "Capels" of the Cornish miners. After running a drift longitudinally on the vein about 35 ft., and sinking pits along the line of the vein for several hundred feet, in all of which the vein was encountered, work was stopped, and since then the work of development has been confined to the second prospect located about two miles north of the village. At this place work has been continued uninterruptedly up to the present time. The shaft at this place has reached the depth of 90 ft., and nearly 50 ft. below water level. At the depth of 40 ft. a tunnel was driven to the vein. At this point the vein is from 6 to 8 ft. thick. At the depth of 85 ft. another level was driven to the vein. The vein at this point is about the same thickness as above, and somewhat richer in tin ore. This vein is running N. 28° W. It

may be well to mention that the formation in this section courses N. 25° E. Like the first vein spoken of, this vein is also decomposed, or mostly so, at this depth. The company is now preparing to go on down to a depth of 150 ft. It is difficult to say just what the ore is worth in tin. The company has no means of crushing the ore on a scale large enough to get an average result. The crystals of cassiterite vary in size from 1/2 in. in diameter down to microscopic particles. Careful pannings have been made, and an average taken, and it is believed that somewhere about 2% would represent the minimum value of the entire vein. The company has about 3,000 acres under control, and has located 20 or more on crops. There has evidently been a great misapprehension as to the occurrences of these veins. It has been represented that the tin veins would be found lying between the Laurentian granite on the west and the Huronian slates on the east, whereas the veins traverse the granites and slates independently of their structure and are non-conformable to their dip and stratification. The granite occurs about half a mile to the west of the town of Kings Mountain and the tin belt runs under the town, while about four miles north the granite lies to the east of the tin belt, showing conclusively that the tin belt traverses the granite. The veins appear to possess all the features of true lodes or fissures.

OHIO.

The conference on the question of coal mining wages, which was appointed for January 29th at Columbus, was not successful. The coal operators were fully represented, but no one appeared for the miners, so that the question is still unsettled.

Lambright Farm.—At this place, near Fostoria, Emerson & Lambright on January 30th completed a well which is said to be discharging 1,000 barrels of oil per day.

Trumbull County.

Brier Hill Iron and Coal Company.—The stockholders recently re-elected the old board of directors, and Mr. J. G. Butler, Jr., was chosen general manager.

OREGON.

Douglas County.

South Umpqua Mining Company.—Negotiations are in progress for the sale of this company's property to New York parties. The claims are on the South Umpqua River.

Jackson County.

Foot's Creek District.—Mr. M. P. Ward, representing a Seattle syndicate, has secured bonds on some 600 acres in this district. It is said that the property is to be worked on a large scale.

Union County.

Oregon Gold Mining Company.—A dispatch from Louisville, Ky., says that on January 30th Adolph Schmidt, president of the company, was sent to jail summarily by Judge Toney, after a sensational trial, for contempt of court. A warrant was also issued for George H. Dietz, secretary of the company, but he could not be found. Both had been enjoined from instituting receivership proceedings in Oregon by the Louisville court. They paid no attention to the injunction and applied to the district court at Portland, Ore., for a receiver. Their petition was granted, and interested parties notified Judge Toney. He cited them to appear for contempt, and declares he will keep Schmidt in jail until he shall apply to the Oregon court to set aside its action. The stockholders of the company are scattered all over the West.

PENNSYLVANIA.

Anthracite Coal.

The committee of the Schuylkill Coal Exchange on January 31st drew five coleries to ascertain the rate of wages to miners and mine employees for the last half of January and the first half of February. The result was an average of 4% above the \$2.50 basis. Last month the rate of wages was 3% above the \$2.50 bas.s.

A press dispatch from Hazelton says that 100 men, employed by contractors on the Latimer strippings, were indefinitely suspended on January 27th. These are the largest operators of the kind in the region, and it is said a further reduction in the forces of laborers will be made. The extreme dullness of the coal trade is the cause. Other contractors, it is said, contemplate a similar movement.

Lehigh Valley Coal Company.—Press advices from Pottsville state that a summons in ejectment has been issued against this company to dispossess it of 264 acres of coal land, upon which are said to be \$500,000 worth of colliery improvements. A similar suit has been entered against the Philadelphia & Reading Coal and Iron Company, involving 97 acres of coal lands.

Morris Ridge.—Scranton capitalists have purchased the Morris Ridge colliery, about 2 1/2 miles from Mount Carmel, says the Scranton "Tribune." It is on the line of the Lehigh Valley Railroad. In addition, they have also a cured the Reno tract adjoining the Morris Ridge on the east. The Reno property consists of from 400 to 500 acres of good coal land, and has the Manmouth, Buck Mountain, Red Ash, Skidmore and other veins. It is the purpose of the company to immediately open up the Reno tract, a large breaker being already on the property, which, with the breaker on the Morris

Ridge property, will give them a capacity of upward of 400,000 tons annually. The main office will be in Scranton. At a meeting of the stockholders the following directors were elected: William H. Chappell, John Schism, George W. Beale, Clarence K. Shryer, E. R. Griffiths, George W. Finn, George K. Clark, G. L. Clark, Marion W. Finn. At a meeting of the board of directors the following were elected officers: William H. Chappell, president; G. L. Clark, vice-president; George W. Finn, secretary; Stephen P. Fenner, treasurer.

Philadelphia & Reading Coal and Iron Company.—An order has been issued by this company to the effect that the collieries of the company not suspended indefinitely are to work only one day of three-quarter time this week. Last week two short days were worked. This affects more than 40 collieries.

Bituminous Coal.

Samuel P. Langdon, of Philadelphia, receiver of the Altoona, Clearfield & Northern Railroad Company, has petitioned the Blair County courts, at Hollidaysburg, Pa., for the removal of his receiver, Frank G. Patterson. The allegation is that Patterson is attempting, in violation of the rights of the stockholders, to sell the railroad franchise to the Pennsylvania Railroad Company. The court held a decree under advisement.

A riot took place this week among some of the striking foreign miners at the Cherry mines and other coal properties near Mansfield. The miners, it is reported are either anarchists or under the influence of anarchistic agitators. The rioters endeavored to prevent from working the miners who are not on strike. The riot was promptly subdued and several of the participants are in jail awaiting trial.

Chest Creek Coal and Coke Company.—This company has started up its mines at Hastings after several months' stoppage.

Greenville Block Coal Company.—This company has completed a shaft 101 ft. deep near Greenville, in Mercer County, cutting a vein of coal said to be over 4 ft. thick. Development work is to be pushed.

SOUTH DAKOTA.

Lawrence County.

Black Hills Gold and Silver Extraction Milling and Mining Company.—A late issue of the Detachwood "Pioneer" says: The cyanide plant has closed down until the return of Superintendent Childs from New York. The closedown was necessitated by the failure of a part of the crushing machinery to perform its required work, i. e., the Merrill pulverizer. The last two charges were drawn off on January 21st and the product retorted, from which resulted, from 54 tons combined charges, a brick valued at nearly \$1,200. In this run 90% of the metal was saved, and the consumption of cyanide but 1 1/2 lbs., a better showing than any run made at the mill before. Forty-two tons of the ore was from the company's mines at Blacktail, the average value per ton of which was \$20 gold, and the balance of the 54 tons was from Bryan Rossiter's mine, the White Pawn, situated at Squaw Creek, the average assay value per ton of which was \$37.25 in gold.

TENNESSEE.

Tennessee Coal, Iron and Railroad Company.—In relation to the preferred stock dividend, it is the opinion of the executive committee that the best policy to be adopted will be for the company to strengthen itself financially, and although a dividend has been earned on the preferred stock, none will be declared at present. The dividends are cumulative. The preferred stockholders can be paid later on when the company is in a better position to do so. The directors concur in the views of the executive committee.

(From our Special Correspondent at Chattanooga.)

Southern Iron Company.—Capt. H. S. Chamberlain states that a plan for the reorganization of this company has been perfected. This company made an assignment last August and Robert Ewing, of Nashville, was made assignee. Subsequently at a meeting of the bondholders Mr. Ewing was intrusted with the task of devising a plan of reorganization, and the following has been submitted and agreed upon, viz., the property of the Southern Iron Company, consisting of charcoal furnaces in Hickman, Wayne, Dickson and Stewart counties, Tenn., and one furnace in Etowah County, Ala., eight furnaces in all, with a total daily capacity of 400 tons; also a rolling mill and other property in Hamilton County, Tenn., will be sold at Huntsville, Ala., February 20th. A committee representing the bondholders will buy the property and transfer it to the Central Iron Company, for which a charter has already been secured in Alabama. There will be an issue of \$2,000,000 bonds by the new company; also \$2,400,000 preferred and \$800,000 common stock, making total securities \$5,300,000, which is \$2,000,000 less in bonds than were issued by the old company.

UTAH.

On account of the decrease in shipments of ore from the mines of this territory, the smelters such as Salt Lake City have reduced their forces by half and are now running less than one-half of their usual number of stacks. The Germania, which a short time ago was running four stacks, is now keeping up by two; the Mingo two, formerly

five, and the Hanauer one, formerly three, says the Salt Lake "Herald."

Salt Lake County.

The shipments of ore and bull on out from Salt Lake City during the week ending January 27th were 676,746 lbs. bullion and 1,744,873 lbs. silver and lead ores.

The receipts of ore and bullion at Salt Lake City for the week ending January 24th were to the aggregate of \$138,873, of which \$94,823 was in bullion and \$44,050 was in ore. The receipts of Pennsylvania bull on amounted to \$21,228; Illinois bullion, \$6,800; base bullion, \$31,600; Ontario bullion, \$18,715; Daly bullion, \$16,410. Ore receipts were \$23,850 by McCormick & Co., and \$20,200 by T. R. Jones & Co.

Summit County.

The following items are from the Coalville "Chronicle":

John Dexter has finished the new road to the new discovery of coal at his old mine. The new coal is said to be better than the old. A number of improvements have been made on this property recently and an increased output will result.

The average coal output from Coalville is now 15 cars per day, or 90 cars per week.

Work at the new coal mine owned by Mark Hopkins is progressing as rapidly as circumstances will permit. The new engine, boilers and other machinery are in place, and in a short time Coalville will have another producer.

WASHINGTON.

Kittitas County.

Placer Mine No. 91.—This mine, owned by Woods, Mahoney & Glass, has closed down on account of cold weather. The owners have been ground sluicing all of November and December.

Purdy's.—This placer, eight miles up the river from Leavenworth, is about to start up. The gold is very coarse.

Snohomish County.

Peabody Gold Mining and Milling Company.—This company has been incorporated at Seattle to do a general mining business in Monte Cristo mining district. The incorporators are: F. Peabody and W. Berlin, and the capital stock is \$10,000.00 of 100,000 shares of the par value of \$100 per share.

WEST VIRGINIA.

Harrison County.

A deed has been filed in this county, which was made by R. Carney, trustee, of Freemont, to J. M. Husted, J. K. Beason, C. B. Carney, C. V. Thompson, S. L. Mestrezat, H. C. Houston and F. A. Hill, of Pennsylvania, and conveyed the coal underlying 53 tracts of land sitting on Bingham Creek.

WISCONSIN.

Grant County.

Late dispatches report a discovery of galena near Snsinawa, by George Woolridge and Casper Hardy, who are operating on a tract which was worked several years ago and then abandoned. The discovery was made in a cross-cut run 6 ft. from an old shaft.

FOREIGN MINING NEWS.

BRAZIL.

Caethe Mine.—Robert A. Wood has recently sold this mine to Gen. Francis Herron, in New York. A company is soon to be organized under the name of Caethe Mining Company. This property consists of two mines with water rights and a large tract of land in the municipality of Caethe, State of Minas Geraes, in Brazil.

BRITISH GUIANA.

The Demerara "Daily Chronicle" reports the total gold production of British Guiana in 1893 at 142,789 oz., against 129,615 oz. in 1892. The increase last year was thus 13,174 oz., or 10 2/3%.

GREAT BRITAIN.

The Conciliation Board provided for by the terms of settlement of the great coal miners' strike will soon begin its sessions. It consists of 14 members representing each side, the miners and the operators. The chairman, who will have the casting vote, is Lord Shand, a Scotch judge with a high reputation for impartiality and ability.

PERU.

Messrs. A. T. White & Co. have discovered in the pampas of Chimbote extensive deposits of nitrate of soda, samples of which, analyzed at the School of Mines at Lima proved to be very pure. These pampas were denounced more than 40 years ago by a Colombian named Lopez, from whom they were purchased by John Meigs. They were purchased from him by Donisio Derteano, from whom they have descended to Dona Luisa Gonzalez de Dreyfus. The existence of nitrate on these lands has been reported before, but this is the first intimation of discoveries of deposits of any importance. The harbor of Chimbote is one of the finest on the Pacific coast. Nitrate deposits in the Chimbote Valley would, in consequence, be favorably situated with reference to transportation. There is already a railroad running into the valley from the coast.

COAL TRADE REVIEW.

NEW YORK, Friday Evening, Feb. 2.

Statement of shipments of anthracite coal (approximate) for week ending January 27th, 1894, compared with the corresponding period last year:

	1894.	1893.	Difference.
	Tons.	Tons.	
Wyoming region.....	187,582	509,558	Dec. 321,976
Lehigh region.....	86,387	127,499	Dec. 41,112
Schuylkill region.....	140,810	227,062	Dec. 86,252
Totals.....	514,779	864,119	Dec. 349,340
Total for year to date, 2,309,931		2,701,101	Dec. 391,170

PRODUCTION OF BITUMINOUS COAL, in tons of 2,240 lbs., for week ending January 27th and year from January 1st:

	1894.		1893.
	Week.	Year.	Year.
Shipped East and North:			
Phila. & Erie R. R.....	432	4,355	9,917
Cumberland, Md.....	48,654	2,500,590	2,229,444
Barclay, Pa.....	369	1,764	1,707
Broad Top, Pa.....	7,088	25,308	67,613
Clearfield, Pa.....	68,111	204,061	28,703
Allegheny, Pa.....	23,763	101,924	17,765
Beach Creek, Pa.....	56,273	160,076	131,222
Pocahontas Flat Top.....	57,455	203,514	153,143
Kanawha, W. Va.....	46,262	198,442	143,277
Totals.....	286,777	1,170,644	1,197,917

	1894.		1893.
	Week.	Year.	Year.
Shipped West:			
Pittsburg, Pa.....	2,839	10,139	19,122
Westmoreland, Pa.....	27,741	121,500	233,715
Monongahela, Pa.....	254	27,009	61,940
Totals.....	55,834	258,648	314,777

Grand totals..... 313,141 1,429,292 1,492,694

PRODUCTION OF COKE on line of Pennsylvania R. R. for the week ending January 27th, 1894, and year from January 1st, in tons of 2,000 lbs.: Week, 4,978 tons; year, 222,100 tons; to corresponding date in 1893, 413,754 tons.

Anthracite.

There is absolutely no change to report of the anthracite coal market. All conditions to-day are identical to those which have prevailed all this year. There is the same dullness and the same lack of active demand.

During the past week a better demand is noted for coal in cargo lots for immediate delivery, owing to the prevailing cold weather. This improvement is especially on the line points. In this market stocks in dealers' hands are low and the advent of really cold weather brings buyers in to the market for small quantities.

Prices are rather firmer than a week ago, the result of both the present cold "snap" and of the curtailed output. Probably never before in the history of the anthracite coal trade has the restriction in the production been so generally enforced by operators. The necessity for such action is recognized by all. Were it not for it, there would be a great weakness in prices, while the volume of business would not be much greater than it is at present.

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

	Broken.	Eggs.	Stove.	Chestnut.
Hard white ash.....	\$4.00	\$4.25	\$4.60	\$4.60
Free white ash.....	3.90	4.15	4.60	4.60
Shamokin.....	4.30	4.80	4.60	4.60
Schuylkill red ash.....	4.15	4.50	4.95	4.75
Lyken Valley.....	3.15	3.80	4.25	5.50

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

The Reading Railroad reports that its coal shipment (estimated) for last week, ending January 27th, was 167,000 tons, of which 20,000 tons were sent to Port Richmond and 16,000 tons were sent to New York waters.

The Lehigh Valley Railroad has issued a circular withdrawing all through freight rates on an anthracite coal destined for points on the Philadelphia, Reading & New England Railroad (Poultice Bridge system) and the New York & New England road. The withdrawal took effect on February 1st, after which date the Lehigh Valley's coal shipments to the New England States will go by way of the New York, New Haven & Hartford via Jersey City.

A press dispatch from Harrisburg, Pa., dated January 27th, says that Judge Simonton has made a decree dismissing the famous "Reading Combne" suit of the Commonwealth against the Philadelphia & Reading Railroad and Coal companies, the Port Reading Railroad Company, the Lehigh Valley Railroad and Coal companies, the Central Railroad Company of New Jersey, the Lehigh Coal and Navigation Company and the Lehigh & Wilkes-Barre Coal Company. Counsel for the Philadelphia & Reading Railroad Company filed a supplemental answer setting forth that the leases of the Central Railroad Company, of New Jersey and the Lehigh Valley Railroad Company, made in February, 1892, had been terminated, and the railroads surrendered to the several companies, which have resumed actual possession and operation of their respective lines.

NOTES OF THE WEEK.

Voluminous testimony was given at the hearing in the matter of Isaac L. Rice's petition to have the Reading receivers removed before Master George L. Crawford, at Philadelphia, Pa., on January 31st. Comptroller Jones stated that at the appointment of the receivers the Reading was in-

debted to the Lehigh Valley Coal Company for coal to the amount of \$1,500,000. This loss has since been settled. He could not say whether that included the coal purchased from individual operators, but he believed that it did. The sum of \$193,563 was lost in the purchase of coal from the Lehigh Valley Coal Company. The loss on the operations of the Lehigh Valley from November 16th to March 1st was \$616,351.29, and from March 7th to July 1st \$379,447. To this must be added the \$193,563 lost in the purchase of coal. President Harris, of the Reading, in his testimony, admitted that as a matter of fact the purchase and sale of Lehigh Valley coal resulted in a loss instead of a profit for the first half of 1893, but said that this condition was true of every year. The profits for the latter half of the year balanced the losses. This was due largely to lower prices for coal the first half of the year and more expenses for mining. The price paid the Lehigh Valley depended on the price of coal at tidewater. He believed that it was 60% at this time. There was a clause, the witness said, in the lease giving the Lehigh Valley the power to abrogate the lease at any time when there was a default in the payments for coal. He did not know, but he believed, that the Lehigh Valley waited for coal payments and did not press for money. At the time of the receivership there was a large amount due the Lehigh Valley for coal. The lease was finally abrogated because of non-payment.

The Hartshorne committee of Reading security-holders has issued a circular contradicting a rumor that it and Mr. Isaac L. Rice had abandoned the proceedings against the present management of the Reading company.

A summons in ejectment was issued on January 27th by Prothonotary Degan to Sheriff Woll, of Schuylkill County, to seize on Elisha P. Wilbur, Charles Hartshorne, the Lehigh Valley company and Calvin Pardee, to dispossess them of the York Farm tract, upon which the Lehigh Valley company have erected a breaker known as York Farm colliery, and have made improvements said to cost upward of \$1,000,000. The tract contains 264 acres 140 perches, and is situated at the suburbs of Pottsville, and has proved to be a very valuable coal product. The suit is brought by the heirs of Elizabeth Burke, for whom the property was held in trust by one Mr. Richards. It is claimed that defendants have a defective title.

The statement of the Philadelphia & Reading Coal and Iron Company for December, the first month of its fiscal year, shows gross receipts of \$2,279,310, an increase of \$573,965 over December, 1892. Operating expenses were \$1,983,856; improvements, \$178,001, making a total of \$2,161,857, and leaving as net earnings \$117,453. The fixed charges were \$108,320, leaving a profit for the month of \$9,133, as against a deficit of \$119,527 for December, 1892.

Bituminous.

The large stocks of coal that were laid in by consumers last fall and in the latter months of 1893 are still very far from being used up and this circumstance keeps the market in the condition in which it has been all this year—dead.

There are very few of last year's contracts which are still unfilled; this leaves the market dependent almost altogether upon the transient trade, of which a large proportion consists of orders given by jobbers at a lower ocean freight than the market, the jobber taking this difference in the freight.

A change in the soft coal market is not looked for until stocks in consumers' hands are all worked off, and at the present rate of consumption the outlook for an early improvement in the trade is not very promising. The local trade at the various shipping ports seems to maintain itself quite well, and though it does not amount to much with any single shipper, it forms in these hard times a fair proportion of the total shipments. The all-rail is also well maintained, and it is somewhat surprising how this branch of the trade keeps up in comparison with ocean shipments. New York harbor trade is dormant and very little is doing. The main line roads are still blocked with loaded cars, but the transportation superintendents are learning how to keep this standing coal out of the way enough to prevent serious blockades. The car supply remains sufficient for all demands made upon it.

There is little or no change in ocean freight rates from last week. We quote them as follows from Philadelphia: To Boston, Salem and Portland, 95c. @ \$1; Providence, New Bedford, New Haven and Bridgeport, 80c. @ 90c.; Portsmouth, \$1. From Baltimore, Norfolk and Newport News, rates are from 5 to 10c. higher than the above quotations. There have been some vessels taken at slightly higher rates, but this took place when the shipper was obliged to get a vessel of a particular tonnage for his order. Orders that have been in the market for several days subject to a freight under the prevailing rates do not seem to be shipped, showing that the association is maintaining its rates fairly well, although occasionally outside vessels take freight under the market.

Boston.

Feb. 1.

(From our Special Correspondent.)

The week has been a quiet one in the anthracite coal trade. There is a more settled feeling,

however, since the agents held their meeting in New York last Friday, at which it was agreed to continue to January schedule until the middle of the month when they will hold another meeting. The companies are getting the following net prices f. o. b. New York: Stove, \$4.45; egg, \$4; free broken, \$3.75; chestnut, \$4.45.

Soft coal is also very quiet and without feature. Prices quoted here on cars are: Cumberland, \$3.75 @ \$3.80; New River and Pocahontas, \$3.70; and Clearfield, \$3.40.

Rates are about 10c. per ton weaker owing to the dearth of orders. Rates are as follows: From New York, 60c.; from Philadelphia and Hampton roads, 90c.; from Baltimore, \$1; from Sound points, 10c. less than the foregoing.

There is very little doing in a retail way. Prices are steadily maintained as follows: Stove, \$6.25; nut, \$6.25; egg, \$6; furnace, \$5.75; Franklin, \$7.75; Lehigh egg, \$6.25; Lehigh furnace, \$6; soft coal, \$4.25.

Buffalo.

Feb. 1.

(From our Special Correspondent.)

Several cold days and on Monday last a heavy snowstorm made the retail coal trade quite brisk, and as "Old Probabilities" says this kind of weather is likely to continue, this month may be a good one for the dealers and cartmen. Prices unchanged.

Bituminous coal is very quiet and quotations entirely nominal. The supply is more than adequate for the requirements of manufacturers and others, therefore dealers are willing to make concessions on all cash transactions to save demurrage, etc.

Coke dull and unchanged. It is reported that 37 out of the total of 85 of the Connellsville ovens are idle.

Senator Childs has introduced a bill in the legislature at Albany forbidding the use of bituminous coal in all cities of 600,000 and over inhabitants.

The anthracite and bituminous coal trade of Buffalo for the past two years is shown by the following figures:

	1892.	1893.
Imports by canal.		
Anthracite, net tons.....	54,760	70,546
Exports by canal.		
Bituminous, net tons.....	29,216	19,336
Imports by lake.		
Bituminous, net tons.....	None	None
Exports by lake.		
Anthracite, net tons.....	2,822,330	2,681,173
Blossburg, net tons.....	5,000	7,560
Bituminous, net tons.....	25,000	15,000
Imports by railroads.		
Anthracite, net tons.....	4,750,000	4,700,000
Bituminous, net tons.....	2,627,441	2,896,614
Blossburg, net tons.....	25,000	25,000

* Partly estimated.

Our aldermen are considering the question of municipal lighting, with a view of purchasing the present gas and electric plants in the city, as it is claimed that better service at much less expense would be the result.

The Delaware, Lackawanna & Western Coal Company, by Mr. J. J. McWilliams, a few days since donated 10 tons of coal to the poor of our city, and the Protective Order of Elks No. 23, 50 tons.

The Board of Public Works is taking steps tending toward the abolition of the smoke nuisance in this city. A general inspection of all places where steam is used will be made.

An important case is now before the Supreme Court in Buffalo, Judge Haight presiding, in which coal shippers are interested. It is the Buffalo Creek Railroad vs. E. L. Hedstrom and J. J. McWilliams for \$280 alleged to be due for demurrage charges upon cars of coal. The defendants claim that railroads have no right to collect such charges—about \$1 per car per day—and that discrimination is made on collecting the same which is unjust and illegal. The plaintiffs allege that after a certain time has elapsed for unloading the cars of coal, the cars become practically storehouses and that shippers have no right to use them as such without paying for the privilege. The case is exciting much interest and the court was crowded with railroad men, shippers and others.

Chicago.

Jan. 31.

(From our Special Correspondent.)

No more anthracite coal is to be brought into the West until it can come by water next spring. Cities to the southwest, west and northwest will have such supplies as they need shipped to them from Chicago docks, instead of receiving their coal or cars direct from the mines. By stopping the further inflow of hard coal it is hoped a collapse in prices can be averted. Hard coal has been coming into Chicago at the rate of 200 cars a day and there has accumulated in local railroad yards 4,000 cars, or 60,000 tons of anthracite. The demurrage amounts in these cars to something like \$4,000 per day. An assessment has been levied on members of the old Chicago Coal Exchange which practically passed out of existence three years ago, but unpaid bills to the amount of \$400 have been outstanding and this assessment is necessary to clear this amount. The coal market here remains in its past torpid condition and the prospects are indeed gloomy for all concerned. The extreme cold weather that has been general throughout the West and Northwest for the past week was expected to create a considerable business, but no apparent improvement so far has resulted. It may

have one good effect of clearing up the stocks in the country, thereby opening a possibility of a larger spring or late winter trade. The result of the decreased cost of mining in Pennsylvania is now having its effect in the cost of mining in Ohio, Indiana and Illinois, and it is predicted that this summer will see coal the cheapest it has ever been before.

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

Bituminous.—The bituminous market is dragging along heavily; no movement to any extent is noticed, and unless a great many factories soon start up that are now idle, the chances are that this market will be dull the rest of the season. 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 smelting, \$3.70; Mt. Olive, \$2. Cannel coal quotations are: Pinkney, \$4.25; Birdseye, \$5.60; Kentucky, \$5.60.

Coke has no call of any account. Quotations are: Connellsville furnace, \$4.20; crushed, \$4.30; Ellsworth, \$3.75 @ \$4.25; West Virginia, \$3.75 @ \$4.

All the above quotations are liberal, as in many cases there are constantly being severe cuts made.

Pittsburg.

Feb. 1.

Coal.—The big riot in the Mansfield district was easily put down, notwithstanding the reports to the contrary; but one life was lost, a good deal of property was destroyed, but when it came to fighting the miners could not be counted in. Three brothers, with "Winchesters," drove off between two and three hundred of the strikers and saved their property. It will require four to five weeks to repair damages; until that is accomplished two to three thousand men will be idle. There are about 40 in jail. On Wednesday true bills were found against them; their trial will begin next week.

The fight among local coal men over the Cincinnati prices is at hot as ever, and ugly talk is still indulged in. Fourteen big firms that ship to New Orleans here agreed on the following rates: For New Orleans, first and second pool, coal, 25c. a barrel; third pool, coal, 27c. a barrel; fourth pool, coal, 26c. a barrel, or 10c. a bushel. There are 2 6-10 bushels in a barrel and the barrel measure prevails in the South. There seems to be as little prospect as ever of an agreement among the Cincinnati shippers. While the Pittsburg dealers are steadily losing money on all their sales, the Kanawha shippers are still very sensibly holding out of the fight. The antagonism among the members of the Coal Exchange has even gone so far that some of them have threatened to stay in the fight if they have to ruin one another before the rate war is closed.

Connellsville Coke.—The outlook shows signs of improvement; last week's active list showed an improvement of 270 ovens. Production for the week was light, amounting to 67,340 tons, an increase over the preceding week of 50 tons. The operators are taking great care to prevent stocking coke at this season of the year, and are holding production down. The demand for coke is more encouraging; the last week was the largest for any week since the first of January. The number of cars sent from the region carried 82,458 tons, an increase over the week previous of 5,996 tons.

The Frick company is in better shape for a larger production and have decided to fire up 250 ovens at once. The average for the region was 5'02 days, against 4'93 days the week previous. Of the 85 plants in the region 49 are in active operation and 36 idle. Of the 49 active plants 13 plants, 1,850 ovens, made six days; 21 plants, 4,432 ovens, five days. The shipments for the week were: To Pittsburg, 1,715 cars; to points East, 1,106 cars; to points West, 1,660 cars; total, 4,481 cars.

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

The new Frick scale went into effect February 1st. The other coke operators have given no public notice of what they will do; some of them claim to be paying 15% more than the Frick scale while the workmen insist that there is no truth in the statement.

IRON MARKET REVIEW.

New York, Friday Evening, Feb. 2, 1894.

Pig Iron Production and Furnaces in Blast.

Fuel used.	Week ending		From		From	
	Feb 3, 1893.	Feb. 2, 1894.	Jan., '93	Jan., '94.	Tons.	Tons.
Anthracite.	70	31,999	29	14,192	159,845	70,940
Coke.....	139	135,610	81	82,937	668,050	414,838
Charcoal...	39	8,951	20	3,884	44,775	19,430
Totals....	248	174,564	130	101,013	872,670	505,215

Pig Iron.—Some improvement is to be noted in the pig iron market, following the lines mentioned in our last week's report of the trade. There has been a better inquiry and more sales are reported. The orders have continued small individually, but in the aggregate they show that a better feeling prevails among consumers. Prices, however, con-

tinuous low, and it is said that concessions from recent very low prices have been made by sellers, but on the whole we find that values are neither more unsteady nor lower than they have been for some time past.

Normally prices should show an improvement together with the demand, but these are not normal times. Quotations are nominally as follows: Northern brands; No. 1, \$13@14; No. 2, \$12.50; gray forge, \$12.

For Southern iron we quote: No. 1, \$13@13.75; No. 2 F., \$12@12.50; No. 1 soft F., \$12@13; gray forge, \$11@12—all at tidewater. Scotch irons are quoted: Coltness, \$21.50@22; Eglington, \$19.50@20; Sumemrlce, \$21.50@21.

Billets and Rods.—No business in either billets or rods is reported this week. The market continues quiet, with prices still more or less unsettled. Quotations for domestic billets are nominally \$18@18.50, but doubtless these prices would be shaved for desirable orders. Wire rods, domestic, \$26@27.

Manufactured Iron and Steel.—There is no marked change in this market, although a better feeling prevails owing to the fact that some fair-sized orders will shortly be in the market. Prices are still low. We quote nominally: Angles, 1.55@1.65c.; axles, scrap, 1.50@1.75c. delivered; steel, 1.60@2c.; bars, common, 1.15@1.30c.; refined, 1.45@2c. on dock; beams, up to 15 in., 1.60@1.75c.; 20 in., 1.80@2c.; car truck channels, 1.95@2c.; channels, 1.65@2c. on dock; steel hoops, 1.75@1.9c. delivered; lunks and pins, 1.70@1.80c.; plates, flange, 1.80@2c.; firebox, 2@2.50c.; flange, 2.10@2.25c.; marine, 2.50@2.75c.; sheared, 1.80c.; shell, 1.60@1.90c.; tank, 1.50@1.60c.; universal mill, 1.50@1.70c.; tees, 1.75@2c., all on dock.

Merchant Steel.—There is no change to report of this market. It continues quiet and without any especial feature. We quote tool steel, \$6@6.50; tire steel, \$1.90@2; toe calk, \$2.10@2.20; Bessemer machinery, \$2@2.10; open hearth machinery, \$2.10@2.20; open hearth carriage spring, \$2@2.10; crucible spring, \$2@2.10.

Old Material.—We do not hear of any business worthy of mention doing in this market. Quotations are nominally as follows: Old iron T rails, standard sections, at \$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, \$10@10.50, delivered to vessels at this port; old steel rails, \$9@10; old wrought tubes and pipe, \$7.50@8.50; wrought turnings at \$9@9.25 delivered at mill; old car wheel, \$11@12 New York; cast borings, \$6@7 delivered at mill.

Rail Fastenings.—This market continues exceedingly quiet. Quotations are nominally: Fish and angle plates, 1.30@1.50c. at mill; spikes, 1.75@1.90c. bolts and square nuts, 2.15@2.40c.; hexagonal nuts, 2.30@2.50c., delivered.

Spiegeleisen and Ferromanganese.—We do not hear of any business doing in this market in either spiegel or ferro. Prices are nominally: Spiegeleisen, 10@12, \$21@22; 20%, \$25@26. Ferromanganese, \$53@54.

Steel Rails.—A sale by an Eastern mill of 1,500 tons of rails is reported. The market here, however, continues very quiet. The combination price for standard sections, \$24.80 tidewater, still obtains.

NOTES OF THE WEEK.

A dispatch from Boston, Mass., states that the directors of the Illinois Steel Company held a meeting there on January 27th. The figures for the year ending December 31st will be ready about the middle of February and they will show about 3% earned on the stock. The payment of a dividend, it is said, will not be considered, however, until the outlook is better. The company has work ahead for four or five months, but it has been taken at prices that will not permit of any profit, and was done to keep the works running.

Buffalo. Feb. 1.

(Special Report of Rogers, Brown & Co.) There have no new features developed in the pig iron market this week. Business continues to drag and shipments indicate a consumption of iron which is less than two-thirds of the normal volume. Prices are irregular, and under a lively competition show no strength. The improvement in demand noticed last week is sustained, but it is not of sufficient force to influence the market in any manner. We quote on the cash basis f. o. b. cars Buffalo: No. 1 X foundry strong coke iron, Lake Superior ore, \$13.00; No. 2 X foundry strong coke iron, Lake Superior ore, \$12.50; Ohio strong softener No. 1, \$13.00; Ohio strong softener No. 2, \$12.50; Jackson County silvery No. 1, \$16.80@17.30; Jackson County silvery No. 2, \$16.30@16.80; Lake Superior charcoal, \$15.25; Tennessee charcoal, \$15.75; Southern soft No. 1, \$12.75; Alabama car wheel, \$16.50@17.50; Hanging Rock charcoal, \$18.50@20.

Chicago. Jan. 30.

(From our Special Correspondent.) The past week is virtually a repetition of the previous one. Carloads and small orders remain the feature, but inquiries for larger quantities are more numerous. Consumers are beginning to become more hopeful of the future; at the same time they are indisposed toward contracting ahead, except where it is actually necessary. The Northern coke furnaces, it is said, are prepared to make some further concessions in price where inquiries come in for round lots from known customers. The Iron

Committee of the Central Traffic Association held a meeting yesterday at the chairman's office and agreed upon a reduction in the rates charged upon iron and steel articles in Central Traffic Association territory to the basis of sixth class in carloads and fifth class in less than carloads. The Committee further recommended that the trunk lines adopt the same basis of rates to points in their territory. The new rates go into effect February 5th.

Pig Iron.—The week just passed has been the best so far this year in the pig iron market. Inquiries have been more numerous, and in many cases have led to business. There is a good run of small orders, and several that might be called large with the present conditions. Prices continue to be shaded 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, \$12.40; No. 2, \$11.65; Lake Superior charcoal, \$15@15.50. Lake Superior coke No. 1, \$13.50; No. 2, \$12.25@12.50; No. 3, \$12.00@12.25. Lake Superior Bessemer, \$14; Lake Superior Scotch, \$13.75@14.25; American Scotch, \$15.50@16. Ohio silvers No. 1, \$16.50; No. 2, \$16. Ohio strong softeners No. 1, \$16; No. 2, \$15.75; Tennessee charcoal No. 1, \$16.50; No. 2, \$16. Standard Southern car wheel, \$18.25@18.75.

Structural Iron and Steel.—Some small business is in sight, but nothing of importance. Quotations are as follows, Chicago delivery: Angles, 1.75@1.85c.; tees, 1.95@2.00c.; universal plates, 1.70@1.80c.; sheared plates, 1.70@1.80c.; beams and channels, 1.85@1.95c.

Plates.—But little can be said for plates during the week, the market being about as dull as it could be. Prices are: Flange steel, 2.30@2.50c.; best firebox steel, 4.50@5.00c.; tank steel, 1.70@1.80c.; shell steel, 2.25@2.50c.; iron or steel sheets from No. 10 to 14, 2.10@2.25c.

Merchant Steel.—The market for merchant steel has improved a trifle during the week, the carriage makers and others having bought a considerable quantity. Prices are, carload lots: Smooth finished machinery steel, \$2.10@2.30; open hearth tire steel, 1.90@2.10c.; ordinary Bessemer bars, 1.55@1.65c.; toe calks, 2.25@2.35c.; ordinary tool steel, 6.50@7.00c.; special brand tool steel, 12@20c.; crucible spring, 3.50@3.75.

Galvanized Sheet Iron.—No increased movement is noted, nor are signs for early improvement to be seen. Quotations on Juniata are 70, 10 and 10% off for mill shipments. Job quantities are selling at 75% discount.

Black Sheet Iron.—There is a trifle more inquiry noted. Jobbers are discovering that their stock needs to be sorted up. A noticeable feature of the market during the week is that several large manufacturers, such as ash-pan and trunk makers, have come into the field again, and dealers are confident that business will soon regain some of its former prestige. Prices for small lots from stock are: f. o. b. Chicago: No. 24, 2.50c.; No. 26, 2.60c.; No. 27, 2.65c. Same gauges and steel sheets are 3.10@3.20c. less 10c. per 100 lbs. for large lots.

Bar Iron.—It is quite apparent that there is not only a better inquiry developed the past week in bar iron, but that there is more actual business being transacted than for some time past. Prices, it is safe to say, will not go any lower, and so confident are mill men to that effect that they are making the first of July a limit of shipments at the present market prices. For small lots from stock, prices are 1.60@1.70c. for iron and 1.65@1.75c. for soft steel bars. Mill prices are: f. o. b. Chicago, 1.30@1.35c. for bar iron, and 1.40c. for soft steel bars.

Billets.—The Joliet Mills of the Illinois Steel Company have now been in operation one week, but it is expected the run will not last much over three weeks. Quotations are \$18@18.50. Joliet rods are nominal at \$25.

Steel Rails.—The Illinois Steel Company's rail mill at South Chicago may resume soon. The market has improved slightly with prices at \$25@27.

Nails.—There is hardly any perceptible demand for wire nails, while steel cut nails are in poor demand. The works of the Lakeside Nail Company at Hammond, Ind., employing 500 men and boys, will resume operations at the end of the present month. The company manufactures steel cut nails, and has been in operation three years up to the close-down six weeks ago.

Scrap.—But little 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.—Old car wheels have met with some favor during the week, the price, being generally lower than the ruling quotations. Old rails are in no demand, the quotation being for old steel rails \$7.50@10, and old iron rails \$12.50@13.00.

Pittsburg. Feb. 1.

(From our Special Correspondent.) **Raw Iron and Steel.**—The past week has developed nothing of special importance; the market is still a waiting one, notwithstanding the fact that we have passed January and have now to deal with the second month of 1894. That the iron and steel trade has been and is still demoralized, to an extent that was never before known since iron was first made in this country, is a stubborn fact well known

to those engaged in the business, and what seems worse, no change is looked for until Congress has disposed of the Wilson tariff bill. Prices for all descriptions of iron and steel, raw and finished material, are away below any prices that were ever dreamed of, and there is apparently no room for further reductions in rates without going below the cost of manufacture.

Business seems to be improving in the valley district within a few days. The Youngstown Bridge Company has received a large number of desirable contracts, sufficient to keep the entire plant in steady operation for the next six months, all departments of the establishment were started on Monday on full time. Steel billets and slabs show no improvement so far as relates to values. The lowest sale made public was at \$15.50; highest, \$16.00 f. o. b. at works. Rumors from Philadelphia report sales at \$15.00. For new steel rails there is scarcely any inquiry; the nominal value f. o. b. cars at works is \$24. Bessemer pig is selling at panic prices, \$10.60@10.75. At the close Bessemer and billets showed more firmness.

Table with columns: Tons, Bessemer, Cash, and various steel products like 600 Billets and Slabs, Skelp Iron, Muck Bar, Blooms, Billets, Bar Ends, Ferro-Manganese, Sheet Bars, Steel Wire Rods, Charcoal, and Old Rails.

Philadelphia. Feb. 1.

(From our Special Correspondent.)

Pig Iron.—The amount of business for the past six days has been very disappointing. Buyers talk and act as though they thought another drop might be at hand. Most of the business done this week in No. 1 foundry was at \$13.25 and \$13.50. Brokers are expecting quite a run of orders from concerns using No 2 iron. The average price asked for fair brands is \$13. Several mills will start up in a few days, and this has brought buyers of forge iron to the front. The lower grades have been taken at about \$11 to \$11.25. The general situation has not materially improved. Expectations are indulged in of a large volume of business this month, but the market conditions do not warrant the belief that very large transactions will take place.

Steel Billets.—There is a belief among makers, and brokers representing them, that a reaction in the billet market is near at hand. No instance can be given of sales under \$17.50, although it is said that there have been transactions at less. Buyers make light of the intimations of a reaction to higher prices. Western makers are keeping a very close watch on this market. The situation is likely to improve here, because of the small amount of material which consumers have on hand.

Merchant Iron.—The improvement in business is not felt at the mills, but at the stores. The distribution has improved, and storekeepers talk hopefully of a further improvement. Country mills, in their struggle to get business, have taken orders at 1.25, though so far but little of the business secured is at that figure. We have the promise of large orders from car builders.

Nails.—The storekeepers are working off a good many nails, but the factory people say they are not getting many orders. The production will probably be increased, in spite of the unfavorable market conditions, and nothing but the lowest range of quotations need be expected for a long time to come.

Skelp Iron.—The latest report is that some big skelp orders will be placed in this market within a week. Quotations have been given at least.

Sheet Iron.—The stores are working off a good deal of sheet iron in a retail way, and mill owners are more satisfied with the developments in galvanized within a week. Quotations are not given, and card rates have no existence except on paper.

Plate and Tank Iron.—The only business heard of has been in boiler iron and steel. In this respect there is an improvement in progress, growing out of the purchases made by quite a number of concerns for new work lately secured. The agents for mills give a very encouraging report for the next month.

Structural Material.—Apart from a few small orders for buildings under way, and a few small railroad bridges, and some little material for repairing work, there is nothing to speak of in this market.

Steel Rails.—Steel rails are quoted at \$24. Whatever sales may have taken place are kept back. The representatives of mills say there is nothing of public interest transpiring.

Old Rails.—Some railroad companies having more old rails than they have need of are trying to find brokers who can handle them; but there is no market at present and the only way to dispose of them will be in trade.

METAL MARKET.

NEW YORK, Friday Evening, Feb. 2, 1894.
Prices of Silver per Ounce Troy.

Jan.	St. Ex.	London Pence.	N. Y. Cts.	Value of sil. in \$.	Jan.	St. Ex.	London Pence.	N. Y. Cts.	Value of sil. in \$.
27	1-86 1/2	30 1/2	66 1/2	514	31	1-86 1/2	30 1/2	66 1/2	515
28	1-86 1/2	30 1/2	66 1/2	514	1	1-86 1/2	30 1/2	66 1/2	515
30	1-86 1/2	30 1/2	66 1/2	515	2	1-86 1/2	30 1/2	66 1/2	512

February.

The price of silver stands up wonderfully well when the fact is considered that it no longer has an artificial support; but that its rating is dependent on the judgment of the nations who still prize its value and are willing to part with the labor of their hands in exchange for the white metal. The fact, however, remains true that we must either see an advance and enlargement of Oriental business to sustain the recent rates of silver, or else a contraction in the output of the mines. The result will be watched with interest.

The large acceptance of India Council bills—about 40 lacs—on Wednesday had a sympathetic influence on silver, which operated in favor of a decline.

The United States Assay Office at New York reports the total receipts of silver for the week to be 107,500 oz.

Gold and Silver Exports and Imports at New York, Week Ending January 27th, 1894, and for Years from January 1st, 1894, 1893, 1892.

Week	Gold.		Silver.		Excess of Ex. or Imp.
	Exports.	Imports.	Exports.	Imports.	
1894	\$939,296	261,828	3,412,790	113,782	E 3,976,476
1893	10,755,895	33,260	2,493,784	75,285	E 13,091,134
1892	129,372	389,904	1,818,832	106,242	E 1,452,058

There were no gold exports during the week; the silver went to London. The gold imports for the week included \$96,500 from London, the balance coming from the West Indies; the silver came from Central America.

During the five days ending February 1st the exports and imports of gold and silver were as follows: Exports, gold, \$49,028; silver, \$553,024. Imports, gold, \$110,083; silver, \$11,003. Of the gold exported \$30,000 was in Spanish coin and the remainder was in American coin and bullion and all went to the West Indies. All the silver exported went to London; it included \$42,200 in Mexican coin and \$510,824 in American coin and bullion.

NOTES OF THE WEEK.

The business situation can hardly be said to have changed during the week and any improvement that may be noted is of very moderate degree. While there is a tendency to increased activity in manufacturing, it is still held back by uncertainty as to the final result on the tariff and by the labor troubles existing in many places.

The events of the week have been the passage of the Tariff bill by the House of Representatives and the new bond issue. Of the former, which is more fully referred to in another column, it need only be said that the bill passed February 1st substantially as reported by the Ways and Means Committee, with the addition of the internal revenue measure, including an income tax clause, and is now ready to go to the Senate.

The bond issue has been the subject of much discussion, both in and out of Congress, and in some quarters the opinion has been freely expressed that the issue would fail. While the authority of the Secretary to issue bonds under the act of 1875 seems to be quite clear, the point was raised that it could be done only for the purpose of establishing a gold reserve, and that any use of money received for the bonds for current expenses would be illegal. For the first time in many years partisanship has been carried so far as even to threaten repudiation of obligations of the United States, and, in certain quarters, every effort was used to discourage subscriptions to the new bonds. On February 1st, however, it was announced that the subscriptions received amounted to over \$55,000,000, at premiums ranging from the price fixed by the Treasury, 117-27, to 120, while returns were still to be received from some of the subtreasuries. The total amount of subscriptions reported to date is \$54,500,000. The issue will bring nearly \$60,000,000 into the Treasury and materially strengthen its position. Its success

was largely due to subscriptions of about \$40,000,000 from New York, made after the Secretary had visited New York and held a conference with a number of the leading bankers of that city.

The statement of the New York banks for the week ending January 27th shows increases of \$6,283,550 in reserve; \$3,265,700 in specie; \$4,369,900 in legal tenders; \$5,383,200 in deposits; decreases of \$914,300 in loans, \$65,000 in circulation. The total surplus is \$245,966,000, or \$100,043,000 in excess of the legal requirement.

The increase in deposits, it is understood, comes largely from the continued placing by country banks of their balances in New York, in the hope of finding some use for the money there. The decrease of nearly a million in loans is not a favorable sign.

While all currency legislation has been for the present postponed on account of the discussions on the tariff bill, it must not be forgotten that there are two measures at present before the House Committee on Banking and the Currency which are likely to be brought up before long. The first is the repeal of the tax on State bank issues, which, if passed, would permit the State banks now existing or hereafter to be formed to put out currency under such regulations as the several States impose. The advocates of this measure do not seem to be very active, and it is quite probable that no bill will be presented to the House, especially as there seems to be considerable difference of opinion among them as to the terms of a repeal.

The second measure, which will probably be pressed by its advocates, provides for the coining of the so-called seigniorage silver—the difference between the actual cost and coinage value of the silver purchased but not coined under the late Sherman act. This will undoubtedly meet with strong opposition.

The statement of the United States Treasury on Thursday, February 1st, showed balances in excess of outstanding certificates amounting to \$77,912,882, made up as follows: Gold, \$65,650,175; silver, \$7,580,011; legal tenders, \$2,367,190; treasury notes, etc., \$2,315,506. This shows a decrease during the week of \$2,634,976 in the total balances, and of \$2,006,939 in gold.

The total face value of the coinage of the United States Mint for the year 1893 was: in gold coin, \$57,122,020; silver, \$8,637,797; subsidiary coins, \$1,134,932; total, \$66,894,749. This is the largest amount coined in one year in recent years.

The Bank of England statement on Thursday, February 1st, showed its gold holdings to be £28,026,646, an increase of £2,004,457 over the corresponding date in 1893.

The Bank of France on Thursday, February 1st, reported its specie holdings, in sterling, at £67,844,292 gold and £50,390,207 silver; an increase of £1,990,292 gold and £118,507 silver as compared with the corresponding date in 1893.

Domestic and Foreign Coins.

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

	Bid.	Asked.
Mexican dollars	53 1/2	54
Peruvian soles and Chilean pesos	.51	.53
Victoria sovereigns	4.87	4.89
Twenty francs	3.85	3.92
Twenty marks	4.71	4.78
Spanish 25 pesetas	4.82	4.87

Other Metals.

Copper.—As there is no demand, except in the smallest way, for copper of any of the finer grades, it is but natural that we have to report prices lower than those of a week ago, so that 9 1/2 @ 9 3/4 seem now to be the highest figures we are warranted in quoting for Lake, while other descriptions we value as follows: Electrolytic at 9 1/2 @ 9 3/4; ingot casting of standard quality at 9 1/4 @ 9 3/4; and Arizona pig copper, guaranteed 98% at 8 1/2, the last named still maintaining the comparatively higher level of the last few months.

Abroad, as well as here, the tendency has been toward lower prices, although, as frequently happens, this does not so much appear from the quotations for G. M. B. copper, which are £41 5s. for spot and £41 12s. 6d. for three months prompt. Nothing else could very well be expected, considering the fact that consumers have, as it is reported to us, moderate stocks available out of the liberal purchases made in America last year, which they will use up almost entirely before they will go into the market again and buy at prices higher than those last paid. Evidently they have already formed this determination, as they have not been much tempted even by the low offers of lake and electrolytic copper, the latter in cathodes, made from this side, the prices named being equal, for the former to 9 55 @ 9 30 New York and for the latter to 9 10 f. o. b. at the same point.

The only pleasant feature of the week has been the reported decrease in visible supplies during the second half of January, of 400 tons, due, beyond a doubt, to the smaller shipments of late made from America. Refined and manufactured we quote as below: English tough, £43 17s. 6d. @ £44 2s.

6d.; best selected, £45 2s. 6d. @ £45 12s. 6d.; strong sheets, £51 17s. 6d. @ £52 2s. 6d.; India sheets, £49 17s. 6d. @ £50 2s. 6d.; yellow metal, 4 1/2 d.

The exports of copper for January, according to custom-house returns, as reported by the New York Metal Exchange, were as follows:

	Tons copper.	Tons matte.
From New York	4,286	430
From Baltimore	2,513	—
Total	6,799	430

Reducing the matte at 55% into fine copper, the total exportation for January figures up to 7,035 tons of 2,240 lbs.

During the same time there were imported: 2,935 tons of copper ore from Newfoundland at New York; 1,988 tons of copper ore from Spain at Philadelphia.

The exports of copper from the port of New York for the week ending February 2d, as reported by the New York Metal Exchange were as follows:

Copper:		
Hamburg—Danis	Cakes	3 tons
Naples—Wieland	"	5 "
Hamburg—Sorrento	Cakes	10 "
Liverpool—Runic	Pigs	100 "
"	Bars	25 "
"	Plates	53 "
"	"	53 "
"	"	46 "
Antwerp—Waesland	Ingots	50 "
"	Plates	40 "
Rotterdam—Edam	Ingots	211 "
"	Pigs	87 "
Havre—La Bretagne	Ingots	100 "
Antwerp—Belgenland	"	165 "
Swansea—Wells City	Bars	100 "
London—Mohawk	Ingots	116 "
Matte:		
Liverpool—Horrox	"	24 "

The exports of copper from Baltimore for the week ending February 1st, as reported by our special correspondents, were as follows:

Copper:		
Jan. 24. Antwerp—Rialto	1,642 bars	224,502 lbs.
"	2,360 plates	44,800 "
Jan. 25. Liverpool—Queensmore	20,873 ingots	336,000 "
"	230 bars	54,063 "
Jan. 26. Rotterdam—Delano	7,606 ingots	123,200 "

Other metals exported were as follows: January 24th, 337 bbls. ferro-manganese, 475,404 lbs., to Antwerp, per "Rialto."

Tin has fluctuated more or less during the week, and at the close is lower than when we last reported, as we have to quote as follows: Spot and February, 19-90 duty paid and 15-90 in bond; March and April, 19-80 duty paid and 16 to 16 20 in bond.

The London market opened Monday morning a trifle under the close of the preceding week, and has steadily declined throughout the week, closing at £71 for spot and £71 17s. 6d. for three months prompt, showing a decline in the week of about 10s. per ton, the increase of 800 tons in the visible supplies, reported for January, not helping to stay the downward movement.

Lead is even firmer than when we reported last. The continuing low prices for silver are gradually curtailing more and still more the supply of raw material, and, in turn, of refined lead, the demand for which has improved, causing prices to advance, until now we have to quote the market very firm, with few sellers, at 3 1/4 to 3 40 New York.

Prices abroad are unaltered. **St. Louis Lead Market.**—The John Wahl Commission Company telegraph us as follows: The uncertainty of the past two weeks in pig lead has finally given place to decided strength, and quite a little boom in this metal has been inaugurated within the last few days. Consumers have shown more disposition to take on supplies, and the amount of metal previously pressing for sale has materially diminished. Last sales are at 3 07 1/2 c. At the close, however, little lead could be had below 3 10.

Spelter. although not in the briskest possible demand, is stronger because of curtailed output, and it would seem as if the most ordinary demand must considerably enhance values, which, to-day, are 3 40 East St. Louis and 3 65 @ 3 70 New York.

Abroad, however, prices have declined, as G. M. B. spelter is now quoted at £16 flat, and specials at £16 2s. 6d. @ £16 5s.

CHEMICALS AND MINERALS.

NEW YORK, Friday Evening, Feb. 2.

Heavy Chemicals.—There is very little change to report of this market. It remains practically as it was at the time of our last report. Some business has been done in alkali and carbonated soda ash, while caustic soda has continued in fair request on the part of the smaller customers, the larger contracts having already been signed. Bleaching powder is quiet. We quote nominally as follows: Caustic soda, 60%, 3 05 @ 3 20c; 70%, 2 80 @ 3c; 74%, 2 82 1/2 @ 3 05c; 76%, 3 @ 3 10c. Carbonated soda ash, 48%, 1 15 @ 1 25c; 58%, 1 10 @ 1 20c. Alkali, 48%, \$1.10 @ \$1.20; 58%, \$1.05 @ \$1.15, according to package. Sal soda, English, 1 @ 1 05c; American, 90 @ 92 1/2c. Bleaching powder, 2 25 @ 2 50.

Acids.—This market continues dull and devoid of features of interest. Consumers are not contracting as heavily as they usually do. Knowing how improbable a market advance in prices is, they are buying from hand-to-mouth, just enough to meet

their pressing requirements. Prices are without change and we quote: Acids, per 100 lbs. in New York and vicinity, in lots of 50 carboys or more: Acetic, in barrels, \$1.62½@1.75; muriatic, 18", 80c@81; 20", 90c@1.10; 22", \$1@1.25; nitric, 40", \$4; 42", \$4.50@4.75; sulphuric, 75c@81. 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, \$18; shipments, \$17. Thirds are 75c@81 less.

Fertilizing Chemicals.—There is no change whatever in the fertilizer market from last week. The market continues quiet. Owing to light stocks the ammoniates are firmer and in some cases higher. Our quotations this week are: Sulphate of ammonia, gas liquor, \$3.60@3.65; bone, \$3.40@3.50; dried blood, \$2.55@2.60 per unit for high grade and \$2.35@2.40 for low grade. Azotine, \$2.50@2.60. Concentrated phosphate (30% available phosphoric acid), 75c. per unit. Acid phosphate, 13% to 15%, av. P₂O₅, 60c. per unit at seller's works in bulk. Dissolved boneblack, 17% to 18% P₂O₅, 92½c. per unit. Acidulated fish scrap, \$15 @16, and dried scrap nominally \$25 f. o. b. fish factory; wet scrap, \$15 f. o. b. fish factory. Tankage, high grade, \$25.50@26.50; low grade, \$22@22.50. Bone tankage, \$23@24; bone meal, \$24 @25.50.

In lots of 50 tons on contracts 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 96-99% (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%, \$5.25; river rock, 58%, \$6; all kill-dried.

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 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.—Owing to arrivals of nitrate during the past few days the market is somewhat lower and is now quoted at \$1.90@1.92½ on the spot.

Messrs. Mortimer & Wisner, the well-known brokers of this city, send us their usual monthly statement of nitrate of soda issued under date of February 1st.

	1894.	1893.	1892.
	Bags.	Bags.	Bags.
Imported into A. ports from West Coast S. A., Jan. 1, 1894, to date.....	47,764	19,991	66,404
Imported into Atlantic ports from Europe.....	.....	5,225	.....
	47,764	25,216	66,404
Stock in store and afloat			
Feb. 1, 1894, New York.....	45,612	6,156	61,922
Boston.....	2,700	220	1,000
Philadelphia.....	.....	.....	.....
Baltimore.....	4,500	200	1,200
To arrive, actually sailed	150,000	272,000	172,000
Via supply to May 15, 1894	202,812	278,576	236,122
Stock on hand, Jan. 1, 1894.	44,938	15,454	53,588
Deliveries past month....	39,890	34,094	55,867
Total yearly deliveries.....	.....	754,560	685,158
Prices current., Feb. 1, '94	1'92½@1'95	234	1'85@1'74

Included in the deliveries of 1893 are 9,500 bags shipped to European ports.

Liverpool. Jan. 23.
(Special Correspondence of Jos. P. Brunner & Co.)

There is nothing of interest to report regarding the chemical market, business generally being dull and of a disappointing character. Soda ash is in moderate request and for Leblanc makes quotations vary according to make, quantity, market, etc., the nominal range being about as follows: Caustic ash, 48%, £3 15s.@£4 5s. per ton; 57-58%, £4 10s.@£5 per ton. Carb. ash, 48%, £3 15s.@£4 5s.; 58%, £4 10s.@£5 per ton net cash.

Ammonia ash, 58%, is less active, but prices are well maintained at £4@£4 5s. per ton net cash for casks, and 5s. less for bags. Soda crystals are slow of sale at £3 per ton, less 5%.

Caustic soda is somewhat dull, while quotations remain unchanged, the spot range, 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. Makers are prepared to make concessions for contracts over all 1894 delivery.

Bleaching powder is almost at a standstill and for hardwood packages £7 10s.@£8 per ton net cash is nominal spot range, while tendency seems to be toward still lower prices. Bicarb. soda is in steady request and firm at £6 15s. per ton, less 2½% for 1 cwt. kegs with usual allowances for larger packages. Chlorate of potash is quite neglected as regards January delivery. There are a fair number of inquiries for January-June and all 1894 delivery, but at the same time there is little actual business reported. We quote: January, 7½@7½d. per lb.; January-March, 7½@8d.; January-June, 7½@7½d.; January-December, 7½@7½d., less 5%.

Sulphate of ammonia, although there is not much going on, is rather firmer at £13 11s. 3d.@£13 15s. per ton, less 2½% for good grey 24-25% in double bags, f. o. b. here.

Nitrate of soda is scarce on the spot and sellers ask £9 12s. 6d.@£9 15s. per ton, less 2½% for export quality in double bags, f. o. b. here. Carb. ammonia—Lump, 3½d. per lb. Powdered, 3½d. per lb., less 2½%.

MINING STOCKS.

NEW YORK, Friday Evening, Feb. 2.

[For complete quotations of shares listed in New York, Boston, San Francisco, Aspen, Colo.; Baltimore, Pittsburg, St. Louis, London and Paris, see pages 118 and 123.]

The mining stock market during the past week has been exceedingly quiet and altogether void of features.

The Comstocks during the early part of the week gave promise of some activity. Toward the close, however, they became dull. We note sales of 100 shares of Belcher, at \$1; 400 shares of Consolidated California & Virginia, at \$3@3.40; 225 shares of Gould & Curry, at 55@95c.; 75 shares of Hale & Norcross, at 50c.; 100 shares of Ophir, at \$1.85; 1,200 shares of Alta, at 19@20c.; 100 shares of Best & Belcher, at \$2; 278 shares of Chollar, at 47@50c.; 300 shares of Comstock Tunnel, at 8c.; 350 shares of Consolidated Imperial, at 10c.; 300 shares of Mexican, at \$1.05@1.25; 20 shares of Potosi, at 50c.; 110 shares of Union Consolidated, at 65@90c.; and 100 shares of Utah, at 2c.

Of the California shares we note a sale of 40 shares of Brunswick Consolidated, at 5c. There were sales of 200 shares of Ontario, at \$8@8.13.

Through the courtesy of Mr. A. I. Harrison, secretary and treasurer of the Horn-Silver Mining Company, of Utah, the "Engineering and Mining Journal" exclusively is enabled to give in advance a summary of the report of this company for the year ending December 31st, 1893. We have had occasion frequently to refer to the excellent record made by this property under the present management. The abstracts which we publish below will show in what good condition the company is, both from a mining and a financial standpoint. The superintendent's report says that the total ore extraction during the year was 19,766½ tons, all of which was sold to the Germania Smelting and Refining Company on contract. The company was obliged to practically suspend operations for nearly two months owing to the drop in the price of silver, which accounts to the shrinkage in tonnage as compared with 1892. During the last five months the average value of the ore in silver has been nearly double the ordinary value; this increase was due to a new discovery in the north end of the 300-ft. stope; this ore chute is 14 ft. wide and continues north and downward. The cost of ore extraction was \$58,837; dead work, \$15,242; surface labor, \$24,861; and supplies, \$32,467. The dead work performed was as follows: In the first level the winze was sunk 20 ft. and the north drift extended 75 ft. Fifth level, south drift extended 51 ft. Five hundred and fifty-foot level, south drift extended 134 ft. Seventh level, north drift extended 339 ft. Eighth level, north drift extended 130 ft. Eleventh level, north drift extended 202 ft. The cost per ton of ore was as follows: Extraction, \$2.97; dead work, 77c.; surface labor, \$1.26; supplies, \$1.64; total, \$6.64. The average value of ore per ton was \$24.86. Early in June bids were asked for and received for the erection of a 20-stamp mill with twelve 6-ft. Frue vanner tables for concentrating the low-grade ore from the mine. Owing to the financial trouble commencing about that time operations were suspended until October, when the contract was awarded to Fraser & Chalmers, of Chicago, for \$16,021. This estimate is for the mill machinery complete f. o. b. Chicago. This, however, does not include two engines and three boilers which were moved from the Francklyn smelter to the mine. The mill has a daily capacity of 125 tons. The air compressor costs \$13,434. It is the intention of the management to run the pump and engines at the well with compressed air. An electric light plant of 225 lights capacity for lighting the mill, hoisting works and station in the mine is being put in. The financial statement of the company is as follows: Receipts: Cash balance from last annual report, \$276,684; ore sales, \$491,430; interest account, \$11,561; store at Frisco, \$10,660; bills receivable, \$1,500; house

rents, etc., \$420; transfer fees, \$4. The payments during the year were as follows: Mining, \$135,306; concentrating plant, \$41,046; general expenses (salaries, taxes, etc.), \$27,841; mine account (purchase Dumbarton lode adjoining present property), \$3,000; dividends, \$230,000. This leaves a balance, cash on hand, of \$355,067, or nearly \$79,000 more than the cash balance a year ago. The showing made by the Horn-Silver Mining Company is one to be proud of and speaks highly for the management.

Boston. Feb. 1.

(From our Special Correspondent.)

There is not much to be said about the market for copper stocks this week. There is very little doing and prices continue to decline, although there is no great pressure to sell and (on the other hand) very few orders to buy—result, a dull and lifeless market.

Boston & Montana declined from \$25 to \$24, with recovery to \$24½ on sales of less than 1,500 shares. Butte & Boston declined \$¼ to \$8½, with sales of 400 shares.

Calumet & Hecla sold up \$2 to \$300, but lost the advance later; sales, 30 shares. Tamarack declined to \$157; recovered to \$160, the later sales being at \$158. There were no sales of Quincy reported for the week—\$111 ex-dividend (\$4) is bid and \$116 asked. The last sales were \$120, dividend on. A special meeting of the stockholders is called for March 15th next to consider the question of increasing the capital stock of the company and giving the stockholders the right to the increased shares at par (\$25).

Oscuela declined \$½ to \$26 on small transactions. Franklin sold in small lots at \$9½@10 and \$9½, respectively. Kearsarge was the only stock on the list showing an advance and that only ¼, at \$7½, after selling at \$6¾. Centennial sold at \$4½, declined to \$3½, and recovered to \$4.

Atlantic declined from \$10 to \$9½ on sale of about 100 shares. Wolverine sold at \$1¼ and Tamarack, Jr., at \$19 for a small lot.

San Francisco. Jan. 26.

(From our Special Correspondent.)

There has been little or no change in the mining stock market albeit prices have day by day fallen off a point or two. The center of attraction continues to be Consolidated California & Virginia stock, which at the opening of the week sold for \$3.25 and to-day touched no higher point than \$2.85. The present ruling rate of the bonanza stock curiously illustrates the senseless—judging from an outside standpoint—vagaries of this market. Upon the bare announcement that the Rule drift was to be run the stock boomed to \$6 and carried the line of Comstock shares with it. To-day, when the probabilities of the finding of the ore body spoken of by "Jim" Rule are just as good as then, the stock is not in active demand at 50% under that rate. While such erratic fluctuations may puzzle the outside contingent the inside clique realize that there is method in this manipulation that means money to them.

The Ophir work being carried on in the burning Moscow ground is being watched eagerly, and the stock sold to-day for \$1.80, a 20c. increase on last week's ruling rate. A further and more decisive advance is hoped for. Mexican at \$1; Sierra Nevada at 80c.; and Union Consolidated at 75c., show declines of 10 to 20c.

In the middle group of Comstocks Potosi has been the only stock showing much activity. In the early part of the week the price weakened until Thursday, when light sales were recorded at 50c., to-day the ruling rate was 70c., a 15c. advance on ruling figures last week. Best & Belcher at \$1.90; Chollar at 55c.; Gould & Curry at 70c.; Hale & Norcross at 65c.; and Savage at 65c., all show a decline of from one to two points during the week.

San Francisco, Feb. 2, 1894 (By telegraph).—Today's opening quotations were as follows: Best & Belcher, \$1.90; Bodie, 15c.; Bulwer, 10c.; Chollar, 50c.; Consolidated California & Virginia, \$3.10; Gould & Curry, 75c.; Hale & Norcross, 65c.; Mexican, \$1.10; Mono, 15c.; Navajo, 10c.; Ophir, \$2.05; Savage, 70c.; Sierra Nevada, 90c.; Union Consolidated, 85c.; Yellow Jacket, 75c.

London. Jan. 16.

(From our Special Correspondent.)

The amount of business done during the past week has been as usual very small. Poormans have strengthened from 3s. 6d. to 4s. in expectation that the new mill of the consolidated company will be ready soon. Montanas keep at the high level of 7s. and buyers are still found who believe that the recent discoveries will be of value. Springdale golds are becoming quite a good feature of the market though no reports have yet been issued which show the real state of the mine. The non-dividend paying, low-priced shares have been neglected and the prices of many, such as American Belles, Holcomb Valleys and Palmarejos, have fallen. There have been inquiries for Idaho exploring shares.

MEETINGS.

Copper Queen Consolidated Mining Company, at the office of the company, No. 99 John street, New York City, February 13th, at 12 o'clock noon.

NEW YORK MINING STOCK QUOTATIONS.

Table with columns for NAME AND LOCATION OF COMPANY, Jan. 27, Jan. 29, Jan. 30, Jan. 31, Feb. 1, Feb. 2, SALES. Includes sub-sections for DIVIDEND-PAYING MINES and NON-DIVIDEND-PAYING MINES.

*Ex-dividend. †Dealt in at New York Stock Ex. Unlisted securities. ‡Assessment paid. §Assessment unpaid. Dividend shares sold, 1,235 Non-dividend shares sold, 2,798. Total shares sold, 4,033.

BOSTON MINING STOCK QUOTATIONS.

Table with columns for NAME OF COMPANY, Jan. 26, Jan. 27, Jan. 29, Jan. 30, Jan. 31, Feb. 1, SALES. Lists various mining companies and their stock prices.

Dividend shares sold, 2,377. Non-dividend shares sold, 1,362. Total shares sold, 3,739.

CURRENT PRICES.

These quotations are for wholesale lots in New York unless otherwise specified. Acid—Acetic, chem. pure... 17¢@.19 Commercial, in bbls. and chys... 01¼@.02 Carbonic, liquefied, # lb... 18¢@.25 Chromic, chem pure, # lb... 1.00 for batteries... 40 Hydrobromic, dilute, U. S. P... 25¢@.30 Hydrofluoric, U. S. P... 45¢@.50 Hydrocyanic... 2¢@.30 Alcohol—95%, # gal... 22.30@24.40 Absolute... 33.80 Ammoniated... 32.80 Alum—Lump, # cwt... 1.75@1.85 Ground, # cwt... 1.85@1.90 Powdered, # lb... 04¼@.05 Lump # ton, Liverpool... 25 Aluminum Chloride—Pure, # lb... 1.25 Amalgamating solution, # lb... 1.90@2.50 Sulphate, # cwt... 1.90@2.50 Ammonia—Sal., in bbl. lots... 07¼@.08 Carbonate, # lb., English and German... 07¼@.08 Muriate, white, in bbls., # lb... 08¼@.09 Aqua Ammonia—(in cogs) 3° # lb... 03@.04 20° # lb... 04@.05 30° # lb... 04¼@.05 Antimony—Oxymur, # lb... 04@.06 Regulus, # lb... 10@.11 Argon—Red, powdered, # lb... 15 Arsenic—White, powdered # lb... 03@.03 Red # lb... 06@.07 Yellow... 08@.09 White at Plymouth, # ton... 212.26 Asbestos—Canadian, # ton... 250@300 Italian, # ton, c. i. f. L'pool... 218@260 Ashes—Pot, 1st sorts, # lb... 4.75@5 Pearl... 05¼@.0634 Asphalium—Prime Cuban, # lb... 04@.05 Hard Cuban, # ton... 228.00@230.00 Trinidad, refined, # ton... 230.00@235.00 Egyptian and Syrian, # lb... 05@.07¼ Californian, at mine, # ton... 12.00@26.00 at San Francisco, # ton... 15.00@22.00 Barium—Carbonate, pure, # lb... 212.26 Carbonate, commercial, # lb... 05@.06 Chlorate, crystal, # lb... 75 Chloride, commercial, # lb... 05@.10 pure, # lb... 16 Iodide, # oz... 40 Nitrate, # lb... 06¼@.07 Sulph., Am. prime white, # ton... 17.50@19 Sulph., foreign, floated, # ton... 22@24 Sulph., off color, # ton... 11.50@15.00 Barb. lump, f. o. b. L'pool, # ton... 25 No. 1, Caska, Buncorn, " " 24 10 0 No. 2, baga, Buncorn, " " 43 15 0 Bauxite—# ton... 10.00 Bicarbonate of Potash—Scotch, # lb... 11@.12 American, # lb... 11@.12 Bicarbonate of Soda—# lb... 09¼@.10 Borax—Refined, # lb., in car lots... 08@.09 San Francisco... 08@.08 Concentrated, in car lots... 07¼@.08 Refined, Liverpool # ton... 25@.35 Bromine—# lb... 25@.35 Cadmium—# lb... 21.00

Cadmium Iodide—# lb... 25.50 Chalk—# ton... 1.50@2.25 Precipitated, # lb... 04@.06 China Clay—English, # ton... 13@18.00 Domestic, # ton... 9@11 Chlorine Water—# lb... 10.25 Chrome Yellow—# lb... 10@.25 Chrome Iron Ore—# ton, San Francisco... 10.00 Chromalum—Pure, # lb... 35@.40 Commercial, # lb... 02¼@.03 Cobalt—Oxide, # lb... 1.60@1.70 Copper—Sulph. English Wks. ton... 220@231 Vitriol (blue), ordinary, # lb... 03¼@.03¼ extra... 04¼@.05 Nitrate, # lb... 04@.05 Copperas—Common, # 100 lbs... 85@.95 Best, # 100 lbs... 1.35@1.50 Liverpool, # ton, in casks... 22@22 10s. Corundum—Powdered, # lb... 04¼@.09 Flour, # lb... 03 Cryolite—Pow., # lb., bbl. lots... 07@.08 Emery—Grain, # lb. (# kg.)... 04¼@.05 Flour # lb... 02¼@.04 Epsom Salt—# lb... 01@.01¼ Feldspar—Ground, # ton... 26.00@30.00 Crude... 22.00@23.00 Fluorspar—Powdered, No. 1, # ton... 22@23 Lump, at mine... 26@28 French Chalk—Fuller's Earth—Lump, # ton... 216@220 Glauber's Salt—in bbls., # lb... 01@.01¼ Glass—Ground, # lb... 09@.10 Gold—Chloride, pure, crystals, # oz... 12.00 pure, 15 gr., c.v., # doz... 54.40 liquid, 15 gr., # doz... 55.50 a. v., # doz... 56.00 Chloride and sodium, # lb... 26.00 15 gr., c.v., # doz... 27.75 Oxide, # oz... 27.25 Gypsum—Calcined, # bbl... 1.25@1.50 Land Plaster... 30@.33 Iodine—Resublimed, # oz... 30@.33 Iridium—Oxide # lb... 890 Iron—Nitrate, 40° # lb... 01@.01¼ 47° # lb... 02@.02¼ Kaolin—See China Clay. Kieserite—# ton... 90@110 Lead—Red, American, in oil, # lb... 06¼@.07¼ White, American, in oil, # lb... 06¼@.07¼ White, English, # lb., in oil... 08¼@.08¼ Acetate, or sugar of, white... 05@.06¼ Granulated... 09@.12 Nitrate... 09@.12 Lime Acetate—Am. Brown... 90@.95 Powdered # lb... 1.75@1.87½ Litharge—Powdered, # lb... 05¼@.07¼ English flake, # lb... 06@.09¼ Magnesite—Crude, # ton of 1,015 kilos... 214.75 Calcined, # ton of 2,240 lbs... 222.00 Brick, # ton of 2,240 lbs... 247.50 Manganese—Ore, per unit... 23@.28 Oxide, ground, # lb... 02¼@.06¼ Mercuric Chloride—(Corrosive Sublimite) # lb... 62@.64 Powdered # lb... 1.25@1.50 Marble Dust—# bbl... 1.25@1.50 Metallic Paint—Brown # ton... 22@25 Red... 20@25 Mica—In sheets according to size... 25@60.00

Mineral Wool—Ordinary slag... 01¼@.01½ Ordinary rock... 02¼@.03 Ground, # ton... 10.15 Naphtha—Black... Nitre Cake—# ton... 10.00 Ochre—Rochelle, # lb... 01¼@.01½ Washed Nat Ox'rd. Lump, # lb... 06¼@.06¾ Washed Nat Ox'rd. Powder, # lb... 07@.07¼ Golden, # lb... 03@.05 Domestic, # ton... 12@20 Oils, Mineral—Cylinder, light filtered, # gal... 14@.16 Dark filtered, # gal... 10@.13 Extra cold test, # gal... 20@.24 Dark steam refined, # gal... 07¼@.09 Precip. red, # lb... 80@.85 white, # lb... 85@.90 Platonic Chloride—Dry, # oz... 07 Plumbago—Ceylon, # lb... 04@.05 American, # lb... 05@.07 Potassium—Cyanide, # lb., C. P... 52 67½ # lb... 40 mining... 28@.30 Bromide, domestic, # lb... 28@.32 Chlorate, English, # lb... 18@.18¼ Chlorate, powdered, English, # lb... 18¼@.19 Carbonate, # lb., by casks, 82½ # lb... 05 Caustic, # lb., pure slick... 05¼@.06 Iodide, # lb... 22.50@22.80 Nitrate, refined, # lb... 06@.06 Bichromate, # lb... 10@.11 Yellow Prussiate, # lb... 21¼@.22¼ Red Prussiate, # lb... 39@.45 Pumice Stone—Select lumps, # lb... 01¼@.015 Original cks., # lb... 01¼@.015 Powdered, pure, # lb... 01¼@.015 Pyrites—Non-cupreous, p. units, 10 @.11 Quartz—Ground, # ton... 26.00@30.00 Rotten Stone, Powdered, # lb... 03¼@.03¾ Lump, # lb... 06@.07 Original cks., # lb... 04¼@.05 Rubbing stone, # lb... 03¼@.04 Sal Ammoniac—lump, in bbls., # lb... 80¼ Salt—Liverpool, ground, # sack... 70 Domestic, fine, # ton... 27@27.5 Common, fine, # ton... 24.50@25 Turk's Island, # bush... 25@.28 Salt Cake—# ton... 10.00@10.25 Salt Peter—Crude, # lb... 03¼@.04 Soapstone—Ground, # ton... 22@.24 Block and slab according to size. Sodium—Prussiate, # lb... 22@.24 Phosphate, # lb... 04@.05 Stannate, # lb... 06@.12 Tungstate, # lb... 30@.35 Hyposulphite, # cwt., in casks... 1.70@1.80 Strontium—Nitrate, # lb... 08¼@.09 Sulphur—Roll, # lb... 01¼@.01¾ Flour, # lb... 01¼@.01¾ Sylvinit, 27@35, S.O.P., per unit... 3.75 Talc—Ground French, # lb... 01¼@.01¼ American No. 1, # lb... 01¼@.01¼ American No. 2... 1.66 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 Muriate, single feathered or crossed... 07@.12 Double or strong, 54° B... 10@.16 Oxymur, or nitro... .19 Vermilion—Imp. English, # lb... .80 Am. quicksilver, bulk... 57 @.59 Am. quicksilver, bags... 58 @.60 Chinese... 85 @1.00 Trieste... 90 @.95 American... 11¼@.12 Zinc White—Am., Dry, # lb... 04¼@.05 Antwerp, Red Seal, # lb... 06¼@.07 Paris, Red Seal, # lb... 07¼@.08 Muriate solution... .06 Sulphate crystals, in bbls., # lb... 03@.03¼

THE RARER METALS.

The prices given below are the prices in Germany, and are per gramme except where otherwise stated: Arsenic (metallic), per kilo... 20.25 Barium (ex amalgam)... 2.12 (per electrol.)... 7.75 Bismuth (metallic), per kilo... 6.25 Cadmium (metallic)... 2.75 Calcium (per electrol.)... 5.25 Cerium (pulv.)... 2.25 (fusum in globulis)... 5.50 Chromium (fus.)... 40 (cryst.)... 75 Cobalt (metallic), per kilo... 10.00 (pure), per kilo... 40.00 Didymium (pulv.)... 5.50 Erbium-Yttrium (oxydal.)... 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.)... 12¼ 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 Selenium (cryst.)... 5.4 (precipitates)... 62¼ Strontium (per electrol.)... 7.25 (ex amalgam)... 3.25 Tantalum... 4.75 Tellurium (fusum)... 50 (precipitates)... 22¼ Thallium... 0.84 Titanium... 1.13 Tungsten (pure)... 0.8 Uranium... 1.0 Vanadium... 4.00

DIVIDEND-PAYING MINES.

NON-DIVIDEND-PAYING MINES.

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

G., Gold. S., Silver. L., Lead. C., Copper. B., Borax. * Non-assessable. † The Deadwood previously paid \$275,000 in eleven dividends and the Terra \$75,000. ‡ Previous to the consolidation in August, 1884, the California had paid \$31,320,000 in dividends, and the Cons. Virginia \$12,390,000. § Previous to the consolidation of the Copper Queen with the Atlanta, August, 1885, the Copper Queen had paid \$1,350,000 in dividends. ¶ Previous to this company's acquiring Northern Belle, that mine paid \$450,000 in dividends against \$425,000 in assessments.

COAL AND COAL RAILROAD STOCKS.

Table with columns: NAMES OF STOCKS, Jan. 27, Jan. 29, Jan. 30, Jan. 31, Feb. 1, Feb. 2, Sales. Lists various coal and railroad stocks with their respective prices and sales figures.

Total shares sold, 50,264.

INDUSTRIAL AND TRUST STOCKS.

Table with columns: NAME OF STOCKS, Jan. 26, Jan. 27, Jan. 29, Jan. 30, Jan. 31, Feb. 1, SALES. Lists industrial and trust stocks with their respective prices and sales figures.

Total shares sold, 292,33.

CALIFORNIA. San Francisco.

Table with columns: NAMES OF STOCKS, Jan. 26, Jan. 27, Jan. 29, Jan. 30, Jan. 31, Feb. 1. Lists California stocks with their respective prices.

Colorado Springs, Jan. 27.

Table with columns: (Specially reported by W. H. McIntyre), Bid, Asked. Lists Colorado Springs stocks with their respective bid and asked prices.

Market quiet and lower. Sales for the week ending Jan. 27 aggregate about 1,200,000.

Denver.

Table with columns: Prices and sales for week ending January 29th: High, Low, Sales. Lists Denver stocks with their respective prices and sales figures.

COLORADO. Aspen.

Table with columns: Aspen, Jan. 30 Price. Lists Colorado stocks with their respective prices.

Table with columns: High, Low, Sales. Lists various stocks with their respective high, low, and sales figures.

MARYLAND. Baltimore.

Table with columns: COMPANY, Bid, Asked, Feb. 2. Lists Maryland stocks with their respective bid and asked prices.

MINNESOTA. Duluth.

Table with columns: LISTED STOCKS, Par, Bid, Asked, Jan. 29. Lists Minnesota stocks with their respective par, bid, and asked prices.

UNLISTED STOCKS.

Table with columns: Adams Iron Co., Arate Copper Mining Co., Ashland Iron Co., Aurora Iron Co., Buckeye Iron Co., Buffalo Land & Exp. Co., Camden Iron Co., Chandler Iron Co., Charleston Iron Co., Champion Iron Co., Cleveland Cliffs Iron Co., Chicago Iron Co., Cleveland Iron Co., Columbia Iron Co., Commodore Mining Co., Comstock Iron Co., Dayton Iron Co., Detroit Iron Co., Elmira Land & Iron Co., Great Western Mining Co., Hall Iron Co., Homestead Iron Co., Horton Mining Co., Imp. Iron Mt. Mining Co., Internat'l Development Co., Jackson Iron Co., Kalkina Iron Co., Kentucky Iron Co., Lackawanna Iron Co., Lake Supr. (Marquette), Macomber Mining Co., McCaull Mining Co., McKinley Iron Co., Mesaba C. L. & Ex. Co., Mesaba Chief Iron Co., Mesaba Iron Co., Mesaba Mineral Co., Metropolitan L. & L. Co., Minnesota Iron Co., Myrna Iron Co., Northern Light Iron Co., New England Iron Co., Ohio Mining Co., Oneota Iron Co., Ophir, gold, Penn. Iron & Steel Co., Pioneer Iron Co., Pittsburgh & Lake A. Co., Putnam Iron Co., Red Hematite Iron Co., Republic Iron Co., Rouchleau Iron Co., Standard Ore Co., Syndicate Gold, Towanda Iron Co., Ver. & Mes. Iron Land Co., Zenith Iron Co.

PENNSYLVANIA. Philadelphia.

Table with columns: COMPANY, Bid, Asked, Feb. 2. Lists Pennsylvania stocks with their respective bid and asked prices.

MISSOURI. St. Louis.

Table with columns: Closing quotations: Bid, Asked, Jan. 31. Lists Missouri stocks with their respective bid and asked prices.

London Quotations.

Table with columns: Buyer, Seller, Jan. 23, 1894. Lists London quotations with their respective buyer and seller prices.

Paris. Jan. 19.

Table with columns: Belmez, Spain, Castile River, Cal., Laurium, Greece, Lexington, Mont., Nickel, New Caledonia, Rio Tinto, Spain. Lists Paris quotations with their respective prices.

New York Mining Stocks.

Table with columns: (Latest quotations.) Bid, Asked, Feb. 2. Lists New York mining stocks with their respective bid and asked prices.

ASSESSMENTS.

Table with columns: COMPANY, No., Dinqt. in office, Day of sale, Amt. per sh're. Lists assessments with their respective company names, numbers, dates, and amounts.

CLASSIFIED LIST OF ADVERTISERS.

Adders and Calculators
Smith, R. C.

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

Aluminum
Coviles Electric, S. & A., Co.

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

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

Arms and Ammunition
Hartley & Graham.

Assayers' and Chemists' Supplies
Allanworth, Wm. | Richards & Co.
Baker & Adamson. | Roessler & Hasselacher
Baker & Co. | Chemical Co.
Berge, J. & H. | Snellson, W. H., Assay.
Bullock & Crenshaw. | & Engineering Co.
Henry Hell Chem. Co. | Solvay Process Co.
Hoskins, Wm. | Taylor, John, & Co.
Overbrook Chem. Co. | Troemer, Henry.
Penn Sm. & Ref. Wks. | Victory Chemical Co.
Penn. Salt Mfg. Co. | Voland & Van Zelm.
Queen & Co.

Attorney
McIndoe, Hugh.

Babbit's Metal
Spring, Carpenter & Co.

Bankers and Brokers
Bandell, E. | Pacific Mining Agency
Bober & Sohne | & Trust Co.
Billings, Robt. & Co. | Peabody & Kolff.
Grant, E. K. | Pullman, J. W.
Handy & Harman. | Robertson, E. O.
Hyde, Geo. A. & Co. | Snow & Ficus.
Matten, E. C. & Co. | Smith, C. H.
Trenholm, Paul C.

Belt-ing
Groetzinger & Sons.
Henric & Soutour Mfg. Co.
Jeffery Mfg. Co.
New York Belting & Packing Co., Ltd.

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

Blowers
Foss Mfg. Co.
Sturtevant, S. F. Co.

Boiler Compound
American Fluoride Co.

Rollers
Babcock & Wilcox Co. | Star Boiler & Sheet
Orr & Sombower, Inc. | Iron Works.
Pollock, Wm. B. & Co. | Stillwell-Bierce &
Scaife, Wm. B. & Sons. | Smith-Valle Co.
Stirling Co. (See Machinery.)

Brass Castings
Epping, Carpenter & Co.

Brick Machinery
Freese, E. M., & Co.

Bridges
Berlin Bridge Co. | Pittsburg Bridge Co.
Pencoyd Br. & Con. Co. | Scaife, W. B., & Sons.

Buckets
Scaife, Wm. B. & Sons. (See Machinery.)

Calculators
Smith, R. C.

Calipers
Smith, E. C.

Carburets
Bishop, Victor, & Co.

Car Wheels
Whitney, A., & Co.

Chain and Link Belting (See Belting.)

Chemicals
Baker & Adamson. | Penn. Salt Mfg. Co.
Bullock & Crenshaw. | Roessler & Hasselacher
Henry Hell Chem. Co. | Chemical Co.
Overbrook Chem. Co. | Solvay Process Co.
Vanderburgh Lab'tory

Coal
Berwind-White Coal | Maryland Coal Co.
Mg. Co. | Potts, F. A., & Co.
Cramer & Curran | Stickney, Conyngham
Consolidation Coal Co. | & Co.
Coxe Bros. & Co. | Ward & Olyphant.

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

Concentrators, Crushers, Pulverizers, Separators, Etc.
Allis, Ed. F., & Co. | American Mining & Milling Machinery Co.
American Ore Machinery Co. | American Ore Machinery Co.
Baker & Adamson. | Socket Foundry & Machine Co.
Blake, Theo. A. | Colorado Iron Works.
Copeland & Bacon. | Fraser & Chalmers.
Frue Vanner Concentrator. | Gates Iron Works.
Hendrie & Bolthoff Mfg. Co. | Krom, S. H.
Mechanical Gold Extractor Co. | Pierce & Miller Engineering Co.
Seymour Concentrator Co. | Sturtevant Mill Co.
Walburn-Swenson Mfg. Co. (See Machinery.)

Copper Dealers and Producers
Abbott, Wheelock & Co. | James & Shakspeare.
American Metal Co. | Lewisohn Bros.
Atlantic Mining Co. | Orford Copper Co.
Balbach S. & Ref. Co. | Osceola Con. Mg. Co.
Baltimore Cop. Wks. | Penn. Salt Co.
Boston & Mont. Mfg. Co. | Phelps, Dodge & Co.
Canadian Copper Co. | Quebec R. R., L. &
Central Mining Co. | C. Co.
Copper Queen Mfg. Co. | Tamarack Mg. Co.
Detroit Copper Mfg. Co. |

Diamonds
Bishop, Victor, & Co.

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

Drawing Materials | Heller, Chas. S.
 | Queen & Co.

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

Dump Cars
Hunt Co., C. W.
Thacher Car & Con. Co.

Educational Institutions
Mass. Inst. of Technology.
Michigan Mining School.
Pennsylvania Military College.
Woodside Seminary.

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

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

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

Emery Mill Stones
Sturtevant Mill Co.

Employment Bureaus
Engineering Employment Bureau.

Engineers, Chemists, Metallurgists
Adams, W. H. | Kennedy, Julian.
Anthony, Wm. A. | Assay & Russell.
Baker & Co. | Keyes, W. S.
Bandy, John F. | Kirby, E. E.
Blauvelt, Harrington. | Lammers, T. L.
Boggs, R. J., Jr. | Languth, Werner.
Boss, Clarence M. | Lavagnino, U.
Boss, M. P. | Ledoux & Co.
Brodie, Walter M. | Leggett, Thomas H.
Burlingame, J. H. | Loring, Frank C.
Burlingame, E. E. | Mariner & Hoskins.
Butters, Charles. | Maynard, George W.
Campbell-Juston R.C. | McDermott & DuMeid.
Carnahan, F. W. | McIndoe, H.
Carpenter, Franklin B. | Merwin & Richardson.
Case, Wm. H. | Moore, Gideon A.
Cazin, Franz. | Newberry, W. E.
Chandler, W. H. | Nicholson, Frank.
Channing, J. Parke. | O'Brien, Frank.
Clark, C. E. | Olost, Aben S.
Clark, Ellis. | Osgood, J. O.
Clement, Victor M. | Page, Wm. Byrd.
Collins, H. & Sons. | Penrose & Barringer.
Curtis, Wm. H. | Peters, Edward U.
Cramer, Stuart W. | Phillips, W. B.
Darling, L. B. | Poole, Robt., & Son Co.
Davis, Floyd. | Porter, J. A.
De la Soudiere, Geo. | Potter, William B.
Dewey, Frederic P. | Price, Thomas & Son.
Dickerman, Alton L. | Randolph, John, C. F.
Dickinson, H. P. | Raymond, Roseter W.
Donald, J. T. | Raymond, R. M.
Drysdale, Dr. W. A. | Rickard, T. A.
Ede & Burwell. | Ricketts & Banks.
Emmens, Stephen H. | Robinson, G. H.
Everette, Dr. W. H. | Rothwell, John E.
Farish, Wm. A. | Rothwell, Richard P.
Fearn, Percy L. | Saunders, W. L.
Fisk, W. W. | Schmitz, E. J.
Forbes, George. | Schwarz, Theodore E.
Freeland, Francis T. | Shapleigh, W.
Froehling, Dr. Henry. | Shaw, Thomas.
Furlongs, W. J. | Skewes, Edward.
Genth, F. A., Jr. | Smith, G. O.
Gooding, F. W. | Squire, Jos.
Goudie, James H. | Stein, Wm. M.
Hahn, O. H. | Stolber, E. G.
Hales, E. | Tines, A.
Hammond, John Hays | Trent, L. C.
Hampton, W. Huntley | Vanderburgh Lab'tory
Hardman, John E. | Van Slooten, Wm.
Hastings, John B. | Wagnemaker, J. F.
Hofman, Ottokar. | Wardrop, D. Lee.
Hollbaugh, J. R. | Willis, J. Lanson.
Hooker & Lawrence. | Wilson, J. Howard.
Hunt & Robertson. | Wyatt & Saabach.
Ince, F. W. | Yates, H. N.
Jennings, E. P. | Young & Park.

Engineers' Instruments
Alteneder, T. & Son. | Gurley, W. & L. E.
Brandis' Sons. | Heller, Chas. S.
Bullock & Crenshaw | Queen & Co.
Everhardt, J. M.

Engines
Buckeye Engine Co. | Orr & Sombower, Inc.
Bullock, M.C., Mfg. Co. | Union Iron Works.
Morris Co. Mach. & Iron Works. | Stillwell-Bierce & Smith-Valle Co. (See Machinery.)

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

Fire-Brick and Clay
Chur, A. T.

Forges
Foss Mfg. Co.

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

Gas Works
Pollock, Wm. B. & Co. | Wood, R. D., & Co.

Gauges, Recording, Etc.
Bristol Mfg. Co. | Everhardt, J. M.

Grenase, Graphite, Etc.
Dixon, Jos., Crucible Co.

Hese, Rubber
New York Belting & Packing Co., Ltd.

Inspection and Tests
Hunt, The Robert W. Co.

Insulated Wires and Cables
Okonite Co., Ltd.

Insurance Companies
Hartford Steam Boiler Inspect'n and Ins. Co.
Mutual Life Insurance Co.

Lamps, Miners'
Everhardt, J. M.

Lathe
Seneca Falls Mfg. Co.

Locomotives
General Electric Co.
Hunt, C. W. Co.
Porter, H. K., & Co.
Thomson Houston International Co.

Lubricants
Dixon, Jos., Crucible Co.

Manganese Steel
Taylor Iron & Steel Co.

Machinery
Dealers in Mining, Milling, and Other Machinery
Allis, Edw. P., & Co.
American Mining & Milling Machinery Co.
Socket Foundry & Machine Co.
Baker & Co.
Blauvelt, M. C., Mfg. Co.
Colorado Iron Works.
Copeland & Bacon.
Davis, F. M., Iron Works Co.
Exeter Machine Works Co.
Fraser & Chalmers.
Griffith & Weger Co.
Hendrie & Bolthoff Mfg. Co.
Jeffery Mfg. Co.
McKiernan, S. G. & Co.
mechanical Gold Extractor Co.
Mecklenburg Iron Works.
Moore, Samuel L., & Son.
Morris County Mach. & I. Co.
Orr & Sombower, Inc.
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
Abbott, Wheelock & Co. | Johnson, Matthey & Co.
 | Lewisohn Bros.
American Metal Co. | Mathison Smelting Co.
Am. Zinc-Lead Co. | Orford Copper Co.
Baker & Co. | Phelps, Dodge & Co.
Coviles Elec. S. & | Picher Lead Co.
Aluminum Co. | Pullman, J. W.
Eureka Co. | State Ore Sampling Co.
James & Shakspeare. | Victor Chemical Co.

Metallurgical Works and Ore Purchasers' Processes
American Zinc Lead Co.
Baker & Co.
Balbach Smelting & Refining Co.
Baltimore Copper Works.
Canadian Copper Co.
Coviles Elec. Smelt. & Aluminum Co.
Kansas City S. & Ref. Co.
Ledoux & Co.
Mechanical Gold Extractor Co.
Orford Copper Co.
Pennsylvania Salt Mfg. Co.
Peters & Banks.
Quebrada R. R. L. & C. Co.
Russell Process Co.
St. Louis Sampling & Testing Works.
State Ore Sampling Co.
Walburn-Swenson Mfg. Co.

Mining and Land Companies
Atlantic Mg. Co. | Mollie Gibson Con. Mg. & M. Co.
Boston & Mont. Mg. Co. | Osceola Con. Mg. Co.
Central Mg. Co. | Quebrada R. R. L. & C. Co.
Copper Queen Mg. Co. | Tamarack Mg. Co.
Detroit Copper Mfg. Co. | Eureka Co.
Eureka Co. | Canadian Copper Co.

Nuts, Lock
Young Lock Nut Co.

Ore Cars
Star Boiler & Sheet Iron Works.

Ore Testing Works
Hunt & Robertson. | Ricketts & Banks.
Ledoux & Co. | State Ore Sampling Co.
Snellson, W. H., Assaying & Engineering Co.

Packing and Pipe Coverings
Pratt, Randolph. | New York Belting & Packing Co., Ltd.
Jenkins Bros. | Wyckoff & Son, A.
Kenosy, Robt.

Patents
Atkins, J. L.

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

Periodicals
Arms and Explosives. | Financial Times.
El Minerero Mexicano. | Iron & Coal Trades Review.
Electrical Plant & | Indian Engineering.
Electrical Industry. | Mining Journal.

Phosphates
Trenholm, Paul C.

Phosphor-Bronze
Phosphor-Bronze Smelting Co.

Picks, Miners'
Collins & Co.

Pile Drivers
Bucyrus Steam Shovel and Dredge Co.

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

Platinum
Baker & Co.
Johnson Matthey & Co.

Powder
Etna Powder Co. | Lafin & Rand Powder Co.

Pumps
Blake, Geo. F., Mfg. Co. | McGowan, John H., & Co.
Cameron, A. S., Steam | Morris Co. Mach. & Co.
Pump Works. | Co.
Epping, Carpenter & Co. | Pulsometer Steam Pump Co.
Groetzinger, A., & Sons | Stillwell-Bierce & Knowles Steam Pump Works. | Smith-Valle Co.
Worthington, Henry.

Publications
Allison Courier Co. | Iron & Coal Trades Rev.
Arms & Explosives. | Mining Journal.
Electrical Plant & | Money of the U. S.
Electrical Industry. | Open Court Pub. Co.
Financial Times. | Stechert Gustave.

Pyrites
Adams W. B.

Quarrying Machines
American Diamond Rock Boring Co.
Ingersoll-Sergeant Rock Drill Co.
Rand Drill Co.
Sullivan Machinery Co.
Union Wire Rope Tramway Co.

Quicksilver
Eureka Co.

Railroad Supplies and Equipment
Eddy Valve Co. | Robinson & Orr.
Porter, H. K., & Co. | Young Lock Nut Co. (See Machinery.)

Regulators, Damper, Heat, Etc.
Eddy Valve Co. | Mason Regulator Co.
Lunkenheimer Co.

Rock Drills. (See Air Compressor.)

Roasting
Berlin Iron Bridge Co. | Phelps, Dodge & Co.
Pencoyd Bridge and Pittsburg Bridge Co. | Const. Co. | Scaife, Wm. B., & Sons

Rubber Goods
New York Belting & Packing Co., Ltd.

Screens
Exeter Machine Works Co.
Harrington & King Perforating Co.
Mundt & Sons.
Tyler, W. S., Wire Works Co. (See Machinery.)

Screen Plates
Harrington & King Perforating Co.

Separators
Harrison Safety Boiler Works.

Shoes and Dies
Chrome Steel Works. | Reliance Steel Co.
Crescent Steel Co.

Shovels (Steam)
Bucyrus Steam Shovel & Dredge Co.
Southern & Co.

Smelting and Refining Works
Balbach S. & Ref. Co. | Penn Lead Co.
Baltimore Cop'r Wks. | Penna. Salt Mfg. Co.
Bos. & Colo. Smelt. Co. | Penn Smelting and Refining Works.
Coviles Smelt. & Alu. Co. | Kansas City S. & Ref. Co.
Phosphor-Bronze Smelting Co.
Orford Copper Co.

Steel Rails, Castings, Rolls, Drill Steel
Abbott, Wheelock & Co. | Moore, S. L., & Sons Co.
Baltimore Iron Co. | Reliance Steel Co.
Chester Steel Cast. Co. | Roberts, A. & F., & Co.
Chroms Steel Works. | Robinson & Orr.
Crescent Steel Co. | Whitney, A., & Sons. (See Metal Dealers.)
Exeter Machine Wks Co.

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.

Tools
Pratt & Whitney Co.

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

Tubing-Rubber
New York Belting and Packing Co., Ltd.

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

Valves
Eddy Valve Co. | Mason Regulator Co.
Jenkins Bros. | Sturtevant & Co., B.F.
Lunkenheimer Co.

Ventilators
Bullock, M. C., Mfg. Co.

Vulcanite Emery Wheels
New York Belting and Packing Co., Ltd.

Washers
Milton Mfg. Co.

Well Drilling Machinery
American Diamond Rock Boring Co.
Penn Diamond Drill & Mfg. Co.
Sullivan Machinery Co.
Williams Bros.

Wire Cloth
Harrington & King Perforating Co.
Mundt & Sons.
Tyler, W. S., Wire Works.

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

Wire Rope Tramway
Brown Hoist. & Convey. Machine Co.
California Wire Works.
Colorado Iron Works.
Cooper, Hewitt & Co.
Hunt, C. W., Co.
Roebbing, 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.

1311 WANTED.—A FIRST CLASS PLACER miner, who has had experience in charge of placers, and who understands, practically, ditching, the setting up and operation of hydraulic works, piping, etc., and the construction and operation of sluice boxes. One speaking Spanish preferred. Address with references, "PLACERS," ENGINEERING AND MINING JOURNAL.

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

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

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

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

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

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

Situations Wanted.

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

POSITION AS ASSISTANT TO GENERAL manager or to superintendent of manufacturing concern. Thoroughly posted in modern cost, accounting and indexing, and experienced in factory office work. First-class draughtsman and graduate M. E. (age 29 years). Address ASSISTANT, ENGINEERING AND MINING JOURNAL. No. 15,945, Feb. 10.

TOOLMAKER, ON DIES, TOOLS, PUNCHES, Address TOOLS, care ENGINEERING AND MINING JOURNAL. No. 15,934, Feb. 10.

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

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

SITUATION WANTED BY MINING ENGI- neer, assayer and mill man, experienced and capable; salary moderate. Address O. H. PACKER, General Delivery, Chicago, Ill. No. 16,026, Feb. 10.

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

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

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

SITUATIONS WANTED BY ASSISTANT Engineers.—The progress of the Metropolitan sewerage system toward completion will soon render unnecessary the further services here of a considerable number of assistant engineers who have had valuable experience and who desire situations elsewhere. The undersigned will be glad to give further information to those who need additional assistants. HOWARD A. CARSON, Chief Engineer, 110 Boylston St., Boston, Mass. No. 16,024, Feb. 17.

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

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. 15,932, Feb. 24.

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

GRADUATED CHEMIST, IN CHARGE of large laboratory, 3 1/2 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. 15,927, 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. 15,952, 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.

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.

A MINING SUPERINTENDENT, GRADU- ated 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. 15,914.

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

**WANTED AT ONCE.**

Copies of the Engineering and Mining Journal of January 11th, February 8th, May 3d and August 2d, 1890; January 3d, 18th, February 7th and May 9th, 1891; October 15th, 22d and 29th, December 10th, 1892; July 29th and December 9th, 1893.

—ADDRESS—
Scientific Publishing Co.,
P. O. Box 1833, N. Y. City.

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.

JOHN F. ROTHWELL,
ENGINEERING AND MINING JOURNAL, New York.

Contracts Open.

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

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

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

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

SEALED PROPOSALS, ADDRESSED TO THE Charleston Bridge Company, will be received at the office of M. P. Bennett, President of the said company, 31 Pinekey street, Charleston, S. C., until February 19th, 1894, for the reconstruction of the Ashley River Bridge, near the city of Charleston, S. C., according to plans and specifications, to be seen at the office of the said company, 30 Broad street, Charleston, S. C. There are two sets of plans and specifications—one set calling for the restoration of the bridge as it stood immediately before the cyclone of August, 1893, and the other set for the reconstruction of the bridge on a modified plan of the original structure. Specifications will be furnished to all applicants, and plans can be examined at the office of the company. The company reserves the right to reject any or all bids, and to waive any defect or informality in any bid. The party or parties to whom the contracts may be awarded will be required to execute good and sufficient bonds guaranteeing to the company compliance with the terms of their contracts. A certified check for \$300, made payable to the order of the Charleston Bridge Company, must accompany each bid, as a guarantee of good faith, and which shall be forfeited to the company should the bid be accepted and the bidder fail to enter into contract for the work. RENE K. JERVEY, Secretary and Treasurer Charleston Bridge Company.

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Volumes XI., XII. (1871), XIII. and XIV. (1872) of the Engineering and Mining Journal, bound or unbound.

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MEETINGS.

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

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

H. SUHR, Secretary.

DIVIDENDS

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

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

THE RICO-ASPEN CONSOLIDATED MINING COMPANY.
 DENVER, Colo., Jan. 30th, 1894.

A Dividend of two and one-half cents per share, twenty-five thousand dollars, has been declared, payable February 15th, to stockholders of record on February 10th. Transfer books close February 10th and reopen February 16th. Transfers of stock to be made at the general office of the company, Denver, Colo., or at the offices of W. M. Tuttle, 22 William St., New York, or Elliott, Johnson & Co., Philadelphia.
 A. B. ROEDER, Secretary.

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