

in the past, expected to supply the grade of metal with the highest conductivity owing to its natural purity. Recently so large a percentage of copper produced in this country has come from sulphide ores, and these frequently containing considerable impurities affecting the quality of the refined metal, that the perfection of the refining and the perfection of the analysis in determining the purity are of greater interest and importance than at any previous time. As is pointed out by Dr. Keller, very slight traces of the impurities retained in the refined copper by the electrolytic process affect the conductivity to a greater extent than is the case in the best Lake copper. Almost the only impurities traceable in Lake copper consist of silver and iron, and these in amounts so small that in many cases they would be disregarded or possibly not detected by analysis. With electrolytic refining there will, in spite of every precaution, occasionally remain small quantities of bismuth, antimony, arsenic, selenium and tellurium.

All electrolytic refiners fail at times to bring up the refined copper to the same standard, and usually test their product so as to grade it first and second. For sake of example, the Baltimore Works have a first-class brand known as B. E. C., and what does not come up to that standard is cast into C. C. W. ingots.

In consequence of the growth of this method of refining in this country it is impossible to make too close a study of this analysis of electrolytic copper, as only by this means can these defects be removed and the standard of electrolytic copper brought up to that of Lake. It is perfectly true that in some cases where those refiners who are doing electrolytic work, and who have a simple proposition in the matter they are handling, make a product equal in conductivity and in every other respect to Lake copper; but, unfortunately, there are many matters that are not so easy to handle. The method adopted by Dr. Keller for making an accurate analysis of electrolytically refined copper appears to us to be both practical and simple, and we give an abstract of his method on another page.

English Mining Finance.

Our London letter last week, which is always worth reading, being full of financial news and right up to date, informed us that the prospect of a boom for the sale of American mining properties might be considered at an end for the present, as the Exploration Company, of London, representing the strongest financial and influential channel, had abandoned several options which they had considered worthy of being taken at some expense to themselves, and the authoritative announcement is made that the Exploration Company has no intention at present of promoting sales of American mines. This is a business-like announcement, and may save vendors and promoters considerable time and money by being made in this public manner.

This will no doubt be a great disappointment to many fortunate owners of prospects or options upon more meritorious properties in this country, as the London market, if properly handled, is undoubtedly the finest field that has ever been exploited by schemers. To give an illustration of the opportunities that occur, and as verifying the old saying, "When thieves fall out, honest men may come to their own," and as it is very rare that the other proverb proves true, viz., that "There is honor among thieves," the mysteries of promoting and underwriting have been laid bare in a lawsuit in London. The facts were undisputed and revealed that a vendor, Carter by name, agreed to sell certain mining concessions in the Gold Coast Colony entirely undeveloped for the sum of \$462,500; \$150,000 of which was to be paid over in cash. The next step was the registration by the purchaser of another company with a capital of \$5,000. This intermediary or buffer company, as it is appropriately described by the *Economist*, subsequently decided to increase its capital from \$5,000 to \$1,175,000, offering the shares to the public at that capitalization. The next step was the formation of a syndicate with \$5,000 which agreed to purchase the concessions for the sum of \$975,000, of which \$50,000 was to be payable in cash and the balance in cash or shares at the option of the directors. The whole transaction was simply to cover up and conceal the fact that what was offered to the company for \$975,000 had been purchased for \$462,500 within a few days or possibly even hours, and in all probability the real price of the concessions without a stroke of work was more nearly represented by the original capital of \$5,000 than any other figure," and yet this went through by the aid of a board of eminent "guinea pigs" and the action was brought to recover money invested.

Economy of Electric Light.—Mr. W. H. Preece, in a recent interview reported in a London daily paper, stated that since the electric light was introduced into the General Post Office, the number of days of absence among the employees and officials had been reduced at the rate of two per annum for each one. By calculating the amount of saving represented by these additional days, he finds it to be sufficient to pay for the electric light.

NEW PUBLICATIONS.

ELEMENTARY LESSONS IN ELECTRIC TELEGRAPHY. By L. Michaut and M. Gillet. Paris; Gauthier-Villars et Fils. 1895. Pages, 210. Illustrated, and Appendix. Second Edition. Price 75c.

Encouraged by the favorable reception accorded their first edition of the same work, the authors have just issued a second edition, containing much new material and a thorough revision of their earlier work. The book is intended to instruct the old operator in the practical details of the apparatus he uses, and also to assist the beginner who rightly considers a familiarity with such details a proper, if not necessary, branch of his study of the art of telegraphy. The authors have endeavored to make this book practically useful, not only in setting forth the subject in a practical way, but also as a guide to which to turn in case of difficulties. In line with the latter object the appendix contains numerous tables of the resistances of wires, etc., together with thirteen practical problems and their solutions. To an American telegrapher who is able to read French the book will prove interesting as illustrating points of difference between his own and French practice, and instructive in its practical points. The fact must be borne in mind, however, that it is intended to be elementary in its scope.

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.

Pennsylvania: Department of Internal Affairs. Reports of the Inspectors of Coal Mines for 1894. Harrisburg, Pa.; State Printers. Pages, 571; illustrated.

Professional Papers Read Before the American Institute of Mining Engineers. By Thomas Arthur Rickard. New York and London: The Scientific Publishing Company. Pages, 351; illustrated. Price, \$2.

Proceedings of the Twenty-First Annual Convention of the American Bankers' Association, held at Atlanta, Ga., October 15th, 16th, and 17th, 1895. New York; Published by the Association. Pages 248.

Republica Mexicana: Estadística Fiscal; Datos Relativos a Septiembre de 1895, y de 1894; y al Primer Trimestre de los Años Fiscales de 1895-96 y de 1894-95. City of Mexico; National Printing Office. Pages, 68.

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. Letters should be addressed to the MANAGING EDITOR. We do not hold ourselves responsible for the opinions expressed by correspondents.

Mining Industry of Bolivia.

Sir: I have read your interesting article on the "Mining Industry of Bolivia" in your valuable paper taken from a report on the trade of Bolivia, by the British Consul at Lima. While I have no doubt that the information about the mines and deposits of ore are in the main correct as emanating from so high an authority as Mr. John B. Minchin, I beg to rectify an error as to the rate of freight from and to Corocoro and the Pacific coast, having been connected with the transport traffic for the last eight years by way of Desaguadero.

The Southern railways of Peru have had for the last three years special contracts with all the mining houses at Corocoro to transport their total output from the mines on board ships at Mollendo, at the rate of B's 1.65 per Spanish quintal of 46 kg. each. This amounts to B's 36.40 per English ton of 2,240 lbs., or, at the present rate of exchange of 19d. per one Bolivian, to £2 17s. 8d. per ton.

This includes agencies at Corocoro, Nazacara, Desaguadero, Puno and Mollendo, with launch hire at the last-mentioned port and all other expenses for embarking. Considering that there are 30 miles of land transport of very difficult road, 42 miles of river transport, 120 miles of lake transport and 325 miles of railroad transport, this rate cannot be considered high, but on the contrary compares, I believe, very favorably with any other road.

As to inward freight the Southern railways of Peru puts all kinds of machinery from Mollendo to the mines at Corocoro for £7 10s. per ton, according to their published tariffs.

The opening of the navigation of the river Desaguadero, eight years ago, has enabled the Southern railways of Peru to give all these facilities for transport, lowering the rates to about one-half of what was paid formerly for llama transportation by way of Arica, though a route much shorter. The facilities for getting machinery by way of the river has contributed greatly to improve the methods of working the mines at Corocoro, and every establishment there has now steam plants for hoisting and grinding ore, thus lessening the cost of production and augmenting their yearly output.

JOHN BERGELUND.
DESAQUADERO, Peru, Nov. 30, 1895.

Milling in the Cooney Mining District, New Mexico.

Sir: In the *Engineering and Mining Journal* of December 14th, 1895, Mr. L. W. Tatum, who from December 1st, 1894, to December 1st, 1895, was general manager for the Silver Creek Mining Company, writes, under the heading "Improved Method of Handling Pulp in Silver Mills," an article for the benefit of others who have a similar problem to solve. But as Mr. Tatum never did perform what he states to have done, I would advise some caution and investigation before adopting his proposed plan of working. The figures below are from Mr. Tatum's own monthly statements, and cover the entire period that he was in charge. I have divided them in two semi-annual statements, thus allowing Mr. Tatum six months to investigate and work out his improvements, and six months to demonstrate the same.

These, Mr. Tatum's own statements, thus show for the first half year, a saving of 63%, at a cost of \$4.57 per ton, and for the second half year a saving of 69%, at a cost of \$5.03 per ton. Of course the expenses under general supplies are greater the last half year, but Mr. Tatum ought not charge the company up with the cost of 4 left-handed mullers that he

ordered, when the mill is a right-handed mill. Furthermore, Mr. Tatum received the mill in good working order and left it a total wreck from the rock-breaker to the engine. As example, the "mullers" in the pan were run so long that not only the shoes were worn out, but the muller too, so that now it would be impossible to fasten any shoes to them. As to Mr. Tatum's comparison between November, 1894, and November, 1895, it would certainly not give a fair idea of the working, as he during the first 20 days of November cleaned up \$5,000, and during the last 10 days of same month, \$11,000. Looking over the company's accounts, I find that during November, 1894, the consumption of fuel was 6½ cords per day, and during November, 1895, 7¼ cords per day, or at the rate of 10½ cords per 40 tons of ore treated, and not 5½ cords as Mr. Tatum states. So much about Mr. Tatum's improvement as to cost of treatment.

As to improvements in treating the ore and saving the slimes, Mr. Tatum writes concerning the *modus operandi* he found on his arrival. "The slimes from sand tanks were allowed to run to waste sluice, and were entirely lost." This is not so. Before Mr. Tatum took charge the slimes from sand tanks were run through three large settling tanks outside of the mill, the overflow from these tanks returned to the mill, were then pumped up in a large settling tank above the charging floor, from which tank the slimes were emptied directly into the pans, the overflow from this last tank was run into the battery. All that Mr. Tatum did do was to add two more settling tanks outside of mill. Mr. Tatum furthermore writes "the coarse sand only contained about 20% of the value of the ore." This is not very surprising, as by pulverizing through 40 mesh screens only 19¼% of the pulp is coarser than 60 mesh. Mr. Tatum then adopted a 22 mesh screen but he forgot to tell that instead of clear water, he used the overflow from the settling tanks which got thicker and thicker so that after 24 hours run, no ore was crushed, the slime-water being so thick that nothing but fine slimes were discharged from the bat-

tery for the commercial production of calcic carbide, which, he says, is an abortion of the old Siemens electrical furnace, and under which Willson method, he says, not a pound of calcic carbide has ever been produced, is likely to make serious trouble for some one. So we have thought for some time. Dr. Birchmore takes strong ground that the gas in question will find no market as an enricher. It certainly will not, from a commercial standpoint, unless carbide can be produced for less than \$20 per ton, in support of which view I may refer to Professor Lewes, of London. Figures have been given in detail in the technical papers, and there is no excuse for ignorance on this subject. From a chemical standpoint, it may be shown that it cannot be used at all for such a purpose. Dr. Birchmore is of the opinion that the gas must be burned pure. He says the idea of mixing it with air is simply ridiculous. He hints that those who prefer acetylene to eyes will use the new gas.

Mr. John C. McMinn, M. E., recently read a paper before the Northwestern Electrical Association on the subject of acetylene gas, which was most eulogistic of the whole matter. He has been to Spray, says he has seen two tons of calcic carbide produced here in two days, at a cost of \$25 per ton, and then stops his flow of alleged facts. Well, at this figure the "revolution" is over. But we opine that Mr. McMinn is in error in his figures. If he will be good enough to furnish us with the items of his bill of costs we will be indebted. We learned addition early in life. I believe this carbide party not only early in life learned "addition" but also "subtraction," "division," and undoubtedly "silence." In summing up Mr. McMinn says:

"Of the following fact, I am certain: (1) The gas is intensely brilliant." Now, this is news indeed, and we are all much indebted to Mr. McMinn! He is also certain that it has a disagreeable odor! And then he concludes that in all probability it is going to do wonders, even with calcic carbide at \$50 per ton. This gentleman should communicate at once with the

	Ore crushed. Tons.	Average value per ton.	Value in ore.	Bullion produced.	Milling expenses.					Total milling expense.
					Wood, oil, etc.	Chemicals.*	Mercury.	Gen. supplies.	Wages.	
December, 1894.....	434	\$21.14	\$9,174.76	\$6,920.23	\$791.55	\$514.08	\$253.75		\$1,559.38	
January, 1895.....	515	19.71	10,150.65	7,218.88	702.55	506.47	293.61	\$112.23		1,441.11
February, ".....	595	17.56	10,172.96	7,245.49	667.51	635.29	298.92	86.64		1,473.23
March, ".....	864	16.1	14,035.44	7,780.62	825.70	920.81	3.507			1,341.20
† April, ".....	94 slime.	20.00	1,800.00							
	997	15.04	14,994.88	8,899.89	941.74	599.23	162.15	67.68		1,563.70
May, ".....	889	10.05	13,339.15	9,937.19	947.58	431.10	208.86	10.07		1,653.68
	4,379		\$73,758.14	\$47,192.30	\$1,879.62	\$3,607.89	\$1,546.36	\$276.62		\$9,721.95
† In April 94 tons of slime, of \$20 per ton. Cost of milling, per ton, \$1.57. 63% saved.										
June, 1895.....	60 slime.	\$20.00	\$1,200.00							
	656	16.44	10,784.64	\$4,997.57	\$390.20	\$163.95	\$312.30	\$93.78		\$1,455.56
July, ".....	361	15.85	5,721.85	3,595.35	318.53	281.08	52.15	69.64		1,254.71
August, ".....	643	16.41	10,551.63	7,781.55	179.09	210.99	971.94	11.35		1,472.61
September, ".....	727	15.21	11,079.48	8,554.15	669.54	575.61	34.72	793.12		1,301.04
October, ".....	751	17.91	13,456.41	9,117.63	902.24	532.57	524.15	357.73		1,395.10
November, ".....	874	21.41	18,712.34	16,467.42	932.69	751.55	1,295.05	930.13		1,600.68
	4,072		\$71,500.35	\$49,913.77	\$3,759.69	\$2,817.59	\$3,199.31	\$2,257.75		\$8,480.70
‡ In June 60 tons of slime of \$20 per ton. Cost of milling, per ton, \$5.03. 69% saved. *Bluestone and salt.										

tery and the battery had to be shut down until all the slimes had been cleared up. Nor does Mr. Tatum's statements show an output of 40 tons per day.

Thirty mesh screens are now being used at the Confidence mill on the same character of ore as was milled in the "Sheridan" mill (the mill referred to), but I am satisfied that 22 mesh would be altogether too coarse if clear water is used in the battery. The pan capacity of the mill is 32 tons per day of 24 hours (6 hours charge), being 4 pans with 1½ tons capacity and 2 pans of 1 ton capacity.

CARL ANDERSEN.

MOGGOLON, N. MEX., Jan. 19, 1896.

The Acetylene Mystery.

Sir: The carbide schemers have now received their first severe check in that semi-insiders, some of the original purchasers of "rights," are notifying the principals that they will stop payments until the parent company managers show some actual evidence of making their original promises good. In the meantime scientific men are announcing the results of their studies and experiments, all in favor, of course, of the beauty of acetylene gas, but all against its utility on any of the lines laid down by the present carbide party, and all against this party's promises of the cost of calcic carbide at \$5 to \$7 per ton. The carbide party, in the meantime, is harping away on their old promises, and are producing no facts to show their correctness.

The technical, and some of the independent press has taken up the subject, and are boring deep for reasons. This is distasteful to the carbide party. They prefer generalities, not reasons or facts. Fancy is their stronghold and mainstay. They prefer to refer to the beauty of acetylene, which we all admit, rather than to their promises as to the cost of its base—calcic carbide. By this time it is admitted by all that their original claims as to cost, are ridiculous. This being so, naturally all their prognostications as to their "revolution," based upon the original false estimates of cost of the base of their gas, fall to the ground.

Dr. Birchmore says that not a single lawyer consulted by interests known to him has taken any other position than that the Willson-Dickerson-Suckert patents are only waste paper, so far as their claims to the exclusive production of calcic carbide are concerned. I looked into this subject some time since. I am pleased to have such corroboration as is afforded by Dr. Birchmore's statements. This gentleman has made a valuable study of this subject. He states that he has worked with (1) the Willson patent method, (2) the Morehead (Willson) unpatented method, (3) the Cowles patented method, (4) the Clark patented method (5) and by the Moisson unpatented method, and that modifications of the latter method will produce carbide more cheaply than the Morehead (Willson) unpatented method. He calls attention to the fact that in the judgment of some good lawyers the carbide party's antics in exhibiting the Morehead (W.) unpatented method as the basis of the Willson patented method

General Electric Company and get some information which would probably stop him in his mad career.

When the calcic carbide party first began business it was going to send calcic carbide around in casks. This would not do, they soon found. A house, with a cask of it in the cellar, on fire, would simply have been turned into a gas works after the fire engines got to work. The greater the fire the greater the water, and the more water on the calcic carbide, the more gas. The first house has not come down yet! It is in the clouds, with this part of the scheme. The next plan was the service of cylinders—"pocket flasks"—and every man could find his own key-hole. In Europe the students of this subject having dropped the first plan and gone to the second, are now giving this up and are in a quandary. But adhering to the present party's plan of serving this gas in cylinders we have actual figures by Mr. F. H. Lewis, 406 Locust street, Philadelphia, (*Engineering News*, February 6th, 1896), which go to prove at least that this plan has grave defects. This gentleman states that he "had occasion sometime since to ascertain whether a small cylinder of about ½ cubic foot capacity could possibly contain the amount of gas that the company's orator in Philadelphia had declared it to hold. A little calculation showed that if the gas was present, as stated, its density must be nearly equal to that of cast iron." Referring to Dr. Birchmore's probably not fully considered suggestion, likely based upon the carbide party's figures, of storing a month's supply of gas for household use in a bottle of "very moderate dimensions," to contain, say, about 1000 cubic feet, Mr. Lewis shows that according to Dr. Suckert's own figures, would require a cylinder with an inside diameter of five inches, a length of 15 ft., and weight of about 300 lbs. Mr. Lewis then says:

"To make a lighter cylinder would indeed be practicable to sustain 40 atmospheres, but the critical point of the liquified gas is stated to be 98 degs. Fahr. (Suckert, in *Journal of Franklin Institute*), and at this temperature there would be an enormous increase in pressure, the exact amount of which is, however, probably still undetermined. It would clearly be unsafe to furnish or use cylinders which would not be entirely safe at temperatures of at least 100 degs. Fahr. Hence this estimate of 300 lbs. as the weight of cylinder and contents is believed to be a conservative one. . . . The fact which the acetylene gas people must face is this—that it is entirely unsafe to liquify a gas whose critical point is only 98 degs. Fahr., and subject such cylinders to the incidents of transportation and of ordinary use in dwelling-houses. It has been found necessary to adopt this view in the case of nitrous oxide for dentists' use, and it will be necessary with acetylene. If, then, 40 atmospheres at 70 degs. Fahr., is the limit of compressibility, the use of acetylene in cylinders is even more impracticable than its distribution by tanks and street mains."

What is the meaning of Mr. Lewis' mild hint about "danger in transportation"? The distinguished French chemist, Berthelot, says, after experiment, that gases which absorb heat in their formation, as acetylene,

cyanogen, etc., "although they may not be exploded by simple heating, can be made to explode by a sudden and violent shock." This statement refers to experiments carried on with gases under no pressure. Under such conditions, explosions result only in giving off great heat estimated by Berthelot at 2500 degs. C., as a maximum. When, however, such an explosion takes place in a vessel containing compressed acetylene, the free hydrogen has an expansive force enormously greater than the acetylene, which is still further increased by the great amount of heat liberated. Even the strongest vessels obtainable would burst long before the maximum of this pressure was reached. Or, in other words, the explosion of only a part of the liquid acetylene contained in a vessel would burst it before the rest had time to explode, although the remainder would

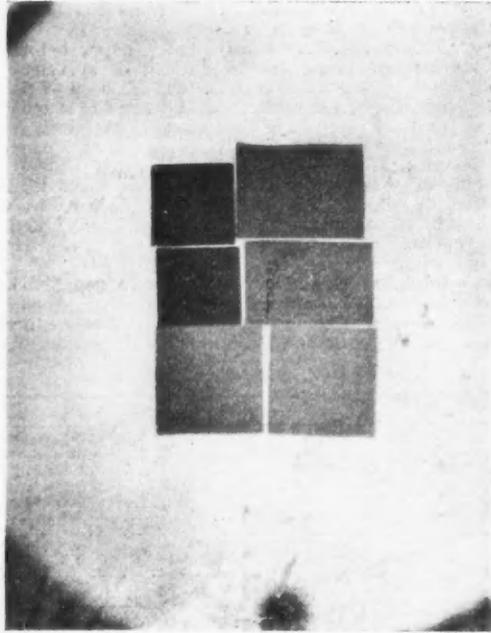


FIG. 1.

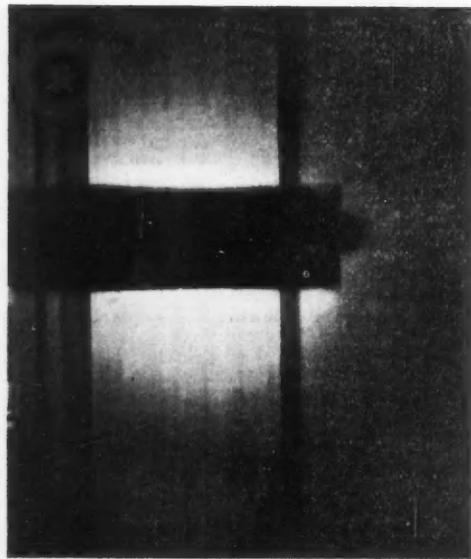


FIG. 2.

explode anyhow and the heated hydrogen would unite with the oxygen of the air causing a second explosion and conflagration.

This is possibly about what took place recently at New Haven. It is also what will occur at many other points before we get through, no doubt. Will the editor of the *Journal* please inform me where I can get a "small bottle" of this beautiful gas? I want one to put into the cellar of mine enemy! "O, that mine enemy might write a book!" will now be changed to the wish that he may "light up"—yea, verily, up he goes!—with acetylene!

I must beg Dr. Birchmore not to hit me when I'm down too hard with his light reference to the "bugaboo" of cost of power. He is a chemist. He must remember that this question of the cost of power does not belong to his profession and is such a deep one as to call out the best efforts of a most expert school of engineers, who are so busy with it that they haven't yet found time to get over into the doctor's professional field and wink slightly at problems which are keeping him busy. I'll venture the assertion that if the doctor will consult the editors of the *Engineering News*, which published his very able paper, he will have his mind opened somewhat upon this subject. He will find that really "cheap" power is a scarce commodity, and in making our best efforts to obtain it that the usual business rules are reversed in that generally as we better our facilities we increase our cost. I beg to call Mr. McMinn's attention also to this fact as it especially relates to Spray.

ACETYLENE.

THE ROENTGEN RADIATION.

Specially Written for the Engineering and Mining Journal by Charles H. Lees, D Sc., Owens College, Manchester, England.

The recent discovery by Professor Roentgen, of Würzburg, of a new kind of radiation, seems likely to bear such important fruit that it is incumbent on every one who is concerned in the practical application of science to make himself acquainted with the most important at least of the details of the discovery. The new rays, which in compliment to the discoverer we may call Roentgen rays, are produced by the discharge of electricity through vacuum tubes. When the exhaustion of a tube is

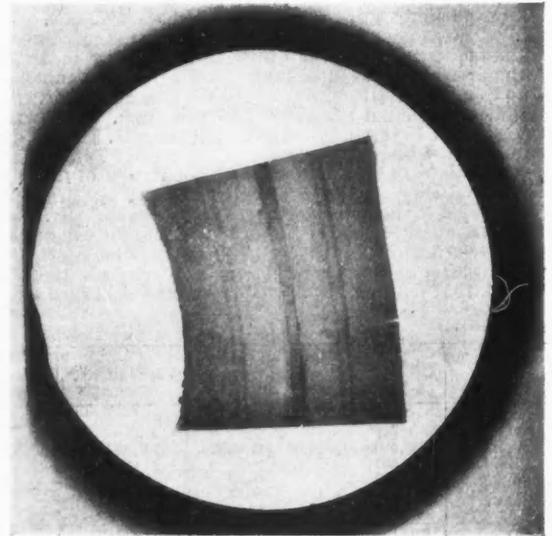


FIG. 3.



FIG. 4.

sufficient, the glow which surrounds the negative electrode extends to the walls of the tube, and causes them to become fluorescent. These fluorescent spots are the sources of the Roentgen rays, and up to the present no more direct method of producing them has been discovered. The rays are found to travel like ordinary light rays in straight lines, but unlike ordinary light they are transmitted by many opaque bodies, e. g., wood, paper, aluminum and flesh. They are capable of producing fluorescence in bodies like quinine, and are found to act on photographic plates and films. This latter fact has furnished a means by which the further properties of the rays have been investigated, but as no body has been found which refracts the rays, nothing of the nature of a lens has been used in taking the photographs which would be more correctly described as shadow pictures. Dense bodies like platinum, lead and iron, absorb the rays in even thin films, while films of zinc, glass and bone require to be thicker to produce the same absorption. Speaking generally, the absorption produced by a film increases with its thickness and with the density of the matter of which it is composed.

The accompanying photographs, taken by Professor Roentgen himself, illustrate some of the possibilities of the discovery. Fig. 1 shows the relative absorption produced by equal thicknesses of glass, aluminum, quartz and Iceland spar, interposed between the source and the plate. It shows also that the two latter substances have no polarizing effect on the rays.

Fig. 2 represents a painted wooden door with a strip of platinum foil attached to it, the source of the rays being on the other side of the door. The fine vertical markings are due to the brush marks in the paint. Fig. 3 represents a sheet of zinc, which appeared homogeneous to the eye, although composed of four pieces soldered together. Under the Roentgen rays the joints come out very distinctly. This may in the future give us a method of detecting flaws in metal, but it should be remembered that it is easier to detect an absorbent body in a non-absorbent one, than vice versa; we can, for example, detect a dark spot in a transparent piece of glass, much better than we can a transparent spot in a piece of dark glass. The distinctness of the joints in the figure is due probably to the presence of the strongly absorbent lead in the solder. The fourth figure shows the bones of a living hand, the outline of the flesh being only just visible. The spot on the third finger is caused by two rings. This figure suggests numerous applications of the new rays to surgery, some of which have already been made. All doubt as to the accuracy of Professor Roentgen's statements has been entirely removed by the repetition of his experiments by at least half a dozen distinguished physicists. The discovery has a scientific as well as a popular aspect, and the present question among scientists is "what is the nature of the Roentgen rays." There appear to be two opinions, each of which has its supporters. According to my view they are transverse vibrations of extremely short wave length—ultra-ultra-violet rays; while, according to the other, they are the longitudinal vibrations which always accompany the transverse vibrations of an elastic medium. Which of these views is the correct one, or whether they are both incorrect, are questions which only further investigation can decide.

ANALYSIS OF REFINED COPPER.*

For several years past I have given considerable attention to this subject. My analyses include the metal from the Lake mines, as well as copper obtained from Western mattes.

To the former, I found Hampe's original method † of analysis well adapted. This consists essentially in precipitating, by electrolysis, the greater part of the copper, and separating the metallic impurities in the usual manner from the remaining solution. The non-metallic elements,



PROF. DR. W. ROENTGEN.

such as oxygen and sulphur, are determined in separate portions of the sample.

For obvious reasons it is not desirable to employ this method in analyzing electrolytically refined copper. Accurate results can be obtained by following the plan proposed by Fresenius, ‡ but the separation of large quantities of copper by means of hydrogen sulphide, and the difficulty of accurate weighing bulky solutions, render this method very objectionable. A far more convenient process is the one recently published by Professor Hampe. § It is also more rapid than either of the two methods mentioned, and, with some modifications, it is especially well adapted for the analysis of most of the American refined coppers.

The process depends upon the removal of most of the copper as cuprous sulphocyanate.

The manner in which I practice it is briefly as follows: Twenty-five grams of material are placed in a tall, lipless beaker and treated with a mixture of 200 cu. cm. of water, 45 to 46 cu. cm. of nitric acid (specific gravity 1.21), and 25 cu. cm. of concentrated sulphuric acid (in case that much antimony or bismuth is present, as much as 100 cu. cm. of H_2SO_4 may be taken). The beaker is covered and heat applied until nitrous fumes are no longer given off and the solution then diluted with 200 cu. cm. of water to prevent the separation of copper sulphate. A rapid current of sulphur dioxide is now conducted into the liquid, the temperature of which is maintained at about 40° C. When the nitric acid is destroyed and the red fumes have disappeared, the liquid becomes turbid, owing to the precipitation of silver, selenium and tellurium. To insure the complete separation of the silver, a drop or two of hydrochloric acid may be added. After standing for 24 hours in a warm place, the solution is poured through a small filter into a graduated flask of two liters capacity. It contains bismuth, antimony, arsenic, iron, also nickel and cobalt, if these are present in the sample.

The sediment retained by the filter is composed of gold, silver, silver

chloride, selenium, tellurium, possibly also lead sulphate, and traces of bismuth and antimony.

To determine the elements in the filtrate, the greater part of the copper must first be removed. To this end a measured amount of standard potassium sulphocyanate solution (1 cc. = .05 Cu) is gradually added, while a current of sulphur dioxide is passed into the liquid. An excess of the sulphocyanate should be carefully avoided; it is preferable to leave some of the copper in the solution which should now emit a perceptible odor of sulphur dioxide. The delivery tube is withdrawn and rinsed off into the flask, the contents of which are then made up to the mark. To effect a thorough mixing it is well to pour the contents into a dry beaker, and to re-transfer them several times from one vessel to the other. The precipitate is allowed to settle and an aliquot portion, say 1,800 cu. cm. of the solution filtered off. The separation and estimation of the different metals is effected according to the usual analytical methods. It is hardly necessary to state that the sulphur dioxide must be expelled before hydrogen sulphide is passed into the liquid.

In calculating the amounts of the metals contained in the entire liquid, we must allow for the volume occupied by the precipitate. According to Hampe the specific gravity of the sulphocyanate is nearly 3, and since 25 grams of copper would give about 48 grams of this salt, the volume of the latter would be 16 cu. cm. The actual volume of the solution, therefore, is 2,000 — 16 = 1,984 cu. cm. Suppose, e. g., we had filtered off 1,800 cu. cm., and found in it .020 gram of arsenic, then

$$\frac{1984 \times .02}{1800}$$

would be the amount of arsenic in the sample taken.

There yet remains to describe the analysis of the insoluble portion from which the main solution was filtered. It may contain, as I have already said, gold; silver (both in the metallic state and as chloride), selenium, tellurium, lead sulphate, and traces of bismuth and antimony, occasionally also copper.

It is best to detach, as completely as possible, the dry mixture from the filter, and to destroy the latter with fuming nitric acid in a small porcelain casserole. The detached portion is then added, and treated with the nitric acid till completely oxidized. After evaporation on the water-bath of the free nitric acid, the residue is digested with dilute hydrochloric acid, which leaves the silver in the form of chloride. This is filtered off, purified, and determined in the usual way. From the filtrate, selenium and tellurium may be thrown down by means of hydroxylamine hydrochloride. In the cold this reagent seems to have little effect, but, upon warming, a reddish turbidity is observed, which gradually collects in the form of dark flakes. These represent all the selenium and tellurium; they are collected on a tared filter and dried at 105°–110° C. to constant weight.

I have not been able to effect a clean separation of the two elements. Approximate estimations were made by fusing the mixture in a current of hydrogen with potassium cyanide; the aqueous solution of the fused mass was then exposed to the air, which caused most of the tellurium to separate.

Gold, lead, and the traces of antimony and bismuth are obtained by the ordinary methods.

Gold Mining in Victoria.—Forty years ago Victoria was the foremost gold-producer in the world, throwing even California into the shade. Although, however, its output has shrunk from over 3,000,000 oz. in 1856 to 673,000 oz. last year, has now again become a progressive quantity, and the product in 1895 was greater than that in any previous year since 1885. This was due to exceptional causes, the granting to the unemployed of free passes by railway from Melbourne to the various gold-fields having added 15,000 laborers to the number of prospectors and "fossickers." Quartz mining was less actively pursued in 1894 than in 1893, and the whole gain came from alluvial deposits. Of these, as usual, the most important were the "deep leads" or gravels contained in the beds of Pliocene streams now buried beneath lava flows. In Victoria these gravels are almost exclusively reached by shafts, the deepest of which, at Bendigo, is now down 3,122 ft. The government geologist reports that some extensive systems of deep leads have been discovered and traced out by borings, one system in particular, on the northern side of the Great Dividing Range and to the westward of the meridian of Melbourne, having an aggregate length of forty miles of leads. To work this an enormous capital would be required, and it is proposed to make it a national undertaking, subsidized by the government.

Desulphurization of Gold Ores by Ozone.—The desulphurization of gold ores by ozone and manner of making ozone were recently alluded to by the *Electrical Review* (London), and its treatment of the subject brings out the following interesting communication from Col. W. J. Engledue: "In a recent issue there is a note on the 'Desulphurization of Gold Ores by Ozone,' in which the idea is evidently ridiculed. It will, however, interest your readers to know that a patent ozone generator, in which I am interested, has been made by an eminent practical electrician, whose name is a household word in the profession, which enables ozone to be produced in quantities, heretofore impossible, and at a small cost.

"Atmospheric air is forced through the apparatus, and subjected during its passage to the action of a silent discharge of electricity at very high potentials, whereby the ozone is generated from the air acted upon.

"Such an invention opens up enormous possibilities, but its practical use for the treatment of refractory ores to render them more amenable to the action of cyanide or chlorination, can only be determined by tests on a large scale, arrangements for which are being made. There is, however, no doubt as to the value of the invention as enabling cheap ozone to be applied to other industries, such as the bleaching of linen, cotton, silk, and woolen fabrics, and of paper pulp; also for the purification and bleaching of oils, fats, waxes, etc., and for sanitary purposes, general purification and ventilation.

"The new ozone generator appears to be as far ahead of the Siemens's tubes, and other known methods for the production of ozone, as the use of steam is in advance of wind as a motive force; but, as the invention is not yet generally known, the scepticism of the writer of the note in question may be excused."

* Extract from Journal Franklin Institute, by Harry F. Keller, Ph. D.

† Zeitschr. f. Berg. Hütten u. Salinenwesen 21, 218, and 22, 93.

‡ Zeitschr. f. analyt. chem., 21, 229.

§ Chemiker Zig., 1893, 92, 1691.

AUSTRALIAN GOLD MINING AT DEEP LEVELS.

Written for the Engineering and Mining Journal by John Plummer.

The Melbourne *Argus* has published an interesting account of the manner in which payable quartz is being obtained from the deep mines sunk on the New Chum line of reef at Bendigo, the leading Victorian goldfield. The Victorians are firm believers in the existence of gold at deep levels, and when, at a depth of about 2,150 ft., the last payable reef appeared worked out, the miners, instead of abandoning their work, determined upon going further down, with the result that payable quartz was discovered at a depth of 2,800 ft. and in exactly the same formation as that met with in the higher levels. This has naturally acted as an incentive to those engaged in deep mining, and further developments in this direction may be anticipated. The New Chum reef is one of the richest and most extensive known and is worked by a number of companies, the new find being on a portion known as the New Chum Railway, from the ground being traversed by a railway line, and when, in September, 1894, a crushing of 29 loads taken from the cap of a reef met in the center country winze in this mine yielded 56 oz. 9 dwt. of gold, the fact was at once demonstrated that gold in payable quantities still existed in the saddle reef formations on the Bendigo goldfield at the great depth of 2,830 ft.

No time was lost in sinking the main shaft to a depth of 2,878 ft., and driving a crosscut east 232 ft. to the reef, so as to work the payable stone proved above to its best advantage. This deadwork has now been got through, under the mine management of Mr. C. S. Rowe, in a surprisingly short time. Where the reef has been recently struck in the 2,878-ft. crosscut the stone is small—1 ft. thick. The reef underlies to the west at an angle of 69°. A reef drive has been started to go south to pick up the shoot of gold on its southerly dip, as proved in the winze above. Referring to the longitudinal section above, showing the position of the winze where the payable quartz exists at a depth of 300 ft. (or 2,798 ft. from the surface), the first crushing of 19 tons from the extreme cap of the saddle reef only returned 5 oz. of gold. However, the second crushing of 29 loads taken just below the cap yielded 56 oz. 9 dwt., or an average of 1 oz. 19 dwt. per ton. In sinking the winze from 313 ft. to 340 ft., 57 tons were taken out and crushed for 101 oz. 9 dwt., the lode being from 3½ ft. to 6 ft. in width. At a distance of 330 ft. down the winze a north main level has been started and driven 28 ft. on the course of the lode. A crushing of 81 tons was put through from this drive for a return of 137 oz. 16 dwt. Here the stone averages 3 ft., the north face showing 2 ft. of stone in the back and 4 ft. going under foot. At a distance of 345 ft. in the winze a south level has been driven on the reef for a distance of 62 ft. The first crushing of 100 tons taken out from here yielded 171 oz. 17 dwt. A second crushing from here of 94 tons yielded 182 oz. 5 dwt.; the stone taken out averaged 5 ft. in width. Above this level a stope has been taken up 15 ft. in height and 48 ft. in length, and 244 tons broken down yielded 501 oz. 13 dwt. From the winze between 340 ft. and 360 ft. 21 tons were crushed for a return of 6 oz. 14 dwt. The crushing referred to totaled 616 tons, which, with pyrites and plates, has returned altogether 1,161 oz. 12 dwt., equal to an average of 1 oz. 17 dwt. 17 gr. per ton. The shoot of gold is going down horizontally, but the dip of the reef is to the south. The height of the payable shoot of stone is 52 ft., and so far proved to average 4 ft. in width; this is independent of the cap from which the first poor crushing of 19 tons came. The length on the line of reef is about 850 ft. The last payable shoot of stone worked in this mine was between the 2,025-ft. and 2,110-ft. levels. As an illustration of the cost of mining at deep levels, the following facts and figures have been taken from the balance sheets of this company between March, 1890, and up to September, 1892, during which period 25,013 tons of quartz were crushed, producing 21,948 oz. of gold, valued at £87,792, and from which £47,035 was divided among the shareholders. Therefore, the profits obtained in this instance were considerably more than half the value of the gold won, and the expenses of working included an extensive amount of deadwork and also adding more efficient machinery to the plant. This illustration is a fair average of the cost of deep mining in Bendigo, as the stone crushed was by no means a high average, but the fact must not be lost sight of that the quality of the stone so far proved in the winze is immeasurably superior to the last run of stone worked, therefore the profits should in this instance be much larger.

The company owning the adjoining claims, the Shenandoah and North Shenandoah, lost no time in sinking their shaft deeper to pick up the run of gold met in the New Chum Railway mine below 2,800 ft. At a depth of 2,782 ft. the crosscut east struck the lode at a distance of 291 ft. from the shaft. Here a rise has been put up on the reef for a height of 68 ft., and 245 tons has been crushed, which returned 395 oz. 4 dwt. (exclusive of pyrites and plates). The rise averages 13 ft. in length on the course of the lode, and the crushings put through the battery have given excellent results. The character of the lode gives good indications of permanency, and strong enough to live through the country for a long distance north and south, there being no difference of opinion as to this reef being one and the same with that met in the New Chum Railway mine. The last payable reef worked in this mine was between the 1,930-ft. and 1,990-ft. levels. A west leg of a reef was worked out, and £10,400 was paid in dividends, besides paying off a large bank overdraft.

The North Shenandoah is awaiting further developments in the preceding claim, but it has, in the past, been a very good gold producer, 37,155 oz. have been won up to date. The next two mines on the New Chum reef are the Shamrock and North Shamrock. On these preparations are being made for deepening the present shaft, now down 2,346 ft., another 34 ft. The run of gold from the Shenandoah will be picked up. At the 1,840-ft. level in the two mines a run of spurs has been worked with good results during the last nine months, the Shamrock having paid 3s. 3d. per share on the profits obtained, but the stone is now smaller, and not returning much profit. In the North Shamrock these spurs still continue payable. They are from 12 ft. to 14 ft. in width, and work up to a height of 40 ft. Since July, 1893, £9,600 has been paid in dividends.

The Garibaldi, New Chum Consolidated, and other mines which have been working at deep levels and obtaining good returns, are preparing to go further down to pick up the new lode. Among these is the "180

Mine" at the extreme end of the line of reef, and which is owned by Mr. Lansell. This mine has produced up to date 92,389 oz. of gold, and the wealth thus obtained has laid the foundations of the large income enjoyed by Mr. Lansell, which has been largely and unsparingly used by him in carrying out an enormous number of mining enterprises not only on this field, but throughout many of the quartz-mining districts in Victoria. At the "180 Mine" the shaft has now reached the depth of 3,209 ft., and sinking operations are to be carried on until a depth of 3,300 ft. is reached, when crosscuts will be started at the 3,200-ft. and 3,300-ft. levels to the east for the downward continuation of the massive quartz formation at the 3,110-ft. level, where it has the appearance of being the neck of a saddle reef. Although payable gold has not been met with at the great depth obtained, Mr. Lansell states that he has by no means lost heart or faith in the property, and he has every belief that the next levels will bring results which will reward him for his enterprise. As for the depth of working, Mr. Lansell states that if a reef of a size that permits of opening up and working in a large manner is met with the cost of mining it would be no more at 3,300 ft. than at 700 ft. from the surface.

Commenting on the large and valuable body of information collected by him, the *Argus* writer says: "It is by no means contended that the deeper formations are as rich or as profitable as the reefs worked at higher levels. However, no one can help being struck with the splendid reefs now exposed in the New Chum Railway and Shenandoah mines, which battery tests so far have demonstrated to be richer in quality than those worked at the last level. It is an acknowledged fact that mining on the Bendigo field can now be carried on down to 3,000 ft. as economically as was the work at a depth of 600 ft. or 700 ft. from the surface. With the introduction of more efficient machinery, the use of air-compressors and rock drills, and the reduction of cost in mining material, stone which yields 4 dwt. to the ton can be now mined at 3,000 ft. so as to leave a margin of profit, if it exists in bodies sufficiently large to allow of operations on a large scale. A truck of quartz (half a ton) is now hauled from a depth of 2,800 ft. in two minutes. The cost of shaft-sinking at this depth is £10 a foot, and at what depth mining will be profitably carried on depends more on the value of the stone met than the impossibility of mining in deep levels. Everywhere along the line where deep sinking is now being carried out the winding engines are capable of hauling from a depth of 4,000 ft. In the early days of quartz-mining it was considered that payable quartz would not exist much below the grass-roots. Such theories as these were freely enunciated by certain geological authorities, who possibly considered that it was wise to be sceptical; but these ideas have been long since upset by more practical development at the pick's point. However, it has been now practically demonstrated that payable gold does exist so far as the miner has reached, and to what depth he will follow the gold is as yet an unknown quantity."

A NEW SAFETY CARTRIDGE FOR FIERY MINES.

In order to avoid the dangers of electric sparks and of the flame of the explosive, quicklime cartridges have repeatedly been suggested and applied with a certain amount of success. They cannot, however, replace the powerful, instantaneously acting explosives. Mr. Ludwig Jaroljmek, of Prague, has had the idea of combining quicklime and dynamite cartridges in such a manner that the quicklime by absorbing water heats a preliminary primer sufficiently to fire off the detonator which is imbedded in the dynamite. Two commissions, the Ostrau Firedamp Commission and the Rositz-Oslava Commission, have reported favorably on the new cartridges, which Mr. Jaroljmek has perfected in conjunction with two Prague firms, Messrs. Sellier & Bellot and Mr. A. Schram. Tests were conducted in the collieries of the Emperor Ferdinand North Railway, at Polish Ostrau, in May and June of last year. An abstract of the reports is given by the inventor in the issues of November 16th and 23d of the *Oesterreichische Zeitschrift für Berg und Hüttenwesen*. We quote from those reports: The quicklime is applied in the shape of cylindrical blocks, ending in truncated cones. Into a hollow in the block fits a two-part capsule. The part which is surrounded by the quicklime contains a preparation which takes fire at 212° or 230° Fahr.; the other part, which reaches into the dynamite, is charged with a detonator. When the lime is slacked, the temperature may rise to 750° Fahr. The parts are not put together before everything is ready. The compound cartridge is then inserted in a bag of loose cotton, knitted like a stocking or woven like a wick. A little wire is twisted round the open end of the bag, and the ends of the wire are bent back. These wires prevent the cartridge from slipping out of a hole bored in an upward direction. When the hole is inclined downward, water is simply poured into it over the cartridge just fixed in position. When this is not possible, either special water bags of cartridge shape, made of a stoutish porous paper, are applied and fixed by a tamping, or the lower part of the whole is filled with moss soaked in water. This latter expedient stood all the tests. The blocks are made in different sizes, and are partly encased in tinfoil. The part to which the water is to have access is provided with a removable cap of tinfoil to keep off moisture and the carbonic acid of the atmosphere. The dimensions of a complete cartridge would be, for instance: Total length, 3½ in.; diameter, 1½ in.; length of dynamite cartridge, 2 in.; of lime block, 1½ in.; of primer capsule, 0.75 in.; diameter of capsule, 0.3 in. The tests were made under considerably varying conditions and with different kinds of explosives, not safety explosives. There were no failures, and, on the whole, firing ensued within the periods stated by the manufacturers. No case of premature firing is reported. Small naked cartridges went off in half a minute or a minute; the same blocks, more or less sheathed, in one or two minutes, according to the looseness of the bag. The Ostrau Firedamp Commission worked in an experimental gallery, which contained 6 8% of methane and an ample supply of coaldust, which was kept in agitation. In no case did the cartridge fire the gases or the dust. The commission declare that evidently the explosion cannot spread, and that hence this method is safer than electric blasting, in which sparks must always be feared. The flame is confined to the interior of the cartridge, and is stopped both by the slacked lime and by the water in the borehole.

THE DAVIS CRUSHING ROLLS.

More attention has been paid recently to improvements in crushing rolls than perhaps at any previous period in the manufacture of mining machinery. This is the most rational consequence of the increased demand for this class of pulverizer by reason of development of improved systems of concentration and the numerous cyanide, chlorination and other leaching mills being erected, which call for large and cheaper crushing capacity with the greatest possible avoidance of sliming.

The Davis Crushing Rolls retain in their designs all the good points of the original Cornish rolls, and embody improved details and new features of great merit suggested by our most experienced mill men. The rolls as now perfected are of simple and massive design, entirely self-contained, with perfect provision for adjustment and lubrication, well housed and protected from dust.

In Figs. 1 and 2 the construction of the machine is clearly shown. M is the frame of the rolls, of ample proportion, cast in one piece.

This design of frame insures perfect alignment of the journals, great strength and rigidity, requires no separate foundation, and dispenses entirely with loose joints and their innumerable bolts and nuts.

The ball and socket bearings of the stationary roll are perfectly seated in the frame.

The bearings of the adjustable roll are carried by swinging arms, E, avoiding the excessive wear of the usual sliding bearings. The swinging arm is carried by and turns on a heavy steel eccentric pin, F, held firmly in its seat in the frame. The portion of the pin carrying the arm is eccentric with the part in the frame, and a partial revolution of the pin raises or lowers the swinging arm and bearing, providing a perfect vertical adjustment for the roll shaft—a very important point in fine crushing rolls where it is absolutely necessary that the rolls should be exactly parallel to avoid side thrust in bearings and consequent loss of power.

The bearings, G, for the roll shafts, both in the frame and arms, are of the ball and socket type, very heavy and of ample length to insure moderate working pressure. This form of bearing allows of perfect adjustment under all conditions. The boxes are perfectly fitted to frame and arm, and are provided with phosphor bronze bushings easily renewed. Oiling and the protection of the bearing from dust has been carefully considered.

The arms of the adjustable roll are held in position by the connecting rods, J, which connect the arm to the spring bar, H. The distance between the rolls can be adjusted at any time by means of the turnbuckles, K.

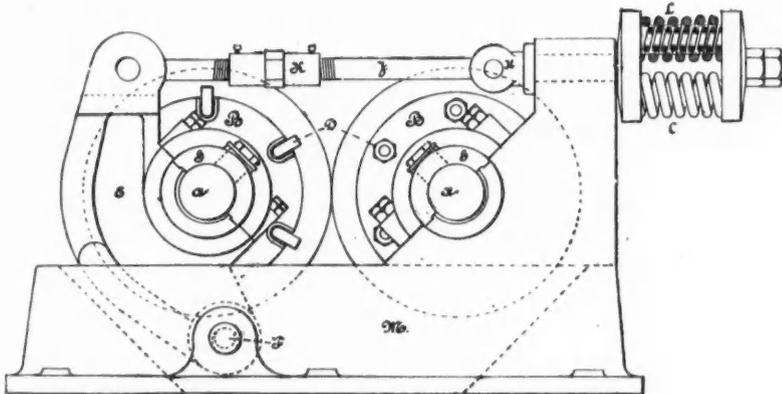


FIG. 1.

THE ORISKANY IRON ORES AT RICH PATCH MINES, VA.

Written for the Engineering and Mining Journal by Edmund C. Pechin.

(Concluded from page 134.)

It is proper in closing this article to call attention to the mining of the Clinton (No. V.) ores on this property. Usually, the Clinton rocks follow the ordinary sweep of the measures, but immediately opposite the camp, and for some distance each way, these rocks have been inverted, the ordinary foot being the hanging and the hanging the foot walls. A large number of test pits, found the ore in place.

At the very bottom of the Rich Patch Mountain, in the ravine of Raleigh Run, and at, say, 3,000 ft. in a direct line from the Oriskany lead, drifts on the opposite sides of the run have been started on this ore. One was in about 50 ft. and another 150 ft. In spots the ore was 4 ft. thick, but the average was fully 3 ft., as I saw it. Mr. E. J. Schmitz, at the Atlanta meeting of the Institute of Mining Engineers, gave an interesting paper on a section of Rich Patch Mountain at Iron Gate, a few miles from Clifton Forge, and only a short distance across the mountain from Rich Patch mines, but on another fold of the measures. He pays particular attention to the fossil ores (No. V.) at that locality, where he finds their seams of brown ore laminated with the fossil. At the workings at Rich Patch the whole seam looks like brown hematite and makes a brown scratch. There are minute seams that look like fossil, but that is all. Picking out the hard lump, it will run from 52% to 54% in iron. At the furnace a cut was made down the middle of a pile that was not regarded as a first-class article, with the following result: Iron, 44.61; silica, 14.34; alumina, 9.95; phosphorus, .74; manganese, 1.15. The combined water was not determined, but it will be noted that room is left for 10% water. The company are mining this ore and shipping it to Buena Vista, because they have found that by using as low even as 10% the furnace works better and can be kept more easily on foundry iron. This recalls to mind a similar result, when I was running a furnace in 1879 at South Pittsburg, Tenn., on fossil ores. The use of a fifth or even a tenth of brown hematite made a wonderful difference both in the working of the furnace and the grade of iron. Of course, a 3-ft. seam is more costly to mine than the brown ones, and it is simply a question of figures whether it will pay to mine and use this ore.

This being decided affirmatively, there seems to be no question of the company's ability to get all they need. There have been surface pits dug in a score of places, and the ore always found under similar conditions. There is scarcely a ravine on the estate, where this seam cannot be at-

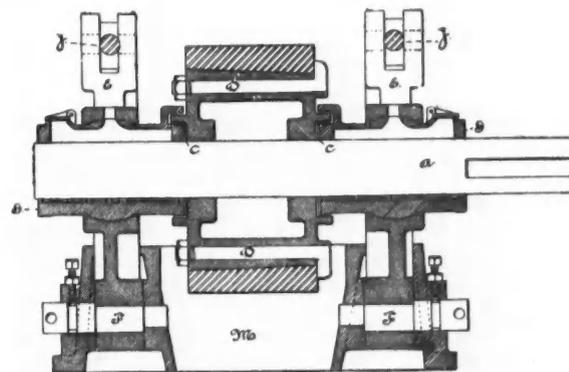


FIG. 2.

The spring bar H passes through the frame, and through a nest of springs on the outside of the frame, and is held by the nuts, which are screwed up against the heavy washers carrying the springs. These springs resist the strains due to crushing, and are stiff enough to do the regular work for which the machine is intended without compression, and only yield under abnormal strains.

The roll proper consists of a very heavy forged steel shaft, A, on which is securely mounted a heart or roll center, B, forming a solid support for the full width of the tire and preventing the shearing off of the edges of the shell, as often occurs when not suitably supported.

This center is turned tapering, and the shell C is bored out to fit, and drawn on and held in place by the draw bolts, D.

The shells are of open hearth steel, hard and tough, forged and rolled to shape, and carefully turned inside and out. For longitudinal adjustment and wear there is placed on the roll shaft, between each bearing and the center, two or more steel rings, C. These can be changed from one side to the other to shift roll as desired. The rolls are completely housed in, but are provided with covers, which can be taken off at any time.

Rolls can be driven by gears, or more usually by large heavy band wheel.

Feeders can be attached to the roll housing, as shown in the engraving, and require no outside supports.

These rolls are built in four sizes, from 12x12 to 16x38. The 12x12-inch rolls are generally used in sampling works, and for this purpose are built with light steel housing, quickly removed by one man, giving free access to all parts of the machine for cleaning. It is also for the same reason provided with but one drive pulley, the adjustable roll being driven by small finger gears.

German Iron Production.—The Association of German Iron and Steel Manufacturers reports the total production of pig iron in Germany (including Luxemburg) for the year 1895 at 5,788,798 metric tons, against 5,559,322 tons in 1894, and 4,986,003 tons in 1893. The output in 1895, over 50%, or 2,898,476 tons, was classed as Thomas pig iron. The Bessemer pig iron made was only 444,495 tons, or 7.7% of the whole. The remaining 2,444,827 tons were foundry and forge irons.

tacked, with level on top of level, starting from the open. Where the two drifts are now being worked the mountain rises so rapidly that within a short distance there is 600 to 800 ft. of vertical height. The vein stands nearly vertical itself, requiring very little timbering and no washing, as the fine is nearly as good as the lump.

The whole estate is thickly covered with forests, so that mine timber will be abundant and cheap for a long time to come. I have gone somewhat into details to give, if possible, the reading public a clear idea of the condition of the ores in this district, as it will have a bearing on what I have to say in another paper, to the effect that the Oriskany brown ores of Alleghany and adjoining counties which have been quietly but profitably worked for many years by local furnaces, must shortly attract large outside attention, and create a new iron center of no mean importance.

Of the many charcoal furnaces built to work the Oriskany brown ores in what is now Alleghany County, Virginia, nothing remains but grass-grown ruins. With the advent of coke and the completion of the Chesapeake & Ohio Railway, came the building of the Longdale and Lowmoor furnaces near Clifton Forge, about 1880, to be followed by the Victoria at Goshen in 1882; the Princess, at Glen Wilton, in 1883; the Alleghany at Iron Gate, and the Covington, at Covington, in 1892. If I am not mistaken Longdale and Low Moor never have stopped save for necessary repairs, but through every business depression, including panics, have kept on the even tenor of their way. All of these furnaces work the Oriskany brown hematites of the section. A gigantic undulation of rocks carrying this ore sweeps over the Potts Creek Mountain, into the valley, up Horse and over Rich Patch mountains, on Crag's Creek, at Longdale and as far east as Goshen, near the Rockbridge alum springs. Necessarily over such an extended area the quality and minor conditions of the ore varies, generally coincident with the flattening and dipping of the seam, at places having much higher silica and manganese.

Longdale has always mined its own furnace supplies, and I believe sells from its Big Hill mines. Low Moor has been a large ore producer, but has also been a purchaser saving its own ground. Princess has had its own mines. Goshen and Iron Gate have been large purchasers. Some years since, the Stack, Dolly Ann and Iron Mountain mines were opened and equipped near Covington, and were the only mines of any consequence supplying the open market, until the Rich Patch property, bought

by some Louisville parties about 1890, came in the field. During the "boom" period a furnace was erected at Covington, but owing to the business revulsion never went into blast, finally becoming the property of the Lyman, of New York. Lately this furnace, together with the three mines of Stack, Dolly Ann and Iron Mountain were consolidated with the Lowmoor furnace property, in which the Lyman were also interested. The Iron Mountain is only a leasehold, the fee being in Mr. McLaren, of Canada, and I am told the lease expires this year. When the depression came, and furnaces were "blown out," there was no market for the Rich Patch ores, so after stocking a considerable quantity of ore, operations, save dead work, were suspended, until recently. The company were confronted with a peculiar condition of affairs. An enormous property, which had cost, with improvements, \$500,000, thoroughly opened and equipped, capable of a large daily output, and no market, save for small and intermittent lots.

It very wisely decided to lease the Buena Vista Furnace, which was on the market. This furnace is reached from the mine, via James River division of the C. & O. Railway, 4 miles (main line) to Clifton Forge, 55 miles to Balcony Falls, 12 miles to Buena Vista, a total of 71 miles. The furnace 16 ft. x 70 ft. is now averaging over 100 tons a day of high-grade iron, so it will be seen that the ore company has a home market for at least 250 tons a working day. This it can give without trouble, and at the same time meet any reasonable demand from Goshen and Iron Gate furnaces. The Rich Patch Company is so well satisfied with the running of the Buena Vista Furnace, since August 1st last, that it has decided to erect one of its own upon its own property.

Within sight of Covington, on the south bank of the Jackson River, they have a broad stretch of level land, at the base of Horse Mountain, and with a long river front. An unfailing supply of pure water can be had at Mill Branch, with a pressure that will throw the water over the stack. A short tramway will connect the furnace site with the great ore deposits heretofore noted as running all along the slope of the mountain. This location is the natural outlet for at least 4,000 acres, to be readily reached through the ravines of Mill Branch and Laurel Run. Beyond question, this company could in a comparatively short time, and with a moderate outlay of money mine, at the rate of 1,200 to 1,500 tons of ore a day. The ground now worked is as rich as any I have ever seen (for brown ores) and 1 ton of ore to 10 cubic ft. of ground is certainly a safe estimate. Now 1,000 ft. in length with an average width of 20 ft. and a depth of 300 ft. will give 6,000,000 cubic ft. of ground, or 600,000 tons of ore. The ground now actually proved and opened is over 5,000 ft. in length, with an average of considerably over 20 ft. in width, and this, irrespective of the parallel seam noted in my first article, which if it continues will double the quantity, and this 5,000 ft. is only one little corner of the estate, with miles and miles of the exposed and tested lead as yet untouched. It seems to me beyond question that this single company is now in a position, not only to supply its own furnace or furnaces, but to guarantee very large supplies of ore to other furnaces that may be erected by outside parties. But the Rich Patch property, large as it is, is small as compared with other land apparently carrying these Oriskany ores. The Iron Mountain mine above mentioned, as adjoining the Dolly Ann, is on one edge of a vast tract of 175,000 acres, making a considerable portion of three counties, the property of Mr. McLaren. When I last saw this mine there was a great face of ore, worked as an open cut. As above stated, it is only leased by the parties who are working it, and as lessees for a moderate time, they naturally would not go to the expense of underground work, so long as they could work it in the open. On this side of the river, as on the south side, the fold runs many miles to the eastward, and unless all signs fail there are untold tons of ore, only awaiting the advent of enterprise and capital to penetrate these wilds and make them productive. The outlook on Craig's Creek, as it appeared to me some years since, is fully described in the issue of the *Engineering and Mining Journal* of August 13th, 1892. I simply repeat that while the outcrop could be traced for miles, the test pits were so superficial and perfunctory, that no fair opinion as to the extent of the deposit could be found, but I saw enough to conclude that a thorough and systematic exploration was warranted, and might lead to most important results.

Still further to the southwest is the Mountain Lake property, on which large showings of Oriskany ores have been talked of for years. Mr. D. W. Langdon, Jr., of Cincinnati, told me that when he visited the openings, some years since, they were of such a character as made it impossible to form any estimate as to quantity. Mr. Reuben Patterson, manager of the Roanoke Furnace, an intelligent and competent observer, told me a few months since that he had lately inspected the property, and that further work had shown satisfactory indications of a large amount of ore. A branch road is now being constructed, 13 miles long, from the Norfolk & Western Railroad, on New River. Should these anticipations be realized, while the output of ores would go to supply the Graham, Radford, Pulaski and Max Meadows furnaces, it would be strong presumptive evidence that the seam was in a workable condition along Craig's Creek, and indeed in the whole section between Jackson and New Rivers.

For many years past Potts Creek, which is parallel to Craig's and flows into Jackson River at Covington, has been heralded as carrying on both sides of its valley enormous quantities of this ore. I have never visited this locality, but my friend, the late J. Herbert Bramwell had and expressed to me a very high opinion of this ground. Knowing his caution and large experience, I have just heard to my surprise that another friend, Mr. P. N. Moore, who ought to know what he is talking about, has quite recently made an examination of Potts Creek, and has expressed an unfavorable opinion of it. As he is undoubtedly a reader of your journal, perhaps he will not find it inconvenient to give his reasons for this conclusion, if correctly reported. Popular expressions of approval are one thing—the opinion of an expert is what is of real value when we are seeking for real facts. I must be permitted to say, however, that in view of the remarkable and unexpected results reached on Rich Patch and a Low Moor, I do not think that any section in this vicinity carrying the Oriskany sandstones, with accompanying outcrop of ore, should be turned down without a thorough and conclusive testing. Much depends upon the dip of the ore, as wherever I have seen the measures seriously flattened much of the ore was gone, and what remained was very silicious.

Leaving these outlying districts out of consideration, enough high-grade

ground has been proved to warrant the expectation that in the near future, with the rapidly increasing demand for cheap iron, that this great district of Virginia, taking Clifton Forge as a center, must and will be looked to as an attractive field for the necessary and profitable expenditure of the capital necessary to build furnaces and cognate industrial plants. The quality of the foundry irons of Low Moor, and of the forge irons of Longdale, has been "known and read of all men" engaged in the iron business for many years past. A new feature is now at hand, which must not be ignored, the application of these ores without any admixture to the manufacture of open-hearth basic steel. My views on the advantages of using the Virginia brown ores for this purpose have been public property for years, and while at the time recognized as being theoretically correct from a practical standpoint, were relegated to the middle of the next century.

Longdale has been making open-hearth basic pig for months past and Mr. Johnson advises me that they have no difficulty in guaranteeing a maximum of 1% of silicon. Within the last two months I have seen analyses of forge irons made at Buena Vista, when the furnace ran off of foundry, that gave one-half of 1% of silicon. The sulphur in these irons, made with New River and Pocohontas coke, is always extremely low, the phosphorus is within satisfactory limits, and the manganese always present in varying quantities, is a help rather than objectionable. If the North and West want high-grade basic irons they can get them right here.

All recognize that it is an unsatisfactory business condition for any section to be putting ores into irons to be sold at a small margin of profit, to be manufactured elsewhere into finished products. The true business position is to have the furnaces and mills close to the raw materials and ship the finished goods. While there are many favorable sites along the railroad, and the C. & O. Railway has shown a liberal policy to industries on the line of its road, a severe business experience has taught me, if you can possibly avoid it, never put yourself in the power of one road. Absolutely uninterested, either directly or indirectly, in either place, my own judgment is, that the natural locations for large iron industries in Virginia are Buchanan, Botetourt County, and Glasgow, Rockbridge County, 18 miles below. Both the Norfolk & Western and the Chesapeake & Ohio (James River division) run through these places, affording access to all markets. Both places are on the James River, with its ample supply of pure water. Two competing coke regions, the Pocohontas and New River are about equidistant. Buchanan has a trifling advantage over Glasgow, in the enormous deposits of almost pure dolomitic and carbonate limestones, from which the furnaces at Roanoke, Iron Gate, Clifton Forge, Buena Vista and Shenandoah are now supplied. Taking Clifton Forge as a center, the ores would have a haul of only 35 miles to Buchanan and 53 to Glasgow.

Broad level reaches of land on the river bank are available at both places. A superb climate, neither too hot nor cold, wonderfully cheap living, owing to the fertility of the surrounding limestone soils, and a good deal of excellent local labor. The seaboard is reached both at Newport News and Norfolk. In addition to the two railroads above mentioned, the Valley Branch of the Baltimore & Ohio Railway is at Lexington, 24 miles from Buchanan, with a roadbed partly graded. Any large industrial development in the region would undoubtedly result in the building of this extension to Roanoke, via Buchanan. This would give connection with a third trunk line.

Considering its geographical position, its existing rail facilities, and the excellence and availability of its ores, this great Oriskany field must become before long another important factor in the iron business of the country.

ANCIENT COAL MINING.

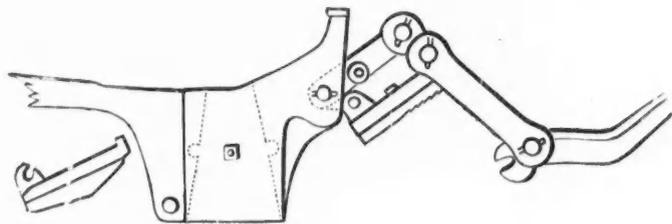
Coal mining in the United States has been in operation about 150 years and the earliest mention of coal itself seems to date back about 200 years. When we come to coal mining in Scotland we have to take a back seat, as, although there is little documentary evidence of the extent of the operations, there is a legal document in existence conveying a coal mine in the year 1210, 686 years ago. Mr. Walter H. Mungall, of the British Society of Mining Students, has written an interesting paper on the historical records of Scotch Coal Mining. Although the document above referred to is the only known authentic evidence fixing the early part of the thirteenth century as the historical birth of coal mining in Scotland, the conveyance itself is significant of the fact that prior to that date coal mining had been carried on for some considerable time.

The method and extent of these early operations, however, are not described, and beyond the fact that coal was worked there anterior to the year 1210, we have no definite information on the subject. About the same time also a colliery was in operation on the Duke of Hamilton's estate of Carriden, near Blackness, a small village on the southern shore of the Forth, and about five miles to the west of the modern Forth Bridge; for we find that in 1214 William de Vereponte paid a tithe of this colliery to the monks of Holyrood Abbey in Edinburgh. Nor was the Fifeshire coal-field unknown in these early times. Toward the close of the thirteenth century (in 1291) the right to dig coal in the lands of Pittencreeff, adjoining the Convent, was granted by William de Oberwill to the Benedictine monks of Dunfermline.

From this time onward the Scottish coal trade continued to increase till, toward the middle of the sixteenth century, the export trade from Scotland, as from England, had assumed such proportions that fear of the early exhaustion of the coal-fields was entertained. So great had the export trade become, especially to France, that in 1563 the Scottish Parliament of Queen Mary, having "consideration of the great multitude of coales continually carried furth of this Realme, not only be strangers, but alsua be the lieges and inhabitantes of the samin," passed an Act prohibiting the exportation of coal which was then "becummin the common ballast of emptie schippes." The penalty for an offense against this Act was the "confiscation of the schip, coales and all the guds that the awner of the coales hes within the said schip." Notwithstanding the provisions of this act do not seem to have been generally observed, for sixteen years later, another Act was passed, ratifying the former Act, and "ordaining it to be put to execution in all pointes." Even this was not rigorously enforced, and in 1597 another act prohibiting the exportation of coal stated that "Coales are commonly transported fourth of this

Realme be diverse and sindry persones quha at all times laiden their Schippes and uthers veschells therewith, and transports the same at their pleasure usand the samin as a commoun trade togidder, without his Majesties licence or permission: To the great hurt of the Commoun weill, and expressly against his Hienesse Lawes, Acts of Parliamente and sindry Proclamations made in the contrair."

About the beginning of the seventeenth century fresh difficulties arose, and the fears that had been entertained half a century earlier seemed now to be almost realized. The supply of coal from parts that were easily accessible was now well nigh exhausted, and to maintain a supply equal to the demand that had arisen, it became necessary to work the coal that lay at greater depths. The new difficulties now to be encountered soon became apparent, and of these, not the least considerable was the difficulty of dealing with the water that was found in greater abundance than formerly. Where the situation of the mine and other local circumstances were favorable, this was overcome by driving level tunnels or adits from the lowest part of the workings across the strata till the surface was reached. Through these tunnels, or "day levels" as they were commonly called, the water flowed from the workings and discharged into some river or stream. In the case of mines less favored by local circumstances some mechanical appliance had to be resorted to for unwatering the mines. Probably the earliest form of mechanical contrivance for this purpose was the rag-and-chain pump, which consisted of a column of pipes through which an endless chain, with bunches of rags or other material attached at short distances apart, passed. These somewhat primitive pistons, ascending in the pipes, carried the water before them and it was discharged at the top. Motion was given to these water-raising machines by horses, wind-mills, or water-wheels where they could be applied. An improvement on this form of pump was the Egyptian wheel—a sort of dredger or bucket elevator. One of these wheels was erected by Sir George Bruce when re-opening his sometime abandoned colliery at Culross, near Dunfermline. Sir George, being a man of no mean ability, and having a knowledge of machinery "such like as no man has in these days," his colliery soon became renowned, not merely in the immediate neighborhood but throughout the district. There were two shafts at the colliery, one on the shore and the other near low water mark, protected from incursions of the sea by an artificial embankment. His water-raising machine, consisting of thirty-six buckets, was placed at the pit on shore, and was actuated by three horses. According to tradition, King James VI, then also I. of England, in making an excursion to Fife-shire about 1617, visited this colliery at Culross, and by his own desire was conducted through the workings. Without giving him previous intimation the party as-



THE TAYLOR HAND ROCK CRUSHER.

cended by the second shaft, and it being then high water, the king, finding himself surrounded by the sea, was apprehensive of some plot against his liberty or life, but was soon assured that such apprehension was groundless and the party went ashore, His Majesty expressing gratification at what he had seen.

The first pumps, apart from Egyptian wheels and earlier contrivances, that were introduced into the pits of Scotland were erected by the then Earl of Mar at his Alloa collieries.

Even in these early times the lot of the coalmaster or colliery manager was not a happy one. Although the colliers had not yet learned the art of striking, they had found other means of shewing their displeasure, and of emphasizing their grievances, real or imaginary. At this time it was no uncommon thing for the mines to be set on fire, and so general had this practice become, that in 1592 the Scottish Parliament passed an Act "For the better punishment of the wicked crime of setting of fire in coal-heuches" by some ungodly persones upon privat revenge and despite." By that act it was declared "that the committing of the said crime in any time hereafter shall be treason, And that the committers thereof, being ordourly convict, shall suffer sik punishment in bodies, landes and guddes, as is dew by the Law, in causes of treason." Within a year after the passing of this act, a collier who had been found guilty of this "wicked crime" was hanged at the Market Cross of Edinburgh, and his head was subsequently placed upon a pole near the mine as a warning to others.

Virtually the mine-workers were serfs and the coalmasters were invested with power and were commissioned "to apprehend all vagabounds and sturdie beggars to be put to labour" in the mines. Fifty-five years later, in 1661, considering that "Watermen who laves and draws Water in the Coal-heugh-head, and Gates-men, who work the wayes and passiges in the saids heughs, are as necessary to the Owners and Masters of the saids Coal-heughs, as the Coal-hewers and Bearers" they were employed under the same conditions, and their removal from one place to another was restricted in the same way as in the case of the hewers and bearers. By the same act, not only was the maximum wage of the collier limited, but his minimum period of labor was fixed at "six dayes of the week, except the time of Christmas." Failure on the part of the colliers to comply with this provision mulcted them in the sum of twenty shillings Scots to be paid to their masters for each day they were idle.

This system of serfdom continued till, in 1775, Parliament decreed that no person shall be bound to work in the mines, in any way different from

* Coal-hewings or coal-workings.

common laborers, and, under certain restrictions, liberated the collier from bondage after a given time, but his emancipation was not completed till the restrictions were removed by a further act in 1799. Females and children, however, still continued to find employment in the mines, and it was not till Lord Ashley's famous bill became law, that the bearing system in Scotland was doomed to extinction, and the labor of young persons became regulated by statute. In carrying coals along the roadways and up the ladders in the shaft, the common load of a woman was from 200 to 240 pounds, while girls and small boys carried single blocks of coal, proportionate to their strength. The coals were carried in wicker creels or baskets fitted to the back and steadied with a strap across the forehead. In reporting on a colliery in Midlothian in 1830 where this system was then in operation the late Matthias Dunn says: "The bearers find their own lights and creels, and are hired at from 10d. to 14d. per day, by such of the hewers as are not fortunate enough to possess wife, sister, or daughter, the necessity of which tends to constant and early intermarriages amongst each other, and is attended with utter want of domestic comfort."

THE TAYLOR HAND ROCK CRUSHER.

The design of this small machine is to enable a person quickly and easily to crush by hand power to a fine powder the hardest ores.

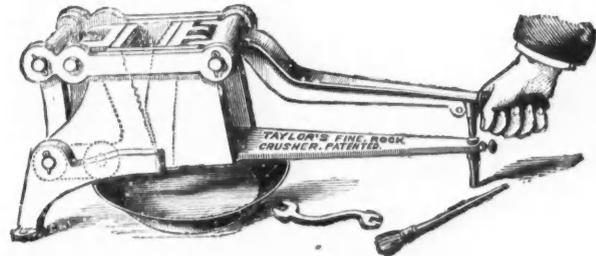
Both jaws are faced with hard white or chilled iron, the lower parts of which are plain surfaces, between which the ore is crushed fine. The stationary jaw, B, has its lower plain surface at an angle to the upper or corrugated surface. The lower part of this jaw is adjusted by a screw shown under the hand, to crush fine or coarse. The movable jaw, C, is operated by the hand lever, and has its corrugations horizontal to facilitate the forcing the ore down at each stroke of the lever. This jaw has a vertical and horizontal motion.

The lever has a rubber covering where grasped by the hand, and a rubber cushion where it strikes the bed piece, to prevent jar and noise.

These jaws are 3 in. wide and open at the top 1½ in., consequently a piece of rock 3 × 1½ in. can be crushed. With the lower part of the jaws set at one-tenth inch apart, 40 lb. of the hardest rock can easily be crushed in one hour, and 20% of this will then go through a No. 60 sieve. Screw up machine and soon run through balance to No. 60 or finer.

This machine crushes much faster than the hand mortar and pestle, because of the great leverage and power, and because the fine crushed rock always drops away; whereas with mortar and pestle the fine is always in the way, and deadens each blow of the pestle.

The mine superintendent uses them as an easy method of getting an



accurate sample of ore. He takes a few hundred pounds from this or that drift, and quickly crushes it to the size of corn, and then samples it down by rolling it over and dividing upon a rubber sheet, then crushes the sample fine and assays it; thus he is able to have a check as to what the mill should do, as the assayed sample is an average of a large lot—instead of being from a small selected piece.

The prospector with this crusher, and a few other tools, can make an extended search for mines. He can break off from the croppings one hundred or more pounds, crush it down and sample, and pack the samples in small paper bags; number them and keep a record of the date and locality, and when he reaches home make assays, and learn the result of the summer's work more satisfactorily than he would if compelled to pack hundreds of pounds of ore home. He can prospect more territory.

The assayer is enabled to save fine ore, and to rapidly clean the machine, making it so easy to sample and assay much larger lots of ore than when confined to the common mortar and pestle, and to prepare a greater number of assays in a short time.

Many miners have been deceived and have experienced great disappointment and loss by sampling a small quantity of rock in a mortar, which all experienced miners know is very uncertain and risky to base large calculations upon, as a small piece might contain a few specks of gold, making a valuation per ton that would be much more than by large samples.

This rock crusher was invented by H. R. Taylor, of John Taylor & Company, who have been in business in San Francisco ever since the first California gold discoveries. The crusher has had a large sale, not only on the Pacific coast but in Australia and other mining countries.

A Pointer for the New York "L" Road.—The experience of the Metropolitan, of Chicago, shows that on an elevated railroad the expense of electrical operation averages 45% of the gross income. Figuring on this basis and the present business of 35,000 passengers per day, President Louderback, of the Lake Street Elevated Railroad Company, Chicago, estimates that the change from steam locomotives to electric power on that road will cause a saving sufficient to show an annual net earning of \$362,312. This will meet the fixed charges of \$280,237, and leave \$82,075 for the stockholders—changing the road from a losing venture to a profitable one. According to the annual report, contracts have been let for equipping the road with electricity, at an estimated cost of \$249,410, which will include car barns and repair shops to house 38 cars.

RECENT DECISIONS AFFECTING THE MINING INDUSTRY.

Specially Reported for the Engineering and Mining Journal.

NEGLIGENCE OF MINE FOREMAN IN PENNSYLVANIA.—A coal mine foreman, licensed under the laws of Pennsylvania, is liable, independently, as well as under the statute, for injury to an employee due to his want of attention to his proper duties, in failing to render secure what he must have known to be an unsafe place to work.—*Durkin vs. Kingston Coal Company* (33 Atlantic Reporter, 237), Supreme Court of Pennsylvania.

OWNERS OF MINES CANNOT BE MADE LIABLE FOR NEGLIGENCE OF FELLOW SERVANTS.—The Court holds that a law which makes the owner of mines, etc., liable, for injuries to other employees, from the failure of a foreman, a fellow servant of the other workmen to do properly what the laws of Pennsylvania require of him, is unconstitutional, as being in violation of the Bill of Rights.—*Durkin vs. Kingston Coal Company* (33 Atlantic Reporter, 237), Supreme Court of Pennsylvania.

CONSTRUCTION OF ASSIGNMENT OF A MINING LEASE.—The Court holds that, where one to whom an interest in the lease of a mine is assigned agrees to pay all costs and assessments on his own interest and that of his assignor, he is not liable for a deficiency of receipts for a certain month, and incurs no liability, if during the whole period of the lease there are funds available for expenses.—*Shaw vs. Horner* (42 Pacific Reporter, 689), Court of Appeals, Colorado.

INDICTMENT FOR OPERATING COAL MINE ON SUNDAY.—Where, on an indictment for operating the pumps and fan of a coal mine on Sunday, there was evidence that the work was necessary to keep the mine from flooding, and from becoming dangerous by filling with gas, but it did not appear that the owners could not have employed some other device, without unreasonable expenditure of time and money, or that the mine could not, by the exercise of ordinary care, have been so constructed as to avoid Sunday labor, a conviction will not be disturbed on appeal to the higher court.—*Shipley vs. State* (32 Southwestern Reporter, 489), Supreme Court of Arkansas.

QUESTIONS OF NEGLIGENCE MUST BE DETERMINED BY THE JURY IN MINING AND ENGINEERING CASES.—Where, in an action for personal injuries to a miner, there was evidence that the superintendent of the company knew of a loose stone over the place where the miner was put to work by him, and that the superintendent had made an unsuccessful attempt to dislodge it, and that he told the workman of that fact, and that the place was safe, but the stone afterward fell upon the workman, the question of the company's negligence and the employee's want of care is for the jury. As is also the question of whether the employee assumed the risk. In such an action it is not competent to show that no accident had ever happened there before that.—*Burgess vs. Davis Sulphur Ore Company* (41 Northeastern Reporter, 501), Supreme Judicial Court of Massachusetts.

CONTRACT OF CONVEYANCE OF MINERAL RIGHTS.—An instrument conveying the mineral interest in certain land, after reciting a nominal consideration, declared that the grantee should have full power to convey, and the grantee stipulated that he would examine the land and if he found valuable minerals, would pay the grantor one-half the net proceeds of same, or should such grantee convey to third persons he would pay the grantor \$200 and one-half the net proceeds of the sale. The Court held that the rights of the grantee under such an instrument were forfeited by his failure for eight years to open the mine and prepare it for sale. Also, that where a conveyance of mineral rights in land is defeated by the grantee's failure to perform the particular acts stipulated to be done by him in the instrument itself, and which form the real consideration for its execution, a re-entry by the grantor is unnecessary.—*Hawkins vs. Pepper* (23 Southeastern Reporter, 434), Supreme Court of North Carolina.

SPUR VEINS AND MEASURE OF DAMAGES IN MINING CLAIMS.—Where a party is adjudged the owner of a vein, having its apex within his location, dipping to the north, and extending under the location of another company, which lay north of this vein; and it appeared that there were certain ore bodies lying south of the vein and under it, with reference to vertical location, and that the ore had been taken by such company from such bodies, such ore bodies, since they could upon no theory have a separate existence, extending through said vein, and giving them an outcrop on the location of the company, should be regarded as having some connection with and belonging to the vein of the first party, and thus entitle him to whatever was in them. The proper measure of damages in an action against the company for unlawfully taking such ore, when the company was not a willful trespasser, is the value of the ore taken, less the cost and expense of breaking it and bringing it to the mouth of the mine; and where the ore has been taken out by a lessee of such company, it having received a royalty upon the ore, such royalty may be taken as its net profit.—*Colorado Central Consolidated Mining Company vs. Turck* (70 Federal Reporter, 294), Circuit Court of the United States, District of Colorado.

LOCATION OF MINING CLAIMS.—A party discovered a mineral lode and posted on the spot a notice claiming the right to locate 1,500 ft. on the lode and 300 ft. on each side of it, naming it the "R. J. Lode," and also claiming the right to have 20 days in which to complete his boundary monuments. He afterward went to the premises to mark the boundaries but was prevented by sickness; but within 20 days he agreed with three other persons to give them half the claim if they would complete the location, which they did, by setting up monuments at the corners and on the lines and posting a location notice, describing it, in which the claim was called the "R. J. Gold, Silver and Nickel Quartz Mining Claim." The court held that the location made by the associates was a completion of the claim made by the first party, notwithstanding the addition of descriptive terms to the name of the claim, in the notice posted by them;

also, that the first party had a right to transfer by parol an interest in his right to locate his claim to his associates, and his doing so and permitting them to complete the location was not an abandonment of such right. Also that the discoverer of a mineral vein should have a reasonable time after his discovery to complete his location, the length of time depending on the nature of the ground, the means of marking it and the ability to ascertain the course or strike of the vein, and that, in the case stated, 20 days was not an unreasonable time, the vein being situated on a rough mountain side, the dip not exposed and 1,000 ft. of vein covered.—*Doe vs. Waterloo Mining Company* (70 Federal Reporter, 455), United States Court of Appeals, District of California.

Glucinum.—The price of this metal is now nearly \$18 per pound, says the *Electrical Review* (London); it is a white metal of a specific gravity of 2.1, that of aluminum being 2.6; it is malleable, may be forged, rolled into sheets, and will take a high polish, does not tarnish in the air, and resists the action of most oxidizing agents; its electrical conductivity is as high as that of silver, and therefore higher than copper; its price is only one-tenth that of platinum, weight for weight, and 166th volume for volume; it is thought that if the supply is sufficient and the methods of production are improved, it will find useful application in the electrical industries; it was formerly known by the name of beryllium.

Gravity Electrical Power Generation.—The old story of an electric railway in the iron district of Michigan, to operate without a power house is revived. An exchange states that the subject is being considered by the Marquette Iron Range Railroad Company, Michigan, for transporting ores; the length is 15 miles, in which there is a fall of about 800 ft. from the mines to Lake Superior; on account of the topography an endless chain cable is impracticable; it is therefore proposed to construct an ordinary trolley line without a power house; the loaded trains come down from the mines generating current, which is to be transmitted to the trolley line and from it to the cars going up grade; the loaded cars weigh 25 tons; each train of 10 or 15 cars will have a motor car; the difference in weight between the light and loaded trains is thought to suffice to overcome the loss of power in the transmission and machinery.

PATENTS RELATING TO MINING AND METALLURGY.

United States.

The following is a list of the patents relating to mining, metallurgy and kindred subjects issued by the United States Patent Office. A copy of the specifications of any of these will be mailed by the Scientific Publishing Company upon receipt of 25 cents.

WEEK ENDING FEBRUARY 4TH, 1896.

- 553,875. **MANUFACTURE OF IRON.** Charles P. Sherck and James L. Rutter, Lebanon, and Samuel Groh, Lieddale, Pa.; said Groh assignor to said Sherck and Samuel Weiss, Lebanon, Pa. In the conversion of crude or pig iron into malleable iron or steel, the method consists in simultaneously applying a portion of the blast across the bath above the surface of the metal, and a portion across the bath below, the portions of the blast being in opposing directions thereby circulating the bath horizontally and effecting the conversion simultaneously.
- 553,989. **APPARATUS FOR CONDENSING METALLIFEROUS FUMES.** Malvern W. Iles, Denver, Colo. Combination with a metallurgical furnace or furnaces, of a cooling chamber for conducting the smoke and metalliferous fume from the furnace or furnaces, a condensing-chamber into which the cooling chamber opens having two or more sets of tubes or pipes therein, passages so arranged that the smoke and fume will be conducted through one set of the tubes after the other, and nozzles for throwing a spray of water through the tubes always in the direction of the smoke-current so as not to impede but rather to aid the flow of the current, and means for collecting the water and separating it from the condensed fume carried thereby.
- 554,082. **MINING PUMP.** William Nance, Grass Valley, Cal. A combination of a reciprocating pump-rod formed of connected and reinforced wooden sections, means for connecting the piston rods or plungers therewith, an actuating mechanism consisting of bell-crank oscillating levers or bobs, the horizontal arm of one connected with the pump-rod, and the other carrying a counter-balance-weight, and the vertical arms connected by pitmen with an engine-crank intermediate between the two, a horizontal rod extending beyond the weight-carrying bob or lever, a fixed cushion upon the rod and adapted to make contact with the cushion at the end of the downstroke of the pump-rod.
- 554,143. **ORE CONCENTRATOR.** Wentworth Rice and Percy S. Farrar, Deadwood, S. Dak. Combination of a sluice box having a bottom opening, a supporting-stand having a hollow bearing-post provided with a lower interiorly-threaded end, an exteriorly-threaded bearing-step fitted in the lower end of the post, a vertical table-shaft journaled inside of the post and stepped on the bearing-step, a conical concentrating table mounted on the upper end of the table shaft directly under the sluice box opening, and means for rotating the table.
- 554,185. **APPARATUS FOR REFINING ZINC.** George M. Holstein, Pulaski City, Va. Assignor to the Bertha Mineral Company, same place. Combination of a series of retorts set in the furnace chamber with their front ends lower than their back ends, and formed with an externally-exposed dam at the lower part of their front ends for retaining and chilling the stratum of metal flowing to the front and a recessed seat for the condenser above the dam and a condenser communicating with the retort above the chilling-dam and fitted in the recessed seat all combined.

Great Britain.

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

DURING WEEK ENDING JANUARY 4TH, 1896.

- 24,782 of 1894. W. H. Hyatt, London. Dry amalgamator, in which the crushed rock is carried by a powerful current of air over mercury in such a way that the gold balls to the surface of the mercury while the tailings are carried away by the blast.
- 24,288 of 1894. P. Grandjean, Paris. Improving the Coombes' miners safety lamp by increasing the air inlet and so increasing the luminosity of the flame.
- 297 of 1895. C. F. Claus, Swansea and H. S. Sutton, Neath. Recovering tin from scrap by an alkaline electrolytic bath in presence of sulphides.
- 1,155 of 1895. M. M. Tolten, Berlin. In making alloys of iron with nickel, chromium, etc., adding a carbonizing material.
- 21,415 of 1895. R. H. Elliott and J. B. Carrington, Birmingham, Ala. Dust arresters for use with mining drills.
- 21,416 of 1895. R. H. Elliott and J. B. Carrington, Birmingham, Ala. Detailed improvements in coal cutters.
- 21,463 of 1895. I. B. Hammond, Portland, Ore. Improvements in framing of stamp mills.

DURING WEEK ENDING JANUARY 11TH, 1896.

- 3,755 of 1895. B. C. Hinman, New York. Economizing bromine in bromidation process by recovering the excess used.

DURING WEEK ENDING JANUARY 18TH, 1896.

- 19,912 of 1895. S. Mason, Leicester. Detailed alteration in Blake rock crusher.

PERSONAL.

MR. A. R. MEYER, President of the Consolidated Kansas City Smelting and Refining Company is in New York for a few days on business for the company.

MR. FRED. M. RUSSELL, of Wallace, Idaho, assayer to Messrs. Finch & Campbell, the well-known mine owners of Cœur d'Alene, Idaho, is now in New York City.

MR. T. BENTON LEITER has resigned his position as general manager of the Leiter Mining Company, Madison County, Montana, and will hereafter devote himself to his other interests in Montana.

MR. G. W. BENJAMIN has been appointed coal and coke agent of the Chesapeake & Ohio Railroad, and will have charge of the westbound coal traffic of the company, with headquarters at Cincinnati, O.

MR. W. P. WALKER, JR., who has been appointed freight traffic manager of the Chesapeake & Ohio Railroad, will hereafter have direct charge of the seaboard coal traffic of that road. His office will be at 362 Broadway, New York.

OBITUARY.

CHARLES WACHSMUTH, a geologist, died on February 7th, at Burlington, Ia., aged 67 years. He was a member of the leading scientific societies of London and Berlin.

JOSEPH C. F. CHEEVER died in Brooklyn, N. Y., on February 8th, aged 59 years. He was born in Salem, Mass., and went to Brooklyn in 1866. He was a graduate of the Lawrence Scientific School of Harvard University, and was a chemist of some note. Since his arrival in Brooklyn he had been connected with the New York Chemical Coal Tar Company as superintendent.

SOCIETIES AND TECHNICAL SCHOOLS.

IRON FOUNDERS' ASSOCIATION OF MONTREAL.—At the annual meeting of the association held in Montreal, Canada, on January 31st, the following officers were elected for the ensuing year: H. R. Ives, president; Walter Laurie, first vice-president; Jos. Amosse, second vice-president; Moses Parker, treasurer; Wm. Greig, honorary secretary; G. H. Weaver, secretary.

CANADIAN SOCIETY OF CIVIL ENGINEERS.—An ordinary meeting was held on February 13th, at which a paper on "The Penn Yan (N. Y.) Waterworks," by Angus Smith, was read. The discussion on Mr. W. B. Dawson's paper was concluded, and the discussion on Mr. Smith's paper continued. The following special topic was discussed: That engineering works should be constructed by day's work, under the immediate direction of a civil engineer instead of being done through a contractor.

ILLINOIS SOCIETY OF ENGINEERS.—At the annual meeting at Galesburg, Ill., January 30th, the following officers were elected: President, C. C. Stowell, of Rockford; vice-president, J. H. Burnham, of Bloomington; recording secretary, J. W. Alford, of Chicago; executive secretary, J. A. Harmon, of Peoria. The society will meet next year in Springfield. A committee was appointed to act in conjunction with the State Board of Health in securing legislation that will broaden the work of the board in sanitary matters.

AMERICAN CHEMICAL SOCIETY.—The New York Section of the American Chemical Society held its regular meeting at the College of the City of New York on February 7th. The programme announced a paper by Dr. R. G. Eccles on "New Facts About Calceanthus" and "Items of Interest from the Cleveland Meeting," by Prof. A. A. Breneman. Dr. Durand Woodman exhibited a simple lecture table apparatus for experimentally demonstrating the luminosity of the acetylene flame. The meeting adjourned until March 6th.

CIVIL ENGINEERS' SOCIETY OF SAINT PAUL, MINN.—A regular meeting of the Society was held on February 3d. Mr. Archibald Johnson exhibited the drawings and explained the details of the bear-trap lock gates at Sandy Lake. Lieut.-Col. W. A. Jones, U. S. Eng. Corps followed with suggestions as to the probable application of the bear-trap weir foreshadowed by its use at Sandy Lake. The Sandy Lake lock has been in almost constant operation this winter, a temperature of perhaps 30° below zero not having interfered with its work.

NEW YORK ACADEMY OF SCIENCES.—At the meeting of the Section of Geology, on Monday evening, February 17th, at 8 p. m., or soon after, Prof. J. F. Kemp, of the Columbia School of Mines, will give a paper on the Cripple Creek Mining District, Colorado, based on a visit to the camp the past summer. The paper will be illustrated by lantern views and specimens. The meeting will be held in Hamilton Hall, Columbia College, Madison avenue and Forty-ninth street, entrance on the east side, and mining engineers or others interested are invited to attend, whether members of the Academy or not.

GENERAL MINING ASSOCIATION OF THE PROVINCE OF QUEBEC.—This association held its sixth annual session in Montreal recently. The annual report made special reference to the still unsatisfactory

interpretation of the tariff in regard to mining machinery. The election of officers resulted as follows: Capt. R. C. Adams, of the Anglo-Canadian Phosphate Company, president; G. H. Drummond, of the Canadian Iron Furnace Company, first vice-president; B. T. A. Bell, Ottawa, secretary. Mr. Drummond read a paper on "Iron Mining and Trade," John Blue one on "Pyrites and Copper." In this he showed that the quantity of copper ore mined in Quebec in 1895 was 37,560 tons, 22,700 tons of this going to the United States. A paper on "Chrome Iron" was read by J. Obalski, Inspector of Mines, Quebec. There were several other interesting papers.

THE FOUNDRYMEN'S ASSOCIATION.—The regular monthly meeting was held in Philadelphia February 5th, the president, Francis Schumann, occupying the chair. The general order of business was departed from on this occasion, routine business being deferred to allow of ample time for the reading of papers and discussions. The Anniston Pipe and Foundry Company, Anniston, Ala., represented by J. K. Dimmick, vice-president of the company, was a candidate for election, and was admitted to membership in the association. Mr. A. E. Outerbridge, of William Sellers & Co., incorporated, Philadelphia, then read a paper on "Molding Sand and its Preparation." At the conclusion of the reading some discussion arose on points brought out by the paper. In answer to a question: "What did you notice when you used powdered resin in the core mixture? Was there a tendency to a separation of the resin from the sand?" Mr. Outerbridge replied that there was no separation whatever. Before the sand could get out, he said, it was thrown backward and forward an inestimable number of times, and it was this action that caused the thorough mixing. The breaking up of the lumps showed how completely the sand was agitated before it left the machine. A paper by R. A. Hadfield, Sheffield, England, on "The Labor Question" was next read. It had been expected that Mr. Hadfield would be present and take part in the discussion which might arise afterward, but business engagements prevented his attendance. (An abstract of this paper was published in the *Engineering and Mining Journal* for February 15th.) A discussion followed, in which Messrs. Outerbridge, Schumann, Glover, Messick, Justice Cox, Jr., Hanley G. Flagg, Jr., and J. K. Dimmick took part. After passing a vote of thanks to Mr. Outerbridge and Mr. Hadfield for the papers read, adjournment was taken until March 4th, when it is expected that details in regard to the convention of foundrymen to be held in May next will be presented and a programme for that meeting adopted.

INDUSTRIAL NOTES.

The Chattanooga (Tenn.) Iron Company's furnace has gone into blast.

The Reed Island (Va.) Iron Company expects to blow in its charcoal stack early in the spring.

The iron mill at Kittanning, Pa., started up on February 10th, after a shut-down since last September.

The charcoal stack of the Jenifer Furnace Company at Anniston, Ala., will probably be put in operation April 1st.

The Ludlow-Saylor Wire Company, St. Louis, Mo., has just closed a contract for a new building which will be ready for occupancy on October 1st.

C. H. Colby and P. R. Foley have purchased the Dauphin (Pa.) Car Works, and will spend \$50,000 in preparing the plant for making bridges and architectural iron work.

T. A. Wilson and associates will erect a telephone line from West Point to Mokelumne Hill, Calaveras County, Cal., a distance of 15 miles, as soon as the weather will permit.

The Titusville (Pa.) Iron Company has been incorporated with a capital of \$250,000. The directors are John Fertig, John S. and J. C. McKinney, J. J. Carter and B. F. Kraftert.

The Etna Foundry and Machine Company, of Warren, O., which was organized recently, expects to enlarge its works. New machinery will be put in and the capacity of the plant increased one-half.

The Ohio Falls Iron Works, of New Albany, Ind., has filed a mortgage for \$60,500. Immediately after the company asked for a receiver and N. T. De Pauw was appointed with power to operate the plant.

The first electric locomotive built on the Westinghouse system at the Baldwin Locomotive Works, of Philadelphia, arrived at Pittsburg last week. It will be used for heavy hauling in the yards at East Pittsburg.

The Pioneer Rail Renewing Company, which leased the North Chicago rolling mill of the Illinois Steel Company, will probably build a plant of its own at Joliet, Ill., as the lease on the present plant has expired.

The Crown Drill Manufacturing Company, of Phelps, N. Y., has elected the following officers for the ensuing year: President, B. F. Prichard; vice-president and treasurer, G. C. Prichard; secretary, E. H. Liggett.

The contract has been closed for building the new Talcot Forge Works, which are to be removed to New Haven, Conn., from Springfield, Mass. The main building is 70 x 90 ft. and will be ready in about a month.

What is claimed to be the largest lap-welded wrought iron pipe ever produced was turned out at the Pennsylvania Tube Works, Pittsburg, a few days ago. It is 28 in. in diameter, 20 ft. long and weighs 1½ tons.

The Wellston (O.) Furnace Company's stack, producing American-Scotch iron, made an output of 17,500 tons in 310 days in 1895. Of this amount, 95% was No. 1 and No. 2 foundry iron. The present output is 80 tons a day.

The Pultney Foundry and Engineering Works, of Youngstown, O., has been incorporated. The capital stock is \$50,000. The firm manufactures hydraulic machinery, blowing engines and the celebrated Pultney valve.

One of the furnaces of the Shoenberger Steel Company, of Pittsburg, Pa., has had its stoves heightened about 15 ft., and will be blown in this week. The other furnace will probably have its capacity increased in the same manner.

The Round Mountain (Ala.) Furnace Company, with headquarters at Chattanooga, will blow in its charcoal stack about May 1st. The product is cold-blast pig iron for chilled rolls and car wheels, and amounts to about 6,500 tons annually.

The regular organization of the Greensboro (N.C.) Furnace Company was effected on February 4th by D. G. Worth, of Wilmington, N. C.; J. M. Worth, Asheville, N. C.; Edwin Shaver, Salisbury, N. C.; D. F. Caldwell and E. P. Wharton, Greensboro, N. C.

A charter has been applied for by the McKeesport Brass and Iron Company, of McKeesport, Pa. George Russell, George S. Ramsey, George W. Kepner, John Russell and Peter Cameron, Jr., are the interested parties. The company has leased a portion of the May foundry property.

The nail works of the E. & G. Brooke Iron Company, of Birdsboro, Pa., which have been idle for some time, resumed operations on February 5th. The puddling mill will start in a few days. The company has dismantled its Hampton furnace which was built in 1846, and abandoned several years ago.

The Riverside Iron Company, Kansas City, Mo., has been casting some large kettles for the Consolidated Kansas City Smelting and Refining Company, which are used for melting lead. One recently cast was 11 ft. 5 in. in diameter and weighed 18,000 lbs. It would hold 140,000 lbs. of melted lead.

Arrangements have been concluded to place in operation the Fort Payne Steel Mills, at Fort Payne, Ala., owned by E. N. Cullom, of Birmingham and Boston associates. The mills were built eight years ago at a cost of \$300,000, but were never operated because of the collapse of the Fort Payne boom.

The American Projectile Company of Lynn, Mass., which for the past five years has been engaged in the manufacture of different kinds of armor piercing projectiles, is contemplating removal. It is understood that the proposition under consideration is consolidation with the Hotchkiss Repeating Arms Company of Bridgeport, Conn.

Officers of the Pacific Rolling Mills were elected last week at San Francisco, Cal., as follows: President, Edward Coleman; vice-president, Charles F. Neal; general manager, Charles M. Keeney; superintendent, Patrick Noble; secretary, W. T. Sullivan. The directors are: Edward Coleman, Charles F. Neal, George Whittell, L. C. Bresse, A. H. Payson.

Olive Furnace at Ironton, O., has been blown out. Hecla Furnace at the same place will be running by February 20th. It has been banked up some months, waiting for ore. Sarah Furnace, also at Ironton, which blew out January 8th, is having a new hearth and in-wall and some minor repairs made, to put the furnace in first-class shape. It will be ready in a few weeks, but it is not certain when it will be started up.

The Nevada Metallurgical Works, of San Francisco, Cal., established in 1869, have removed to more commodious quarters at No. 71 and 73 Stevenson street. The new premises have been fitted up with a plant which includes a three-stamp Union mill and concentrator, also a large double-hearth reverberatory furnace, one ton capacity. The concrete sampling floor will be a feature. W. B. Taylor and H. C. Ward succeed the late Mr. Luckhardt in this company.

The Punxsutawney (Pa.) Iron Company is now having plans made for the erection of a coke blast furnace. At present the company is figuring on an 80 by 18-ft. furnace, to be equipped with three 80 by 18 ft. Cowper-Kennedy stoves. The plans may, however, be modified a little. The furnace will probably have an annual capacity of from 75,000 to 85,000 gross tons. The company expects to begin active work on the foundations of the plant shortly, and hopes to have the stack completed and ready for blast next fall.

A force of men is at work razing the Alice stack

at Ironton, O. This stack, which measures 8 ft. inside at the bottom, will be 11 ft. 6, while the bosh, formerly 18 ft. will measure 21. The outside diameter at the base will be 19½ ft. where it was 14 before. A series of phospho-bronze coolers and tuyeres will circle about the base of the stack. In place of the dismantled Whitwell ovens, which were 28 ft. high, the three ovens to be erected for Alice stack alone will each mount up 70 ft. They are to be a new type of the Whitwell stove, having a double combustion chamber. The casting house, however, will have to be made considerably larger, to accommodate the largely increased product of iron. The furnace will be ready for operations May 1st.

TRADE CATALOGUES.

The General Electric Company has just issued a catalogue on electric haulage, which deals particularly with mine haulage apparatus. In addition to descriptions of such apparatus, a number of interesting accounts are given of haulage installations complete, several being taken from the pages of the *Engineering and Mining Journal*. A list of plants shows that the company now has in daily operation 41 mining locomotives, aggregating 1,460 H. P. The catalogue is well illustrated, and contains much information on surface haulage plants also.

MACHINERY AND SUPPLIES WANTED.

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

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

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

GENERAL MINING NEWS.

ARIZONA.

GRAHAM COUNTY.

ARIZONA COPPER COMPANY.—This company has declared a dividend of 36c. (ls. 6d.) per share, payable at the office in Scotland. This makes a total of 60c. (2s. 6d.) paid for the year ending September 30th last.

YUMA COUNTY.

HARQUAHALA GOLD MINING COMPANY, LIMITED.—The assistant manager's report of operations of the cyanide plant for December, 1895, is as follows: Pulp treated, 4,050 tons; average assay of pulp, \$4.25 per ton; average assay of tailings, 74c. per ton; percentage extracted, 81%; bullion and gold precipitate, estimated to yield, \$13,785; miscellaneous revenue, \$250; total revenue, \$14,035; operating expenses, \$5,001.11; miscellaneous expenses, \$1,203.61; total expenses, \$6,204; net profit, \$7,830. The plant has been kept running steadily during the month and is giving great satisfaction. Machinery, tramway, etc., are in good working order. At the end of the month a new zinc box was added in the extraction house which will very materially aid precipitation in our future operations. The wet season is apparently past and, as the weather is warming up again, we will have less moisture to contend with from now on.

CALIFORNIA.

AMADOR COUNTY.

(From Our Special Correspondent.)

MOTHER LODGE GOLD MINING COMPANY.—This company has filed articles of incorporation. Directors, William Ireland, A. H. Ricketts, Lyman C. Parke, Leo Neuman, Louis Siesinger and M. M. Stern. The company will develop the Vulture, Price and McNamara mines, on the Mother Lodge, near Jackson, and in the vicinity of the Kennedy, Gover and Oneida mines. Shafts will be sunk to a considerable depth.

BUTTE COUNTY.

(From an Occasional Correspondent.)

BANNER.—This mine is down 850 ft. and still sinking.

BUTTE COUNTY.—Great activity in mining is reported throughout Butte County and many old mines are being reopened. Several new finds are also reported.

ROCK RIVER.—Work is continued on the Rock River group of mines, bonded by an English syndicate and the incline is down 375 ft. Nine claims are within this group and considerable gold has been taken out from several of the quartz ledges in early days.

STANDARD.—This mine, situated eight miles north of Oroville, is down 485 ft. and sinking will be continued as soon as another pump has been put in. A crosscut is run 235 ft. below the surface on the foot wall where two parallel quartz ledges were prospected and found valuable near the surface. Twenty men are employed.

CALAVERAS COUNTY.

(From our Special Correspondent.)

GWIN.—This mine is on the Mother Lodge, three miles west of Mokelumne Hill. A large quantity of

low-grade ore has been struck at the 1,000-ft. level. It appears to be beside croppings of the old vein and work will be pushed down about 400 ft. to the former workings in hopes of tapping a rich deposit. The progress will be slow on account of water.

PLYMOUTH ROCK.—This mine, near Jenny Lind, has completed the Cyanide plant and is treating about 25 tons of \$8 ore per day.

SOUTH PALOMA.—This mine, is being rapidly developed. They are on a 4-ft. ledge of paying ore similar to that taken from the Gwin.

EL DORADO COUNTY.

(From Our Special Correspondent.)

GREENWOOD GOLD MINING COMPANY.—This company which has been incorporated at St. Louis, Mo., has acquired the Fisher property ½ mile west of Greenwood. The ledge is 12 ft. wide, and assays from \$25 to \$275 per ton. A 10-stamp mill is in course of erection.

GREENWOOD GOLD MINING COMPANY.—This company was incorporated in California to develop the Kaiser claim which is located ½ mile east of Greenwood adjoining the Welsh claim. Capital, \$100,000. The shaft is down 59 ft. on a 30-ft. ledge which prospects well. Orders have been given for hoisting and sinking plants. Some confusion is liable to result from the incorporation of two Greenwood mining companies within a mile of one another.

HENRY WELSH CLAIM.—This property, ½ mile east of Greenwood on the Taylor ledge of the Mother Lode, is being developed by San Francisco parties. The shaft is down 75 ft. on a 25 ft. vein of free milling ore. Assays at the surface run from \$2.50 to \$29 per ton.

INYO COUNTY.

(From our Special Correspondent.)

SACRAMENTO.—This mine, 17 miles northeast of Bishop, has been worked in a small way since 1881. The pay ore, which is found in streaks, shutes, and bunches, runs from \$10 to \$100 per ton, by the arrastra process. One of the old tunnels is now being extended to a depth of 250 ft., for the purpose of extracting ore from the old chimney by means of an upraise. Several small streaks of high-grade ore have been crossed. The capacity of the present milling plant is small, but it does good work.

MARIN COUNTY.

(From Our Special Correspondent.)

COAST RANGE.—A rich gold, bearing ledge in the Coast Range, near Bolinas, is reported to have been discovered by S. A. Brown and W. Grider, of Stockton, who claim they will commence shipping rock in a few days, that will run over \$100 in gold and over \$50 in silver.

SAN DIEGO COUNTY.

(From Our Special Correspondent.)

CRESCENT VALLEY DISTRICT.—There is considerable excitement in this section, near Escondido, over the sale of two 20-ft. holes for \$20,000 to practical men who evidently know what they are about. Sales of quite a number of prospects have been reported. The ore assays from \$600 to \$500 per ton.

FREEMAN.—This mine is about 10 miles from Banner. The shaft is only down 20 ft. and shows a 5½-ft. vein of telluride ore, some of which runs very high.

PADLOCK.—This mine, in the Julian District, has been bonded by Frank Harritt, who is now developing a shute of high-grade ore.

SAN MATEO COUNTY.

(From Our Special Correspondent.)

CALIFORNIA NATURAL GAS AND OIL COMPANY.—Thirteen oil and gas grants, which include 2,082 acres of land on the coast side of this county, have been placed on record and assigned to this company. The company is now sinking a well at Half Moon Bay, which, it is reported, is down 750 ft., with a seepage of ½ bbls. of oil per day and a flow of gas. The prospects are considered favorable.

SHASTA COUNTY.

(From Our Special Correspondent.)

BULLY HILL.—This mine at Copper City, on the Pitt River, about 25 miles northeast of Redding, is reported to have been sold to a New Jersey syndicate for \$300,000, by McDonnell & Sallee, who held a bond on the mine and who have been doing considerable development work. The ore, which is very rich in copper, carries gold and silver.

SISKIYOU COUNTY.

(From Our Special Correspondent.)

The Distelhorst Bros. own several claims in the Klamath River from Beaver Creek down. It is their intention to build several dredging machines, invented by John Distelhorst, to work these claims in the spring. Four of these dredges were operated successfully during the past season in the Sacramento River. Each one is capable of handling 40 cu. yds. per hour.

KING SOLOMON CONSOLIDATED MINES.—Supt. H. Bowerman reports that tunnel No. 2 on the Queen of Sheba mine has cut the vein about 50 ft. below tunnel No. 1 at the foot wall, running through 85 ft. of ore body without reaching the hanging wall. Two drifts 70 ft. in length, 50 ft. apart have been run on the vein. Several shallow shafts have been sunk from the surface, which prospect the vein for 70 ft. in width and 700 ft. in length. An average value per ton of all samples taken from the tunnels, drifts and prospect holes is \$27 per ton. The free-milling ore in sight, which is estimated to be 52,500

tons, will, it is said, average \$10 per ton. The company owns 140 acres of good timber land and its own water right. The free-water power is unlimited. Arrangements are being made to put in a 100-ton mill.

TUOLUMNE COUNTY.

(From Our Special Correspondent.)

BELLEVEUE.—The shaft in this mine, six miles northeast of Sonora, is down 560 ft., with a large quantity of ore in sight. The ledge, 14 ft. wide, is being worked between the 400 and 500-ft. levels. Arrangements are being made to increase the number of stamps.

COLORADO.

BOULDER COUNTY.

(From Our Special Correspondent.)

ADIT MINING COMPANY.—This company is crowding operations to the utmost, and is shipping some high-grade ore to Denver smelters.

AMERICAN.—This mine is ready to resume, after its temporary suspension. A long pipe line has been completed to carry water to the boiler-room, and a new shaft house and ore bins have just been finished. The underground workings have also been retimbered.

BLOOMER.—The new roaster at the Bloomer is nearly completed, and in a few days will be ready for operation. The ore body is holding out well.

BRAZIL.—Clemmons & Sale have purchased the Brazil, an extension of the famous Morning Star mine. A new tunnel is to be driven, and work will begin at once. Sale is a lessee on the Morning Star, and will continue his work there in conjunction with the operations on the Brazil.

BUCKEYE MINING COMPANY.—Manager Teagarden, of this company, has acquired a large tract of ground north of Boulder, in an entirely new district, and has a force of men at work sinking a shaft. The outcome is being watched with considerable interest.

CONEWAGO MINING COMPANY.—The Monarch and Empire lodes belonging to this company have been advertised to be sold at trustee's sale on February 7th, to satisfy notes long overdue. The sale was to take place in St. Louis.

DEW DROP.—This tunnel is in 750 ft., and the breast shows 6 ft. of first-class ore. A large force is employed and development work is being pushed.

EMERSON.—Interest has revived at this point, and at a meeting of the company on February 7th, it was decided to invest a large sum of money in the development of this property. Work will begin next week.

GOLDEN RULE MINING COMPANY.—This company's property, consisting of the Gold Dirt, Dauntless and Liberian placer claims, together with ditches and other rights, will be sold at sheriff's sale this week to satisfy a note of \$1,194, in favor of William Flick.

GRAY EAGLE.—Development is going forward rapidly and good ore is being produced. A large force of men is employed.

JACK POT.—A company has been organized in Denver to operate this property, and the work of sinking the old shaft and driving several levels will begin as soon as the retimbering, now under way, has been completed. A plant of hoisting machinery will also be put in shortly.

MUTUAL GOLD MINING COMPANY.—This company, with head offices at Pittsburg, Pa., recently purchased the Rose & Chief mine near here, for a good round sum. The same company owns the Cross mine at Ward, and left instructions with the superintendent, F. W. Davis, to purchase at once large plants of machinery for both properties. The machinery has been ordered from Denver. The Rose & Chief has 4 ft. of good ore in sight.

SLIDE.—The shaft is being repaired and cleaned out, preparatory to sinking much deeper, when several drifts will be run for developing the ore body from below. The company appears to have arrived at an amicable settlement with its employees, as 50 men are now working regularly.

SMUGGLER.—This property started up recently, and is meeting with encouraging indications. The lower workings have been put in working order and the shaft repaired.

WARD.—The mining industry is flourishing at Ward. It is claimed that at least 20 new companies have been organized there this season, most of which are already in operation.

WHITE CROW.—It is stated that \$25,000 will be expended this spring in improvements at this point, including a new hoisting plant, and a mill for treating the low-grade ore. The owner is now in Chicago in the interest of his property.

CLEAR CREEK COUNTY.

(From Our Special Correspondent.)

ALBRO.—A company of Denver gentlemen, including W. H. James, the smelter man and Dennis Sullivan, have organized for the purpose of operating this property near Idaho Springs. Lessees have made some exceptionally large strikes of mineral in the adit level and it is proposed to extend the lower levels to reach the same ore chute.

ANON.—This company operating at the head of Hukil gulch, Idaho Springs, is composed of Denver bank officials. Arrangements have just been made for working the Anon claim through the lower adit of the Shafter mine, thus reaching a depth of 500 ft. by driving a crosscut 250 ft.

COLUMBIA.—A new steam hoisting plant is being

put up preparatory to sinking the shaft to a greater depth. The company claims that a tunnel will be commenced some time during the year to reach all of this claims in this group at a much greater depth.

GRIFFITH.—It is proposed to drive the tunnel at this mine 1,000 ft., and, with this in view, contracts for driving 100 ft. each are being let. In the breast the streak of mixed quartz is 2 ft. wide. This mine was the first discovered in the Georgetown district.

MENDOTA.—The new plant of machinery for this property has just been installed. The *Standard* says that the plant consists of two 80-H. P. boilers and a large Norwalk air compressor, which is calculated to furnish all the air necessary for running two hoisting engines, six machine drills and do the puming that may be necessary around the mine. The hoisting engines are located in a chamber which has been blasted out of the solid rock of the footwall of the Mendota lode, and are of the double cylinder friction pattern with sufficient power to sink to a great depth. The shaft, which is now down about 80 ft., has three compartments. It will be sunk perpendicularly and crosscuts run to the lode at the different levels. Sinking will not commence for some time yet, as the shaft that has been sunk will have to be timbered.

MILLS.—The erection of a number of mills this year for the treatment of ores in the Idaho Springs district is contemplated. They are intended for the treatment of ores from the mines of such companies as the Alkire, Silent Friend, Albro, Senator, Silver Leaf and Stanley.

PIONEER.—The drift is now in 516 ft. and a streak of high-grade ore is showing; the company composed of Nebraska state officials is doing mostly development work.

SHIPMENTS OF SMELTING ORE.—The indications point to a largely increased business here the close of this year, for there are a large number of mines being started up and with those already developed it is expected that Clear Creek County will receive a great amount of attention this coming summer.

TENTH LEGION.—In sinking the shaft on the Gold Dirt property at a depth of 350 ft., it was found that the Tenth Legion people had driven their levels and had been taking out ore from the Gold Dirt mine. An attempt has been made to compromise the matter, but at this writing the contending factions have been unable to reach a satisfactory agreement. The Clear Creek Bank of Georgetown owns the Tenth Legion property, and Hanchett & Himrod, of the Lamartine mine, the Gold Dirt.

EL PASO COUNTY—CRIPPLE CREEK DISTRICT.

(From Our Special Correspondent.)

ANCHORIA LELAND.—This property is on Gold Hill, and the new shaft is being equipped with a temporary steam hoist, when better progress will be made in the sinking of the shaft. At present the shaft is only 50 ft. deep, it being the intention to sink 500 ft. before intersecting the vein. The Hight lease is making its usual shipments. The Maloney lease is just now in poor ground. The vein is 7½ ft. wide, with two well defined walls; but the vein matter is largely a disintegrated quartz, in some places it can be shovelled out and assaying only from \$6 to \$8 per ton.

ELKTON.—This mine on Raven Hill, for a "worked-out mine," as has been reported foreign and Eastern investors, is doing well. One car-load shipment last week netted \$10,000. The slope adjoining the Katherine boundary at the third level—the deepest in the mine—was carefully sampled the past week, the pay streak for 14 in. assaying over \$600 per ton. The shaft has been sunk 75 ft. below the 300-ft. level. The water does not increase much with depth.

GARFIELD GROUSE.—This property, on Bull Hill, is being worked by lessees, who pay 33% royalties. Eight men are employed and a carload of ore shipped monthly. The lowest car averaged \$401 per ton. Two tons of 76 oz. or \$1,520 ore were recently shipped to the Omaha & Grant Smelter. The lessees are at work above the 70-ft. level. The shaft is grown 135 ft., and the work is confined to the original Pike's Peak vein, first discovered in June, 1893.

GRACE GREENWOOD.—This mine on Globe Hill is being actively worked by 20 lessees. One shaft has been sunk 125 ft., the second 55 ft. and the third 65 ft. and the assays from the veins show the ore to be low grade, from \$20 to \$40 per ton.

IRON CLAD.—This mine, on Iron Clad Hill, owned by the Iron Clad Mining Company, of Denver, and worked under lease by Messrs. Cy. Hall & Murphy, has sunk a shaft 150 ft. deep. At the 80-ft. level a drift was run southwest 83 ft., and another in the same direction from the bottom of the shaft, where the vein is 25 ft. wide, assaying from \$5 to \$8. In the middle of the vein there is a streak of quartz varying from 1 to 4 ft. in width, which assays from \$20 to \$800. The shipments vary from \$30 to \$90 per ton.

KISMET.—This claim to which the local papers gave not a little publicity two years ago is being worked by two different leasing companies, both equipped with steam plants. The vein is well defined, but does not carry enough value at present to make it a shipper. On the north end of the claim situated on the southwest of Squaw, the Kismet Mining and Leasing Company is at work, while the south end is being worked by the Cape May Mining Company. Unfortunately the both companies are inconvenienced by water.

LAST DOLLAR.—The lessees on this claim have only about five days to work, the output during the year having been 60 tons a day. This property was one of the 1895 shippers and the lessees have done well on the property; the bonded price was \$75,000, the present owners, Messrs. Eiler of the Colorado Smelting Company, Pueblo, with Messrs. Dickson & Cadman of Denver, being the purchasers at \$100,000.

MAGGIE.—This claim on Wilson Creek 2,500 ft. south of the Independence mine has recently been equipped with steam hoist to still further sink the shaft below the 100 ft. level. The formation is granite, and the vein well defined.

MIDLAND.—A place fully six miles north of the town of Cripple Creek, which was for fully a year the terminus of the Midland Terminal Railway, is somewhat excited over a reported strike of mineral. A test lot of 6,000 lbs. has been shipped, which from a number of assays taken from the vein should sample \$70 per ton. Considerable prospecting is being done in the neighborhood, and there is much talk of erecting a large reduction works, there being ample water and plenty of available mill sites. If this shipment should prove profitable the capabilities of this district will be great. The Lincoln and King of Diamonds are situated midway between Cripple Creek and Midland.

MOOSE.—This mine on Raven Hill is being worked with its usual energy by 75 men. The compressor made its trial run this week, but early next week it will be in regular working order. The shaft will be sunk, and the claim thoroughly prospected from the 600-ft. level by means of machine drills. The present depth of shaft is 650 ft., the second deepest shaft in the camp. The shaft has been perfectly dry.

NEW MOON.—This mine steadily improves. The Peachy lease, ships \$1,200 worth of ore daily, and never looked so encouraging as to-day. The Cobb lease adjoining, presents the same conditions as the Peachy, a little water with easier ground. As yet the Cobb lease has only been self-supporting.

PENNSYLVANIA, WASHINGTON AND CRIPPLE CREEK MINING AND MILLING COMPANY.—This company's properties are being actively worked under a Mr. McKelvey's management. The seven claims are located north of the town on Mineral Hill. On the Katie B north and south vein has been exposed 28 in. wide in a 50-ft. shaft. The Little Dora has sunk a shaft 70 ft. deep on a north and south vein composed largely of quartz and iron. It is the intention to sink the shaft 75 ft. and drift on it. The Lady Loelia has an incline 5½ x 7 ft., 195 ft. deep. At the dept of 75 ft. a crosscut 60 ft. in length intersected a 6 ft. vein of low-grade ore, from \$12 to \$15. At the 120-ft. level there is another crosscut 100 ft. in length in which a 3-ft. vein was found assaying \$35 and \$40 per ton. The Two Jims has a shaft sunk 55 ft., it being the intention to sink the shaft 150 ft.

RAVEN.—This mine shipped this week 5 cars of ore. Two cars from the lessees on the Snowy Range claim and three cars from the upper tunnel. A large sorting house and bins combined has been erected at the mouth of the lower tunnel and in a few days a large force of men will be employed to break part of the reserves which are standing intact for 200 ft. high and for several hundred feet in length. This mine has probably done more dead-work than any other property in camp. The sinking of the Adams' shaft from its present depth, 150 ft., to a depth of 850 ft. to intersect the Raven Hill tunnel is in progress. The Raven Hill tunnel commences on the North slope of Raven Hill in Squaw Gulch. The famous Doctor vein will be intersected by this tunnel at a depth of 400 ft. This mine, from present appearances, will shortly be sold to New York and Boston people. The owners receiving a check recently for \$37,000, and are to receive during the month of February \$110,000, \$100,000 in March, and \$100,000 each month until the full amount is paid. This property comprises an area of 30 acres in the center of Raven Hill which in turn is the central hill of the camp. Of the many experts who have examined the property all have recommended its purchase. The reason it was not sold in London last year was the fact that it was loaded 100%. This sale recalls the history of the mine. It was bonded early in 1892 for \$80,000. The parties refused to pay the bonded price, and there was the most stubborn fight in the history of Cripple Creek, the original and present owners being given possession of the property by the Court after nine successful jury and court verdicts. It is the intention of the company to use electric drills both in the prosecution of the tunnel and the sinking of the shaft.

RENO.—This group of claims situated in Poverty Gulch, are being worked under lease by J. J. Brown has pierced the hill 320 ft. in a westerly direction, but thus far without satisfactory results.

SACRAMENTO MINING COMPANY.—This company has amicably settled with the lessees, and are about to erect a steam plant, and to continue the sinking of the shaft, to a depth of 300 ft. which will thoroughly prove this section of Bull Hill.

SQUAW MOUNTAIN TUNNEL COMPANY.—This company has pierced Squaw Mountain 1,300 ft. and last month shipped 100 tons of ore to the smelters and the Cyanide Works. Five veins have been cut by the tunnel, two of which, at least, show well by development.

THERESA.—This mine, on Bull Hill, close to the town of Goldfield, and owned by Colorado Springs parties, has made a fairly good strike in a 55 ft.

shaft the past week. The seam is small—fully four miles—and assaying \$1,000 per ton.

GILPIN COUNTY.

(From an Occasional Correspondent.)

GOLD COIN.—This property was recently transferred to a New York company. The company owns and leases a group of claims on Quartz Hill, Nevada, the principal of which are the Indiana and Kansas (owned) and the Hidden Treasure (leased from the California Company). Of these the Hidden Treasure and Indiana are westerly extensions of the California vein, the Kansas being a parallel vein to the north. The ore produced is mostly from a rich shoot near the boundary of the Hidden Treasure and Indiana claims, dipping westward into the latter. The high-grade ore is shipped to the Denver smelters, while the mill dirt from the Indiana is treated at the Kansas mill adjoining the Kansas mine, and owned by the company; and that from the Hidden Treasure at the Hidden Treasure mill, at Black Hawk, owned by the California Company. The Indiana claim is at present worked entirely through the Hidden Treasure shaft, on which a pumping plant was placed early in the present year. Much difficulty was, however, encountered in the attempt to deal with the water, which is now being hoisted by the California Company through their shaft. The present output from the group is probably between \$30,000 and \$35,000 per month.

GREGORY BORTAIL.—These important properties at Black Hawk form perhaps the most important group of mines in the county and it is little short of a calamity that they were allowed to fill with water over a year ago. After endless negotiations and one terrible disaster the neighboring Fisk and Sleepy Hollow mines have joined in an arrangement for again draining the district through the Gregory incline and the work is now being vigorously prosecuted. On February 1st the big Knowles sinking pump broke away from its moorings in the incline and was lost, but a new Deane pump of 800 gals. capacity was at once procured from Denver and is now at work. It is hoped that the large station pump at the sixth level, which is of the compound Worthington type and of ample capacity to drain the mines, will be reached before the spring floods increase the difficulty of the work.

GUNNELL.—This mine, one of the principal producers in the county, was closed down some years ago owing to a lawsuit with the Little Josephine, an English company. During the past year it has resumed shipments on a large scale, keeping the Meade mill (40 stamps) at Black Hawk, fully employed, and a week ago the men working in the Concrete, the mine adjoining on the west, struck workings from the Gunnell on ground claimed to be within the Concrete property. Further investigation was, however, checked by the lighting of a fire in these workings, by which the Concrete men were literally smoked out. A lively lawsuit is now expected, which it is feared may result in the temporary closing down of both mines.

JUSTICE.—Another important strike of high-grade smelting ore is reported from this mine. The production has fallen off during the last three months, but will probably now recover.

RUSSELL DISTRICT.—Many old producers, especially in the Russell District, are now starting up and the camp generally has a busy aspect. Old timers predict a prosperous summer here, but as the stamp mills have only about 350 stamps dropping, out of a total milling capacity of over 600 stamps, it will appear that there is room for improvement.

WHITING.—This mine, on Gunnell Hill, is to be reopened at once, and work has already begun on retimbering the shaft. It was a large producer years ago, and noted for one of the heaviest gold returns ever shipped from Gilpin County.

LAKE COUNTY.

(From Our Special Correspondent.)

ALPS LEASING COMPANY.—This company is operating the Alps group, which consists of the Alps, Nos. 1 and 2, Helvetia and Columbine. Most of the stock of the original company is now owned by a Mr. Prentice of New York, but the leasing company is composed of prominent Leadville mining men. A new shaft is being sunk and a great deal of important improvement and development work has been done. The shaft is down 150 ft. and it is expected to catch the ore chute under 300 ft.

ARENA MINING COMPANY.—After shipping quite a quantity of rich lead ore the chute is found to be dipping rapidly, hence Manager George Campion has decided on a new shaft and now has a drill hole going down on a new shaft located east and above the old shaft. It will likely be necessary to go down 500 ft.

BELGIAN.—The old lessees who made such a nice profit out of this property during November and December have succeeded in renewing their lease, and are again opening up a new body of rich ore.

BELLE OF GRANITE.—Word was received here a few days ago that this property which has been owned by Shaul, Mero and Pine, of Granite, has been sold to an English syndicate. The old owners bonded the mine last September for \$20,000, and the bond was taken up by the London Company a few days ago. A new mill is being erected on the property, and systematic development work will follow.

BIG FOUR MINING COMPANY.—J. W. Henney, W. B. McCreery, J. R. Chase and R. A. Sweet, of Chicago, are interested in this company, which a year ago purchased the Rocky Point and Snowflake

claims on Breece Hill. The shaft sunk is the Henney and has opened up a very rich territory. The shaft is 250 ft. deep and will be sunk deeper if necessary. About 25 tons a day of good ore are being shipped.

BOHN.—The big ore bodies from which rich shipments have been steadily made show that they are dipping to the west, hence it has been decided to sink the shaft 100 ft. deeper and then drift west to the ore shute. In order to handle the water a new pumping plant was ordered this week, having a capacity of 500 gals. per minute.

HOPE.—The lessees are seeking for the same ore chute as that opened in the Turbot. They are down 200 ft., and some good stuff has been encountered. The Hope is one of the "city" locations.

KATALINE.—This property lies near the Big Six consolidation, and the shaft, at a depth of 300 ft., is in a low grade contact which promises well.

MIDNIGHT.—Lessees are working on very good indications at the 200-ft. level, and have promise of opening up the big ore chute of that section.

NEW ELKHORN MINING COMPANY.—Manager Timothy Kyle has tendered his resignation to the company, and will devote his time to personal interests on the gold belt. The Elkhorn is preparing for important development work.

RESURRECTION MINING COMPANY.—In addition to shipping steadily and carrying on development work, this company has just leased the New Year property near by.

FLORIDA.

PEACE RIVER PHOSPHATE MINING COMPANY.—This company held its annual meeting yesterday at its office in Savannah, Ga. There was a full attendance of the stockholders and directors. All the officers were re-elected as follows: President, Joseph Hull; vice-president, John T. Wilson; treasurer, R. W. Patterson; secretary, R. S. Cope; assistant treasurer, E. A. Richmond. President Hull says that business was fairly good last year.

GEORGIA.

CHEROKEE COUNTY.

CREIGHTON GOLD MINES.—Mr. O. J. Thies, general manager of the Creighton gold mines, near Canton, reports that the mines are running on full time now and he expects to increase the capacity of the mill soon to 50 tons of ore per day.

OWL HOLLOW.—This mine, near Canton, which was shut down about two years ago, says the *Cleveland Progress* will be reopened at an early date and developed on a more extensive plan than heretofore.

LUMPKIN COUNTY.

CHRISTATEE COMPANY.—This company is extending its pipe line further up the river, where better ground and more gold will be encountered.

FINDLEY.—The big pump has been repaired. The ore in the cuts is getting harder, the values are maintained and the output at the Findley is good.

IDAHO.

IDAHO COUNTY.

(From Our Special Correspondent.)

CLEARWATER RIVER.—Some bars, on which options have been given to a New York company will be opened on a large scale. Work will commence March 1st, and it is expected that mining can begin by July 1st.

DENVER CLAIM.—It is reported that this property at Elk City has passed into the hands of a Portland company, of which the head is H. E. Heppner, of the Moose Creek Diggings.

FLORENCE.—Fifty tons of rich ore are in the bins at the custom mill and more at different claims. The mill will be started February 10th, and will probably be run continuously.

NEVADA AND COMSTOCK.—These claims owned by Youngberg & Thompson, at Dixie, have been sold to a Chicago firm.

SALMON RIVER PLACERS.—The Victor Mining Company and the Slate Creek Company will both commence active mining work in a few weeks.

OWYHEE COUNTY.

DE LAMAR MINING COMPANY, LIMITED.—Capt. John W. Plummer's report for December gives the usual account of the mining and exploratory work. He states that the grade of the ore from the various stopes is dropping in quality. The reason for this is explained by the fact that the faces of the various stopes are gradually receding from the heart of the ore bodies, and approaching their western boundaries. Here the veins are in many instances larger than usual, but they invariably lessen in value. In reference to milling, he says: We shall have difficulty in raising the daily pulp to a higher standard than we are now enjoying. The developments now being made along the fifth level, west, on the combined fifth and 77-ft. veins, and at the eighth level, on the Hamilton vein, will, we trust, give us large quantities of good-grade ore. At present the value of the ore will be low, and the bullion output from the mill will also be diminished. The following is the work performed by the mill during December, 1895: Crushed, wet, 3,825 tons; crushed, dry, 3,443 tons; assay value of the pulp, gold, \$18.31; assay value of the pulp, silver, \$5.54; assay value of the tailings, gold, \$4.28; assay value of the tailings, silver, 97c.; percentage saved, total, 79.30%; dore bars produced, 20; pure gold produced, 1,904.233 oz.;

fine silver produced, 28,800.65 oz. Value of gold produced, \$38,084; value of silver produced, \$17,280; surplus on sales of bullion, \$2,658; ore shipped during the month, \$11,000; miscellaneous revenue, \$461; total, \$69,485; expenses, 39,469; estimated profit for month, \$30,024. Part of the machinery for the Pelatan-Clerici process arrived during the month and was at once installed. The balance is en route from Chicago. Everything about the place is in good working order.

SHOSHONE COUNTY.

(From an Occasional Correspondent.)

CEUR D'ALENE MINERS' WAGES.—At the Bunker Hill & Sullivan the men are working at reduced wages, \$2.50 and \$3 being paid. At the Morning mine the men are also working at reduced rates.

GEM.—It is now stated that this mine, near Mullan, will start up on March 1st.

STANDARD MINING COMPANY.—Additions are being made to this company's plant which will increase its capacity to 450 tons daily instead of 250 tons as at present. The concentrates will average about 64% lead and 80 oz. silver. It is expected that the improved mill will be ready to commence work about March 1st. During the cessation of operations an extensive tunnel has been driven, which is now in 1,200 ft., and which will strike the ore body at much greater depth.

YOSEMITE.—At this mine at Murray, Messrs. Finch & Campbell have struck a 2-ft. ledge of very rich gold ore, an assay of which returned \$1,280 per ton. The mines about Murray are looking well, and last year was the most prosperous of the quartz mining industry of that section.

INDIANA.

OHIO OIL COMPANY.—Pyle and Spellacy have sold their leases, consisting of 646 acres of land, on which there are 25 completed wells, one well drilling, three rigs up and a daily production of about 400 bbls. The Standard Oil Company is the purchaser and the consideration is put at \$225,000, which is a large price for production, being over \$500 a barrel. The Standard in this field is known as the Ohio Oil Company. The Ohio Oil Company has been busy leasing territory in Washington township, Blackford County. It has taken the George Dicken farm of 180 acres, H. L. Bradford, 60 acres, Elizabeth Bradford, 86 acres and 86 acres from Syrene and David Cretzinger. A well must be completed within 30 days. Crandell & Kenney have a contract to put down a test well for Henry Yeager on his farm east of Hartford City. The well will be sunk at once, and will be a first-class test for that territory. George Thompson has leased his farm southeast of Warren, and will have a well on it within 60 days. The well on the Meyers farm, in Nottingham township, Wells County, produced 40 barrels the first 10 hours.

MARYLAND.

Mine Inspector Francis J. McMahon has made his annual report to the Governor. It says that the harmonious relations existing between the operators and employees at the coal mines have continued uninterrupted since the strike of 1894, and that six new openings have been made in Allegany County. Electricity for lighting the mines has been introduced. The past year's shipments by canal amounted to 312,773 tons an increase of 9,079 tons over the preceding year. The total output of the Maryland mines was 3,479,499 tons, an increase of 377,517. There are 3,921 men employed in Allegany and Garrett counties at coal mining. During the year there were only nine fatal accidents.

ALLEGANY COUNTY.

GEORGE'S CREEK COAL AND IRON COMPANY.—At a general meeting of the stockholders of this company, held last week at Baltimore, the following directors were elected: Messrs. J. J. Alexander, Thomas Deford, Richard D. Fisher, John S. Gittings, George C. Jenkins, E. Austin Jenkins, Samuel P. Townsend, Francis White and John A. Whitridge.

MICHIGAN.

COPPER.

HURON, ISLE ROYAL, PORTAGE, SHELDON AND COLUMBIA.—Steps have been taken for the consolidation of these copper mines near Houghton. These mines have been idle several years, but will now be worked.

QUINCY MINING COMPANY.—This company produced 850 tons of mineral during January.

(From Our Special Correspondent.)

HALLOWELL MINING COMPANY.—This company, of Ontonagon, which was organized about a year ago by wealthy citizens of Cleveland, is preparing for active work. The machinery arrived at Ontonagon last week, and will be taken as soon as possible to the mine. The machinery has to be hauled in sleighs 24 miles over an abandoned road. The mine is situated on the Porcupine mountains. The company has had quite a force of men prospecting and sinking test shafts the past eight months.

MINNESOTA.

(From Our Special Correspondent.)

DULUTH, MISSABE & NORTHERN RAILROAD.—The fifth annual meeting of the Duluth, Missabe & Northern was held last week. The old board of directors was elected as follows: F. T. Gates, New York; J. T. McBride, A. D. Thompson, J. B. Cotton, Alexander McDougall, W. J. Olcott and H. C. Merritt. The directors elected the old officers as fol-

lows: F. T. Gates, president; J. T. McBride, vice-president; E. S. Kempton, treasurer; L. R. Payne, secretary; E. V. Carey, New York, assistant secretary; J. B. Cotton, attorney. Mr. Kempton was formerly acting treasurer. The company reports that its gross receipts for 1895 were \$1,468,874, being an increase of \$244,636 over the preceding year. Of the total, \$1,010,874 were the receipts of the last six months. The road's taxes, under the state law, were \$14,688. These earnings were almost entirely from the carrying of ore. There was a slight business from logs and something from passengers, but \$1,271,200 came from iron ore. The traffic of the road for the coming year is expected to be not less than \$2,240,000.

LAKE SUPERIOR CONSOLIDATION.—Annual meetings of the various companies constituting the Minnesota end of the Lake Superior Consolidated Iron Mines were held at Duluth last week. The meetings held were of the Duluth, Missabe & Northern Road, the Missabe & Northern Townsite Company, owner of the Rathbun mine; the Mountain Iron Company, the Biwabik Mountain Iron Company, the Missabe Mountain Iron Company, the Great Northern, Great Western, Shaw, Minnewas and Adams Iron companies. There were trifling changes made in the officers of one or two of the companies, but in the main the directorates and official slates were unchanged. The companies reported but little information for the public, but it is stated that all the concerns represented were pleased with the business of the year and are ready to meet any needed increase in facilities and improvements. The railroad alone is spending this winter between \$500,000 and \$600,000 in improvements and added facilities.

IRON—MESABI RANGE.

(From Our Special Correspondent.)

CANTON.—This mine, belonging to the Minnesota Iron Company, is hoisting some good ore, much like the best of the Biwabik. About 1,700 tons a day are being raised.

CINCINNATI.—Arrangements looking toward the resumption of work at this mine, announced in this correspondence last week, have been begun. Stockpile grounds are being laid out and considerable other preliminary work started. The mine will be in operation in a few weeks.

HALE.—This mine, which has a long time contract with the Thomas Iron Company for delivery of ore, has passed out of the hands of the various Bates companies that have had interests in it for some time, and will be operated by a new concern of which W. E. Dorwin, of Duluth is head. Operations, which have been on the surface, will probably be changed to underground exclusively.

HIBBING.—Excellent prospects are found in section, 26, 23, town 58-20, near Hibbing, where drill work is under way for D'Autremont & Sheridan, of Duluth. An extensive ore body seems to be in sight.

ROUCHELEAU-RAY.—This company is exploring the Gross homestead in the east line of 58-18, recently bought by it for \$25,000, with good results. Ore has been found in many places, and at a depth of 20 ft. The quality is excellent. The explorations being carried on by the Consolidated on 80 acres of land in 17, optioned from this company, are very successful, one of the largest bodies of high-grade ore on this range being uncovered. Five drills are now at work.

SAUNTRY.—Explorations on this property by the owners are being pushed. Two diamond drills are at work by Harrington & Son. There are 38 pits in ore on the mine, and it is the intention to test the ore in each one which has not already reached the bottom of the deposit.

IRON—VERMILION RANGE.

(From Our Special Correspondent.)

BEARINGER.—The Minnesota Iron Company has taken a lease of the Bearinger lands in 26, 63-12, close to the old Miller explorations, and is to mine not less than 25,000 tons annually at a royalty of 30c. Mr. Bearinger was offered \$250,000 for the fee, but decided to hold it, there being an excellent show of ore there. It isn't probable that much ore will be mined there the coming season.

PIONEER.—It is current rumor among Range papers that the fee of the Pioneer is under negotiations for sale to the Rockefeller company, and that the company will build from its terminus at Biwabik to Ely. There is nothing in the story.

RAINY LAKE DISTRICT.

(From our Special Correspondent.)

The State has lost its claim to part of section 33 62-11 on the statute of limitations, no other view of the matter being considered by the General Land-Office. It has appealed to Secretary Smith.

Recent reports from the gold fields of the Rainy Lake region are encouraging, and it is likely that the coming season will see much more activity there than for a long time. At the mines on the Canadian side of the line the veins do not seem to lose as they grow deeper, a fatal defect of those on the Minnesota side of the boundary.

The Minnesota Gold Mining and Development Company, whose operations in the vicinity of Redwood Falls have been referred to once or twice in the past year, has finally thrown up the sponge, alleging, however, that the greed of farmers holding lands along the "vein" is the cause of the suspension of operations. The company has all along

said that it held options on lands along this vein for a long distance.

MISSOURI.

JASPER COUNTY.

(From Our Special Correspondent.)

JOPLIN ORE MARKET.—The ore market shows but little change from that of last week. Jack sold at \$24.50 for top grade ore which was the price paid last week, but lead advanced on February 6th to \$17 per 1,000, with the usual 50c. for hauling. The shipments of lead were much larger this week than last, and it is believed that the prices for both lead and jack will be maintained with a better demand for the next 10 days. There was a large amount of both lead and jack left over. The turn-in was as follows: Joplin, zinc, 910,180 lbs.; lead, 232,600 lbs.; value, \$14,474. Webb City zinc, 381,310 lbs.; lead, 35,860 lbs.; value, \$4,627. Cartersville, zinc, 1,394,130 lbs.; lead, 565,610 lbs.; value, \$23,769. Galena, Kan., zinc, 2,030,000 lbs.; lead, 495,000 lbs.; value, \$29,730. Aurora, zinc, 390,000 lbs.; lead, 33,300 lbs.; value, \$4,172. Zincite, zinc, 46,220 lbs.; value, \$641. Oronoza, lead, 18,700 lbs.; value, \$244. Totals for the district, zinc, 5,091,940 lbs.; lead, 1,388,190 lbs.; value, \$72,300.

LITTLE JEWEL.—On the Yale & O'Brien lease near Joplin, is located the Little Jewel concentrating plant, one of the most complete in the camp, one-half of which is owned by Meeker & Sons, and the other by Cooper & Myers. They are drifting at 100 ft. on a face of lead and jack that is 30 ft. high, in hard ground. Last week they made 50 tons of zinc ore and 25,400 of lead. The plant handles all the ore that they can hoist.

It now looks as if the smelter which was destroyed by fire a short time ago will be rebuilt. Rolin Steward representing Northern capitalists has purchased the works and says that they will be started up as soon as they can be repaired.

SCOTIA.—These mines, at Gregg, shipped five carloads of jack last week that brought the top price, and, judging from present indication, the output will soon be doubled. The mines are located on an 80 acre tract belonging to Colonel Gregg, and there are five shafts on the ground, all of which are operated by Colonel Gregg, who employs about 40 men. The old discovery shaft, during the four years it has been operated, has produced 4,500 tons of the highest grade jack. There is one drift that is over 1,300 ft. long, and a shaft is now being sunk at the head of the drift for air. East of the discovery shaft, another shaft was sunk four months ago, in which ore was struck which speedily developed into a big face of ore, and from this shaft five jig hands concentrate 6 tons of high-grade ore every shift besides the crush rock. North of this shaft, another shaft is going down in which big lead was struck; and west of the discovery shaft there is another shaft which developed a large face of jack at 70 ft. Nineteen-tenths of the ore is free ore, and the crush rock is hauled to the McCracken plant, only a short distance away, where it is concentrated.

MONTANA.

DEER LODGE COUNTY.

ZOSEL.—Everything is running full blast at the mines in Zosel. The carbonate extension lessees have the mine nearly clear of water and ready to develop. Good reports come from the lease of P. Matheson and Cummings & Menard, the property being owned by William and Lewis Coleman, H. B. Hoffman and Jack Conley. They have a good body of ore. Shipments from the Emery run a carload daily. There are about 8 claims active in the district.

GRANITE COUNTY.

ROYAL GOLD MINE.—The raise to connect No. 1 and No. 2 tunnels will have a vertical height of between 240 to 250 ft. It will be completed about April 1st. High grade gold ore is found both in No. 1 and No. 2 tunnels. No. 1 is the lowest of the four in the Royal mine, and is about 100 ft. long. The raise will furnish good ventilation and improve the drainage of the three upper levels.

JEFFERSON COUNTY.

BABY HELEN.—It is reported that work will be started up again on this property. The last work on the mine was done for an interest, and a good working shaft put down to a depth of 200 ft., following the dip of the lode, which contained more or less ore all the way, of above average quality. At certain points along the lode stringers of ore were encountered, and all of the quartz was more or less permeated with high-grade galena.

BLAND.—This property is owned by Messrs. Rose-now, the Latsch Bros. and the Goedo Bros. It is located just beyond the Legal Tender, about one-half mile east from Clancy. There is a shaft on the mine 150 ft. in depth, with drifts and levels connecting. A large steam hoist, capable of sinking to the 500 and beyond, will be put up at once, and the property developed. It is expected that by March 1st everything will be in readiness for work in a systematic manner.

ELKHORN MINING COMPANY LIMITED.—The manager's report for January says: The mill worked 30 days and crushed 1,063 tons. Bullion shipped \$27,765. Smelting ore, 59 tons, which were sold, netting \$6,072. Current expenses, \$19,967. Balance being profit for the month, \$13,780.

FREE COINAGE.—After getting the water out of the lower levels, an examination of the shaft showed it to be sprung out of plumb for a distance of about

30 ft. at one point, occasioned by the swelling of the ground, which will require several days to straighten and strengthen before mining operations are resumed, says the Clancy Miner. The work of sinking the shaft another 100 ft. will commence shortly.

HUMMING BIRD.—This property is owned by Stillman & Beals, and is located not far from the Golden Gate, at the head of McClellan, Moppin and Warm Springs gulches. At a depth of 30 ft. 3 ft. of fine concentrating ore was uncovered which is reported to carry from \$18 to \$20 per ton in gold. A recent sample test made shows that the ore will concentrate down from 6 or 8 into 1.

KING SOLOMON.—Messrs. Redding & Sons have continued the shaft down to a depth of 250 ft., beginning at the 200. At a depth of about 230 ft. a fine chute of ore was encountered which continued to the 250 which is reported to vary in width from 10 to 12 in. They are now running a drift and taking out ore. The ore encountered is fully as high grade as any heretofore taken from the mine.

LITTLE ALMA.—Messrs. Smith & Prescott have a force of 8 or 10 men at work on this property. A fine chute of ore was uncovered last week in the lower drift, but its extent is not yet known.

ROSE.—John Keetsch has bonded the interest of Albert Conrad in this property, and, together with Messrs. Herrmann and Foge, of Helena, will proceed to develop the Rose, which is a prospect above the average. The Rose is supposed to be the same lode as the Legal Tender, and is about 1½ miles due east of that property. The shaft is now about 35 ft. deep. It will be sunk 50 ft. further, when a prospecting crosscut will be run across the lode, after which, if satisfactory, the shaft will be sunk to the 100-ft. level.

NEW MEXICO.

SOCORRO COUNTY—COONEY MINING DISTRICT.

(From Our Special Correspondent.)

COPPER QUEEN.—Two shifts are working, driving the drift on the vein. The drift is now in 475 ft. A shaft was sunk 142 ft. in good ore. This shaft will connect with drift 410 ft. from mouth of drift. Grading for a 10-stamp mill will commence shortly.

DEADWOOD.—The owners, Messrs. Smith & Smith, have resumed work on this mine. A cross-cut was run in near south end line about 80 ft., and where vein was cross-cut some fine ore was struck, then a drift was run on the vein north about 80 ft. on the hanging wall. This drift will be continued, and they expect shortly to strike the ore chute which is showing up on the surface.

FLORIDE.—This group consists of the Floride, Laura, Neglected, Christmas and Mame claims. Of these the Neglected, Floride and Laura are located on one vein running northwest, and the Christmas and Mame on a vein running east and west, crossing the Floride. The Neglected is a contact vein between trachyte and porphyry, but after having crossed the Great Western vein becomes on north side of Mineral Creek a true fissure vein formed in a vertical fault, cutting through the different strata of porphyry, continuing thus until it strikes a dike of mica schist which forms the footwall of the Christmas, when it turns to the west and shortly after disappears under a capping of porphyry. A shaft was sunk 50 ft. on the Floride and a drift was run in 15 ft. on the vein from the bottom of the shaft. The breast averages \$17 in gold and \$9 in silver. A drift now being driven on the vein is in 150 ft., and will in 100 ft. more be under the shaft, attaining a depth of 150 ft. The vein matter is a decomposed quartz with iron hematite and sulphide and chloride of silver.

GRAY HAWK.—This mine, which was leased and bonded to the Maud S. people, has been shut down until some satisfactory arrangement can be made—that is, until the purchase price now due has been paid. Only four men are kept on doing development work.

LAST CHANCE.—It is reported that this property will soon start up again. The property, consisting of the Last Chance, Boise City, Settle and Cross claims and a 20-stamp silver mill, is held under bond by Mr. John Kennedy, of Mogollon. The Last Chance and Boise City claims are on the Confidence vein, from which mine now 90 tons of ore are milled every day. The property has been idle since March, 1893. The Last Chance vein is from 10 to 30 ft. wide, averaging \$4 in gold and \$6.50 in silver, but as the ore occurs in well-defined streaks from 2 to 6 ft. wide, a great deal higher grade ore could be taken out by a small increase in cost of mining. About 2,000 ft. of development work has been done on the Last Chance mine. A large body of ore is in sight.

LITTLE BELLE.—This claim, formerly known as the Tam o' Shanter, is being worked by Bechtol & Company. Some ore was recently milled in the Cooney mill giving excellent returns. The pay streak is 18 in. wide, averaging \$40 per ton. The vein matter is a porphyritic quartz, with copper pyrites and bornite.

OREGON.

BAKER COUNTY.

FLAGSTAFF.—This property, in the Virtue mining district, is making a good showing, says the Baker City Democrat. It is owned by Messrs. Geo. McCarty and M. Mahoney and is situated on the apex of the butte south of the Sparta road and about seven miles southeast of Baker City. The mine was discovered last fall and from the first ore showing free gold was found. Development work has continued since that time and now a shaft is down 70

ft., and at the bottom there is a 3-ft. ledge of good, free milling rock. The property was recently bonded by the French syndicate.

MONTIE.—In this group, consisting of six claims located in the Virtue district, owned by Captain Isidor Fuchs and Geo. Reynolds, a strong 4-ft. ledge of free milling ore, averaging over \$25 per ton, was struck in the shaft at 30 ft. depth. The owners intend to sink 100 ft. before drifting. The Montie is located west of the Emma mine and adjoins that property.

UNION COUNTY.

EUREKA & EXCELSIOR.—These mines in Cracker Creek produced in 1895 ore valued at \$120,000. The concentrates are sent to Tacoma and the State of Washington adds that to its annual output. The above figures, says the Baker City Democrat, have been furnished by J. Henry Longmaid, the lessee of the mine.

PENNSYLVANIA.

ANTHRACITE COAL.

DELAWARE & HUDSON.—All the collieries of the Delaware and Hudson Canal Company in and around Plymouth, are now more or less affected by a cave. The last to feel the effects of a subterranean disturbance is No. 2 Colliery. The squeeze began on February 11th, in the old workings of the Bennett, and five-foot veins. It started at the foot of the bore hole and interferes with the working of the whole mine; The culm bank, which is situated over the workings, is sinking into the mine. Superintendents Rose, Scherer, Peckens, Linskill and Reese were early on the scene and directed matters. The cars are being taken out as rapidly as possible, and their contents dumped into the breaker. The mines had just resumed work after three months' idleness, and nearly 1,500 men and boys are again thrown out of work.

GILBERTON.—After an idleness of over four months, this colliery will resume operations March 1st; During the enforced suspension the breaker has undergone several improvements; the interior having been entirely remodeled and modern facilities added. It will require 600 men and boys to operate the colliery. The resumption of the breaker will cause a temporary suspension of Draper colliery for much needed repairs about the engine house.

LEHIGH & WILKES-BARRE COAL COMPANY.—Chief Engineer Charles Huber, of this company, will commence a general survey of the inside and outside workings of the company throughout the south side, says the Hazleton Standard. Work will be done in both the Yorktown and Beaver Brook mines, which communicate with the workings of the Lehigh & Wilkes-Barre north and east, and also in the Audenried and Green Mountain slopes, obtaining an accurate outline of the property.

YORK COUNTY.

PEACH BOTTOM SLATE DISTRICT.—Since the agreement between the Pennsylvania and the York Southern Railroad considerable activity is being shown on the new road. Surveyors have begun work on a spur road about three miles in length, running from Delta along the numerous slate quarries of the Peach Bottom district. This will heavily increase the freight of the road, as all the slate had to be teamed before through a rough country, and will open to the country at large this deposit.

TENNESSEE.

JEFFERSON COUNTY.

JARNIGAN ZINC MINE.—This property, at Mossy Creek, has been sold to the Bertha Mineral Company, of Pulaski, Va. The new owner will begin at once to take out ore, which will be shipped to its works at Pulaski for treatment.

FOREIGN MINING NEWS.

AFRICA.

GOLD COAST.

WASSAU.—The following report has been issued: During the month of November last the 10-stamp battery worked 12 days 6 hours and crushed 241 tons of ore, producing 266 oz. standard gold and giving a yield of 1 oz. 2 dwt. per ton. In addition to this, tailings and concentrates put through the 12-stamp battery produced 65½ oz. standard, making a total return of 331½ oz. standard. This realized \$5,165. Cablegrams have since been received advising the remittance for December as 234 oz. bullion and a yield of 19 dwt. per ton. Writing on December 5th the manager states that "the Ashanti Expedition has caused some of the native laborers to strike, the majority being hammermen and miners." In a subsequent letter, however, dated December 18th, he says that "of the men who had left work some were returning, finding that they would be employed as carriers and not to fight." This temporary hindrance to the work and the usual Christmas stoppage accounts for the returns for December being lower. Two of the adits in the new property (Cinnamon Bippo) have struck a trace of the lode and more stopping ground in Adjah Bippo will shortly be available. Some increase in the returns may therefore be expected in the near future.

BRAZIL.

OURO PRETO GOLD MINING COMPANY.—During the month of December this company's Raposos Mine yielded 50 oz. gold from 350 tons ore. The

Passagem mine yielded 1,602 oz. gold from 3,940 tons ore. The total yield was 1,652 oz. gold, an average of 0.39 oz. per ton worked. The company has declared a dividend of 1s. per share, payable at the office in London.

CHILE.

NAVARINO ISLAND.—Not more than 50 miners remain on Lennox and Navarino islands, says the *Chilian Times*. A company which had been working three years with but indifferent luck recently struck a pocket on Navarino which yielded them 20 kilos of gold.

PUCHOCO COAL MINES.—A cablegram from Valparaiso states that the vast Puchoco coal mines situated near the port of Coronel, the property of the heirs of Jorge Rojas, have been sold to a French syndicate for \$10,000,000.

SIERRA OVEIRA.—Mr. Ramon Guerrero, is erecting a plant at Sierra Oveira, Taltal, for the extraction of gold. The new concern, which is looked upon with much favor by the miners of the district, will be under his own personal management.

INDIA.

COLAR GOLD FIELD OF MYSORE.

CHAMPION REEF GOLD MINING COMPANY.—The report made up for the year September 30th states that the gold produced during the year realized £264,459, and the profit, after charging to capital account £2,290 for buildings and machinery, amounted to £139,333. The directors now recommend a dividend of 5s. per share, carrying forward a balance of £1,924. The December return shows 4,855 tons crushed, 5,968 oz.; 1,110 tons of tailings, 269 oz.; total, 6,237 oz. gold for the month. The average returns per ton crushed was 1.23 oz. from mill and 0.06 oz. from tailings, a total of 1.29 oz. per ton.

GOLD FIELDS OF MYSORE, LIMITED.—The report for the year ending September 30th states that during the year the company sold a block of 213½ acres of land to the Oriental Gold Mining Company of India for the consideration of 62,500 fully-paid shares in that company. In October last (since the close of the company's financial year) the company sold to the Champion Reef Gold Mining Company, of India, a block of land, about 116 acres in extent, on the western boundary of the company's property, for the consideration of \$225,000 in cash, of which a deposit of \$75,000 has already been paid. The accounts show a gross profit on the year's operations of \$200,000. From this amount the sum of \$72,930 has been written off, being loss on shares realized by the company, and \$3,395 for depreciation of buildings, machinery and plant. There remains the sum of \$139,775 as net profit, and it is proposed to distribute to the shareholders fully paid up shares of the Oriental Gold Mining Company of India, being equivalent to a dividend of 10%. A new 20-stamp mill, with all necessary accessories, has been erected, and trial crushings have been made of the quartz. The directors have decided to adopt the MacArthur-Forrest cyanide process. All the plant necessary for the treatment of 1,500 tons per month has been shipped.

OREGUM GOLD MINING COMPANY.—The statement for December shows 4,785 tons of ore worked in the mill and 4,784 tons of tailings treated. The result was 4,068 oz. from mill and 1,239 oz. from tailings, a total of 6,207 oz. gold. The average yield was 1.04 oz. from mill and 0.26 oz. from tailings, a total of 1.30 oz. gold per ton.

MEXICO.

(From Our Special Correspondent.)

JACALITOS PLACERS.—A company composed of San Diego and Los Angeles parties, which owns 800 acres of placer claims in the Jacalitos District, about 90 miles south of San Diego, is making arrangements to commence work on a large scale next month.

SONORA.

LA SOLEDAD.—This mine, owned by Duran & Morales, of Ilano, and situated about 15 miles from that place, is one of the regular producers of Sonora and yields steadily and well. There is a 14-ft. vein on which a shaft has been sunk about 130 ft., and there are some 200 ft. of drifts and cross-cuts out of which ore is being stoped, says the *Nogales Oasis*. The first class ore yields over 60% lead, 200 oz. silver and \$6 gold per ton; second class over 30% lead, 60 oz. silver and \$8 gold; third class 10% lead, 20 oz. silver, \$12 gold. The first and second classes are shipped, while of the third class there have accumulated 10,000 tons on the dump. The owners are arranging for erection of a reduction plant which will include concentrators and a smelter.

FERGUSON CAMP.—Despite the extremely cold weather good progress has been made in the open cuts and shafts at the Ferguson Camp on La Seine. Work on this property commenced in December. No. 1, or Finn's shaft is down 54 ft. upon a lode averaging nearly 5 ft. of solid quartz. This shaft is located upon claims A. L. 110 containing an area of 40 acres. Shaft No. 2 has been sunk 25 ft. upon a parallel lode 5 ft. in width. Two other pits are under contract averaging 12 ft. in depth, the ores of which carry magnificent samples of coarse and fine gold. The latter openings are upon lot A. L. 111. The price of these lots is \$30,000, 10% of which was paid to local owners for developing bond. Like the Ray-Foley lots the Ferguson Camp is in granite, and the veins cut squarely across that formation and beyond it into the slates of Huronian age. Their strike is North 20° West astronomic. Dip, vertical.

FOLEY'S CAMP.—The North Shaft is down 123 ft. The vein is nearly 5 ft. at bottom. Drifting commenced at 100 ft. both ways, with good results throughout. At the South or No. 5 shaft, they are down over 100 ft. and drifting from this level with excellent results. The vein opening to 36 in. and the ore is richer. Messrs. Foley and his chemist Ross Wilkins are in Detroit, arranging details for extensive operations. Ingersoll drills are giving satisfaction here.

RAY.—The Ray additional, including K 198 and its sub-divisions, lately inspected by Hamilton-Merritt, are again under investigation preparatory to active development. The main vein is 4 ft. 6 in., and its ores exceeds \$33 per ton.

NEWFOUNDLAND.

(From Our Special Correspondent.)

BELL ISLAND IRON MINES.—Work is going on steadily on the deposit of red hematite recently opened at Bell Island, near St. Johns. The ore is shipped to Nova Scotia for use in the furnaces there.

NICARAGUA.

XINOTEGA PLACERS.—It is said that arrangements are in progress to work these placers, which are reported to be rich. They are on the Bondequi River, near the northern boundary of the Republic. The region is little known and is inhabited only by Indians. The discovery was first reported a year and a half ago.

SOUTH AFRICA.

TRANSVAAL.

CASSEL COAL COMPANY.—During the year 1895 this company mined and shipped 247,308 tons of coal, an average of 20,609 tons a month. The dividends paid were at the rate of 20% on the stock.

TRANSVAAL COAL TRUST.—The total quantity of coal mined by this company in 1895 was 343,800 tons, an average of 28,650 tons per month. The company paid dividends amounting to 10% on the stock.

LATE NEWS.

Mr. W. R. Boggs, Jr., mining engineer, of Winston, N. C., leaves this week for Mexico on professional business. He will be absent several months.

COAL TRADE REVIEW.

NEW YORK, Friday Evening, Feb. 14.

Statement of shipments of anthracite coal (approximated) in tons of 2,240 lbs. for the week ending February 8th, 1896, compared with the corresponding period last year.

	1896.		1895.
	Week.	Year.	Year.
Pennsylvania Railroad.....	60,619	363,311	392,134
Totals.....	60,619	393,311	292,134

PRODUCTION OF BITUMINOUS COAL, in tons of 2,000 lbs., for week ending February 8th, and for years from January 1st, 1896 and 1895:

	1896.		1895.
	Week.	Year.	Year.
Shipped East and North:			
Allegheny, Pa.....	42,641	275,714	217,888
Barclay, Pa.....	1,957	5,924	5,924
Beech Creek, Pa.....	65,319	384,311	325,239
Broad Top, Pa.....	8,672	53,735	49,732
Clearfield, Pa.....	79,365	539,018	471,260
Cumberland, Md.....	44,929	329,831	283,171
Kanawha, W. Va.....	113,144	403,051	424,891
Phila. & Erie.....	767	6,730	10,708
Poconong Flat.....	.....	.....	481,224
Totals.....	374,504	2,058,544	2,305,173

† Ten days to January 31st.

	1896.		1895.
	Week.	Year.	Year.
Shipped West:			
Monongahela, Pa.....	15,984	103,351	103,359
Pittsburg, Pa.....	26,847	226,854	223,418
Westmoreland, Pa.....	34,035	231,198	288,830
Totals.....	86,859	561,403	615,617

Grand totals..... 461,363 2,619,947 2,920,790

Production of coke on line of Pennsylvania Railroad for the week ending February 8th, 1896, and year from January 1st, in tons of 2,000 lbs.: Week, 96,628 tons; year, 563,198; to corresponding date in 1895, 640,855 tons.

Anthracite.

No change has taken place in the anthracite coal trade since our review last week. The market is very quiet, so far as concerns new business, and mostly all the coal moving now consists of deliveries on orders booked before the advance.

Despite the present dullness, which after all is only natural, there is now an element of firmness in the market which has been absent from it for many a month.

In the first place the radical restriction recommended by the sales agents is being strictly adhered to by all the companies. This being the case, it is not very difficult to maintain the circular. We do not hear of any company making any "concessions" in this market. They are not taking any order to speak of, at the advance, but they appear to be willing to wait until the dealers are forced to come into the market, which will be by the first week in March or perhaps a little later. Deliveries on old or low priced sales will occupy the best part of three weeks yet. The circular is \$3.60 for stove; \$3.35 for egg and chestnut and \$3.10 for broken, all net on board. Some independent operators, who did not sell ahead to as great an extent as the companies, are willing, in order to protect their customers, to offer some concessions in the way of prices and will probably sell at from 10 to 20c. below the "circular."

This, however, has always been the case in past years.

The East is reported to have comparatively little stocks on hand, as New England dealers were rather skeptical of the ability of the presidents to agree on percentages and consequently bought little coal previous to the advance. Orders will begin to come in from the East before long. The companies, while nominally adhering to the circular here, can, by making a delivered price at Boston, sell slightly below it. Such sellers as own barges can name an arbitrary barge rate and undersell by 15 or 20c. such concerns as have no barges of their own and must pay current vessel rates.

The market for the rest of the winter must be a waiting market, with spurts of activity governed by weather conditions. That the year opens better than did 1895 is undoubtedly true. From the sellers' point of view. There is an undercurrent of firmness that is encouraging, and the anthracite interests are apparently desirous of managing their affairs in such a manner as to preclude the repetition of the disastrous experiences of the past two years.

Bituminous.

There is no change to report in the bituminous coal trade. There are still a few more orders coming from points around Cape Cod, chiefly additional cargoes taken by regular contract customers, and also from dealers and consumers who can now take advantage of the prevailing low ocean freights. The Sound business is slightly held back this week by the lack of boats, which on account of the high winds have been unwilling to venture out.

There is a desire on the part of the producers' sales agents to learn what prices will be this year. This is always the case at this time. In all probability, and with or without a "combination," prices will be slightly higher than in 1895, on account of the advances in railroad freight rates, which at present amount to from 5c. to 15c. It is reported that the "combination" price will be \$2.25 f. o. b. at the lower ports.

There are a few contracts in the market, principally on all-rail business. Consumers find last year's figures acceptable, but sellers are not eager to name the same.

Some of the shoal water ports along the Sound and elsewhere are getting clear of ice, thus permitting once more the direct shipment of extra cargoes, that otherwise would have to go by rail from the nearest ice-free port. Stocks on hand in consumers' yards are reported to be pretty full, though the winter consumption must have made serious inroads into them. At the shipping ports stocks are comparatively small, producers keeping there merely enough to load two or three good cargoes.

The New York harbor trade continues fairly good. The lack of large storage capacity on account of high ground values, prevents the keeping of very heavy stocks on hand, and the demand is always fairly well maintained. The all-rail trade is slightly off, though not enough to interfere markedly with the general steadiness of shipments which we have been reporting for some time.

Transportation from mines to tide is good and the car supply is all that could be desired. Vessels are in poorer supply than last week, doubtless due to the recent storms, and rates are stronger. We quote as follows from Philadelphia: To Boston, Salem and Portland, 80c.; Sound ports, 70c.; Portsmouth, 80c. From Baltimore, Norfolk and Newport News rates are 5 to 10c. higher.

Nominal prices are unchanged. We quote f. o. b. at the various ports, as follows: Norfolk and Newport News, \$1.9 @ \$2.15; Baltimore, \$2 @ \$2.20; Philadelphia, \$1.75 @ \$2.20; New York harbor shipping ports, \$2.20 @ \$2.65; alongside New York harbor, \$2.40 @ \$2.75; alongside Boston, \$2.75 @ \$3.

The latest reports ament the proposed association of soft coal interests, generally referred to as "the combination," are that a new difficulty has been met with in the stand taken by the interest representing a certain region which is by no means a very prominent factor in the tidewater market. This interest is said to be willing to agree to a general understanding, but does not wish to be formally bound to any arrangement. This stand is regarded by some as not being strictly bona-fide, and further efforts are making to overcome the objections raised.

It is a very difficult matter to bring together 125 or 150 bituminous operators and get them to agree on a plan, and it is next to impossible to select a plan which will be acceptable to all. Many of the soft coal men interested profess skepticism as to the ability of the committee to achieve success in this matter. However, there is no doubt that considerable work has been, and is being done on it, and we are informed that the railroads are to be members of the association. The meeting, which was to have been held in Philadelphia to-day, has been postponed until February 25th. There is little doubt that the majority of the important bituminous interests are willing to agree on any reasonable plan that may be presented. Whether the plan, even if accepted, would prove effective, it is impossible to foretell, but we learn from a reliable source that "the trouble with the proposed plan of organization is that it is not simple enough."

NOTES OF THE WEEK.

Receipts of coal by water at San Francisco in January were 120,211 tons, a decrease of 13,802 tons from January, 1895. The receipts this year were made up as follows: Oregon and Washington, 30,853 tons; Eastern (anthracite and Cumberland), 3,200 tons; British Columbia, 32,155 tons; Australia,

19,772 tons; Great Britain, 34,226 tons. The statement does not include the supply from the Mt. Diablo (California) mines.

Buffalo, N. Y. Feb. 13.

(From Our Special Correspondent.)

The anthracite coal schedule of prices is unchanged. Incidents connected with the trade are meager. The weather, as a rule, for the past week, has been comparatively mild, with a very heavy snow fall and at the hour of writing it is raining. It is too early to speculate on the opening of navigation, although the old sailors discuss the matter daily, as well as the probable freight rates on coal to Western ports.

The bituminous coal trade is quiet at same quotations. Supply ample for all requirements of manufacturers and others. Dealers generally effect sales without incurring demurrage charges.

The Lake Shore Railroad Company has ordered 750 coal and iron ore cars; and the Pittsburgh & Lake Erie 100 cars. These new cars will be equipped with removable ends for unloading coal rapidly at lake ports, and with flush drop floors for the rapid delivery of iron ore.

All the tenders for the Grand Trunk Railway of Canada's coal contracts have been rejected by General Manager Hays. The whole matter of the supply for the year is thus left in obedience or for private settlement. The opinion entertained is that Mr. Hays thought a combination had been formed. The reasons given for the advanced figures sent in are the higher freight rates and the probable advance in miners' wages.

Mr. John Crampton, for many years General Agent in Buffalo for the Michigan Central railroad freight department, died last Monday in Chicago in his 67th year, of heart trouble. He was a faithful, intelligent and able officer and much respected by all who knew him.

It is proposed to store coal in iron pockets holding from 50 to 1,000 tons to save space. The dimensions of the smaller size are 27 ft. in height and 14 ft. in diameter. The coal is hoisted in buckets and dumped.

A Duluth correspondent states that the movement of coal from Duluth and Superior during November and December last was the largest ever known for those months. He says: "The mild weather prevailing through January has, of course, had a marked effect in the coal trade, but from the best information obtainable more coal has been sold up to the present time than during the winter of 1894 and 1895. The coal people are not all of the same mind as to the probable surplus at the opening of navigation." The opinion seems to be general, however, that there will be very little coal left over on the docks when navigation opens.

Pittsburg. Feb. 13.

(From Our Special Correspondent.)

Coal.—There has been a fair run of coal since our last, the rivers being in good boating order. Coal plenty, tow boats scarce, as most of the boats are on their way up with empties; as fast as they arrive they return with tows and then empties are forwarded to the ports to be loaded. The prospect is favorable for good water for some time. Unless all signs fail, the week will be an eventful one in industrial circles. As to the affairs in the Pittsburg railroad coal district, they are not quite as bright as a few weeks ago. Meetings are being held. Mr. De Armit, leads the knowing ones to believe that the New York & Cleveland Company will not be a party to an investigation on the lines laid down.

At Morganton, W. Va., the mines and property of the Newburg Averill Coal and Coke Company have passed into the hands of a receiver; liabilities, \$190,000, of which \$150,000 are bonds. The general indebtedness amounts to about \$70,000. The miners will be paid in full; the company owns mines at Newburg, 1,000 acres of coal at Tyrconnell, the Aurora mines at Fairmount, and a tippie at Parkersburg. J. Harry Lee, of Baltimore, has been appointed receiver.

The slack trade of the Washington company is good, but they are doing little trading in other kinds of coal. They are now trying to secure a portion of the Grand Trunk contract, which is for something over 400,000 tons, and if this company gets a portion of it their men would be kept busy all spring and summer.

Connellsville Coke.—Trade has taken an upward move and from now on may be expected to resume gradually until they are normally blown in. Last week showed an increase in product of 11,120 tons, while 12,000 tons was shipped, thus using 2,000 tons of stock coke. The cause of the increase is the demand for iron; to supply that demand coke is required in increasing quantities. The week will show an output of about 10,000 tons over last week. The Cochran companies continue to lead in the output; the company can scarcely meet the demand. They are shipping 110 cars daily their full capacity being 125 cars. Week's summary of the region shows 13,556 ovens in blast, with 4,391 idle. During the week 597 ovens blew out. The indications are that the blowing out of ovens is about finished. Production for the week in tons was 129,880 tons. In running order of the active ovens 4,522 made six days, 8,201 five days, 546 four days, 180 three days, an average of 5.27 days against 4.56 days the preceding week. The shipments for the week amounted to 6,365 cars; increase, 363 cars. The shipments were distributed as follows: To Pittsburg, 1,749 cars; to points East, 1,340 cars; to points West, 3,274 cars.

IRON MARKET REVIEW.

NEW YORK, Friday Evening, Feb. 14, 1896

Pig Iron Production and Furnaces in Blast.

Fuel used.	Week ending				From	
	Feb. 15 1895.	Feb. 14, 1896	Feb. 15 1895.	Feb. 14, 1896	Jan. '95.	Jan. '96.
Anthracite.	35	21,004	55	25,435	150,168	233,393
Coke...	127	137,879	140	166,836	1,001,373	1,131,689
Charcoal...	19	4,268	20	5,425	34,236	32,500
Totals	181	163,151	215	207,696	1,185,777	1,397,637

The iron market has felt the good effects of the success of the bond issue, and the general tone is better. Makers who were in doubt are now inclined to take a hopeful view and look forward to a good business for the year, and this is evident in the freer buying of stocks of raw material and in increasing inquiry for finished products. Prices are generally firm and there are signs of rising quotations in several quarters.

Production of raw iron is on a somewhat lower scale than at the close of last year, the blast furnaces now running at the rate of about 10,500,000 tons of pig iron in a year. This seems to be about on a parity with the demand.

Our Philadelphia correspondent notes the ordering of 31,000 tons of rails for the Pennsylvania Railroad Company.

NOTES OF THE WEEK.

The Bar Iron Association held a meeting in Cleveland, O., on Tuesday and Wednesday of this week. This is the third special meeting held within a few weeks. The meeting was private, and the results have not been announced. It is said that it had reference chiefly to the completion of an arrangement with the manufacturers not in the association.

Imports of iron ores for the year 1895 are reported by the Bureau of Statistics, Treasury Department, at 524,153 tons, an increase of 355,612 tons over the year 1894. Most of the ore came from Spain and Cuba, though there were some imports from Algeria, and at least one cargo from Greece. Nearly all this ore is received at Philadelphia and Baltimore.

Imports of manganese ores for the year 1895 are reported by the Bureau of Statistics, Treasury Department, at 80,717 tons, an increase of 36,052 tons over 1894. The greater part of the imports were from Russia.

The report of the Illinois Steel Company for the year ending December 31st shows that the total net earnings were \$1,893,265, and the fixed charges \$660,000, leaving a balance of \$1,233,265. Deducting the debit balance of profit and loss at the close of 1894, which was \$318,865, there remained a surplus of \$914,400 at the close of the year.

New York. Feb. 11.

The market continues in good condition. The success of the bond issue has stimulated business generally, and there is more talk of new enterprises and of new construction works. The important point locally is the good buying from the smaller foundries, which shows that work will probably be active for some time. The Newark foundries are generally putting in stock on a pretty liberal scale, and the same thing may be said of the Connecticut concerns, especially of one or two which delayed buying last year and were caught by the summer rise.

Pig Iron.—Business has been good and a number of contracts have been made by foundries to cover the next six months. A good many small sales are reported also, and this class of business is better than usual for the season. There seems to be an increased demand for Southern iron and prices keep up well. There has been a little reduction of prices, chiefly on the higher grade irons, but changes are not important.

We quote for Northern brands as follows: No. 1 foundry, \$13@13.50; No. 2, \$12.25@12.75; gray forge, \$11.50@12. For Southern irons prices are: No. 1 foundry, \$12.50@13; No. 2 foundry, \$12@12.50; No. 1 soft, \$12@12.50; No. 2 soft, \$11.50@12; forge, \$11@11.50.

Cast Iron Pipe.—Inquiry continues active and several good contracts are reported closed. The foundries report business very good as a rule.

Spiegeleisen and Ferro-Manganese.—The market is still quiet, and prices are lower, owing chiefly to offers of American material at prices below those at which foreign can be imported. We quote spiegeleisen at \$19@20 at tidewater; ferro-manganese at \$17.50@18.50.

Steel Billets and Rods.—The market is quiet again, and there is less disposition to buy. Prices are a shade lower and billets can be had at tidewater for \$20@20.50 per ton; rods at \$26@26.50.

Merchant Iron and Steel.—Business continues fair and prices show no change. Bars are 1.25@1.35c. for common and 1.35@1.50c. for refined. We quote for soft steel bars 1.30@1.40c.; open-hearth machinery steel, 1.50@1.60c.; steel hoops, 1.65@1.75c.; steel axles, 1.65@1.80c.; links and pins, 1.60@1.75c.; tire steel, 1.85@2c.; spring steel, 2.10@2.25c. Rivets are 2.20@2.30c. for steel, and 3@3.30c. for iron.

Plates.—A good deal of business has been done, chiefly in small orders. There is talk of higher

prices, but no actual advance has been made and our quotations are unchanged. Prices for universal mill plates are 1.45@1.55c. For steel plates we quote: Tank, 1.45@1.55c.; boiler shell, 1.55@1.65c.; good flange, 1.80@1.95c.; firebox, 2.10@2.40c. Charcoal iron plates are 2.20@2.30c. for shell, 2.70@2.80c. for flange, and 3.20@3.30c. for firebox.

Structural Iron and Steel.—While negotiations are still pending for several large buildings, we hear of no new contracts closed this week. No change in prices is noted, and we quote, for angles, 1.45@1.55c.; channels, 1.60@1.75c.; tees, 1.65@1.75c.; beams (up to 15-in.), 1.55@1.70c. for large lots and 1.85@2c. for small orders.

Steel Rails and Rail Fastenings.—Rails are unchanged at \$28 per ton at mill, or \$28.75 at tidewater for standard sections. Girder and street rails are \$28@32 per ton at mill, according to section. The report, noted last week, of a sale of rails to go to Chile is confirmed only in part; inquiries have been made here as to prices, etc., but no order has been given. More inquiry for street rails is noted.

Rail fastenings are steady and prices unchanged. Quotations are: For fish and angle-plates, 1.30@1.40c.; spikes, 1.65@1.80c.; bolts, 1.95@2.05c., for square nuts, and 2.05@2.15c. for hexagon nuts.

Scrap Iron.—Demand for foundry scrap is good and we continue to quote \$9.50@11 per ton, according to size and quality of lots. Good scrap finds buyers without any trouble.

Cleveland, O. Feb. 13.

(From Our Special Correspondent.)

Iron Ore.—Furnacemen are becoming anxious to know what they will have to pay for ores and are making many inquiries of the sellers, but it cannot be learned that any satisfaction has been granted them. The sales agents are simply out of the market yet.

There is talk that some 90c. ore charters have been made for this coming season from Marquette. The report cannot be verified and may be unfounded. That rate should mean \$1 or \$1.05 from Duluth, which is about what the ore shippers expect to pay. Vesselmen say they are still holding their tonnage at \$1.25 and prefer to run wild rather than accept the basis offered by the shippers.

Pig Iron.—Conditions of the local pig iron market are in the main a repetition of those of last week. Bessemer pig has sagged off a little, weak holders accepting about 50c. less than a week ago. Sales have been made on a basis of \$13 to \$13.50, but Cleveland furnacemen are holding for a dollar higher than that figure.

In foundry irons there are fair sales at steady prices. Some producers say they have offers at present quotations aggregating their entire output for three or four months, but they reject those offers, limiting sales to early delivery. We quote No. 1 Northern strong at \$13.75; No. 2, \$13.25; Ohio Scotch No. 1, \$13.25@13.50; No. 2, \$12.75@13. The market for Lake Superior charcoal is dull, a nominal quotation being \$14.25.

Many furnacemen in Eastern Ohio are seriously considering the advisability of making their own coke. By using the German ovens, and thereby saving the by-products, they hope to be able to coke coal so that the product will cost them considerably less than the \$2 which they are now paying. It is reported that the Johnson Steel Company and others are ready to experiment.

Pittsburg. Feb. 11.

(From Our Special Correspondent.)

Raw Iron and Steel.—Business during the week has not developed much actual improvement, but the conditions for future business have been greatly changed for the better, and the response of quickened activity is not likely to be long delayed. The surprising success of the bond issue has strengthened confidence all along the line. Business in the iron and steel products has been on a moderate scale, but the markets are firm, and competent authorities in the trade regard the prospects for spring and summer orders as being favorable. Improved financial conditions are relied upon to have a quickening influence on the markets. The iron and steel trade has remained quiet, with a fair volume of business and no great pressure either to buy or sell; there is, however, a good current demand for limited amounts at prices that were current the preceding week. Lessened activity at certain points and increased competition by Southern iron make prices irregular, although these factors would count for nothing with the volume of business at all normal.

The consolidated mills and the rod mill at Beaver Falls started on Monday; preparations are being made to start the wire and nail mills. The movement has already caused a revival of business. The Schoen Manufacturing Company, of Allegheny City, started up double time, which means employment for 1,200 men; it has been idle for several months.

The market is firm, with a moderate demand; producers are asking more money for iron. Consumers are of the opinion that present prices are enough. Bessemer pig Pittsburg \$13@13.50, according to delivery. Bessemer pig in the Valley held at \$13@13.25. Gray forge firm, \$11.25@11.50. Foundry iron firm and in good demand. Steel billets are firm, demand increasing; latest sales range from \$17.85 to \$18.25, March, April and May delivery. All the iron men with one exception report a firm market with prices tending upward.

Prices in January.—The following table shows the prices of Bessemer pig, steel billets and gray

forge for January the past two years. The figures are taken from the weekly sales, published every Saturday in this paper, and will be found valuable for reference:

1896.	Bessemer.	Billets.	Gray Forge.
Jan. 4.....	\$11.00@11.50	\$16.00@16.50	\$11.75@11.50
Jan. 11.....	11.25@11.65	16.10@16.50	10.40@10.50
Jan. 18.....	12.00@12.60	17.00@17.80	10.35@11.50
Jan. 25.....	13.00@13.35	17.60@18.50	11.00@11.35
Jan. 31.....	13.25@13.50	17.80@18.75	11.00@11.19

In January, 1895, Bessemer pig ranged from \$9.85 to \$10.35; steel billets from \$14.60 to \$15.50; gray forge from \$9 to \$9.30.

COKE, SMELTED, LAKE AND NATIVE ORK.		Tons.	Cash.
3,000 Bessemer, Mar.	Apr., Pitts.	1,200 Billets, Feb., at mill	17.75
2,000 Bessemer, Mar.	Apr., May, Valley	1,000 Billets, Feb., Mar., at mill	18.00
1,500 Bessemer, Mar.	Apr., Pitts.	1,000 Billets, Mar., Apr., at mill	17.75
1,000 Mill iron, Feb.	Mar., Pitts.	500 Billets, prompt, at mill	18.00
1,000 Bessemer, Feb.	Mar., Valley	SKELEP IRON.	
1,000 Bessemer, Feb.	Mar., Valley	400 Sheared.	\$2.50 4 m
1,000 Bessemer, Feb.	Mar., Valley	3,000 Wide gr'v'd.	1.25 4 m
1,000 Bessemer, Feb.	Mar., Valley	2,000 Nar'w gr'v'd.	1.25 4 m
1,000 Bessemer, Feb.	Mar., Valley	SKELEP STEEL.	
1,000 Bessemer, Feb.	Mar., Valley	1,000 Nar'w gr'v'd.	\$1.15 4 m
1,000 Bessemer, Feb.	Mar., Valley	400 Sheared.	1.40 4 m
1,000 Bessemer, Feb.	Mar., Valley	200 Wide gr'v'd.	1.15 4 m
800 Bessemer, Mar.	Apr., Valley	BLOOMS, BILLETS AND BAR.	
500 No. 1 Foundry, Prompt, Pitts.	14.25	1,000 Bloom and end Bil-	let ends..... \$13.50
500 No. 2 Foundry, Feb., Pitts.	13.00	500 Bar ends del'verd.	14.00
500 Mill iron, Mar., Pitts.	11.50	SHEET BARS.	
300 No. 2 Foundry, prompt, Pitts.	12.75	1,000 at mill.....	\$20.00
200 No. 3 Foundry, Feb., Pitts.	11.75	MUCK BAR.	
200 No. 2 Foundry, spot, Pitts.	13.00	500 Neutral, Dev'vrd.	\$21.00
200 No. 2 Foundry, Feb., Pitts.	13.00	STEEL WIRE RODS.	
100 No. 2 Foundry, Feb., Pitts.	13.00	850 5-gauge, at mill	\$23.00
100 No. 3 Foundry, Feb., Pitts.	12.25	SPELTER.	
125 No. 1 Foundry.....	\$17.25	100 Prime.....	\$3.89
100 No. 2 Foundry.....	17.00	FERRO-MANGANESE.	
75 Cold Blast.....	23.50	50 80% foreign.....	\$1.25
50 Cold Blast.....	23.25	OLD RAILS AND SCRAP.	
BLOOMS, BILLETS AND SLABS AT MILL.			
2,000 Billets, Feb. Mar.	at mill.....	1,000 No. 1 wrought, scrap, f.o.b. Pitts.	\$12.50
1,500 Billets, Feb. to May, at mill.....	18.25	1,000 Iron rails, f. o. b. Cleveland.....	17.00
Philadelphia. Feb. 14.			
(From Our Special Correspondent.)			
Pig Iron. —The point in the pig iron market is right here: Large consumers have loaded up with a good deal of material, small ones have not. If large consumers decide to continue this policy under declining production, prices will harden on quite a number of favorite brands and on Bessemer; if not, they will stay where they are. There is considerable anxiety to get iron and selling has been quite brisk for several days. Something depends on the extent of restriction. On that point no one knows much. Furnace managers are doing their best to make profitable contracts, and on failing, the fair presumption is that such furnaces will take a vacation. When they do, it will be a long one. No. 1 foundry is \$13@13.25; No. 2, \$12.50; forge, \$11.25@11.50.			
Steel Billets. —Steel billets are selling at \$20.25. Brokers do not say the demand for the week has been large.			
Merchant Bars. —The country mill people are all in need of business. The city mills have been picking up work. Some few good orders have been shipped west. The feeling is somewhat better regarding early spring demand, but while manufacturers talk of improving possibilities, they know they will have to shade very closely to keep going. Iron is 1-20@1-25.			
Nails. —The retailers have done better than usual so far this winter in working off stock. Manufacturers are accumulating nails. There is nothing on which to base an opinion as to spring prices. All the offers so far made are at or fractionally above present prices.			
Skelep. —Quotations are given at 1-25.			
Sheet. —The agents and manufacturers are sending a good deal of iron out, and mills have slightly more business than on February 1st. The market is not overstocked, and brokers say there are many requirements to cover.			
Merchant Steel. —The salesmen and brokers who control this line of trade are pleased with the business done during the past few days.			
Pipes and Tubes. —No new developments. This would be a good time to get favorable terms.			
Plate and Tank. —A 650-ton order for plates and shapes for ship-building requirements has been placed. Another of possibly 300 or 400 tons is coming along.			

Structural Material.—Some office building work has been placed for city delivery amounting to 300 tons. Brokers have specifications which will require much more. The mills are making nearly full time. Competition has forced some shading.

Steel Rails.—The Pennsylvania road has awarded contracts for 31,000 tons as follows: Cambria, 6,000 tons; Homestead, 9,000 tons; Steelton, 6,000 tons; Lackawanna, 6,000 tons; Illinois Steel Company, 4,000 tons. Of this 8,000 tons are to be laid on tracks west of Pittsburgh, the rest on the lines east. Price \$29, presumably delivered.

Old Rails.—The old rail holders have made a few sales this week, but the calls are few and far between.

Scrap.—Mill owners have been purchasing small quantities of scrap at figures prevailing for several weeks.

METAL MARKET.

New York, Friday Evening, Feb. 14, 1896.

Gold and Silver.

Prices of Silver per Ounce Troy.

Feb.	St. Ex.	London Pence.	N. Y. Cts.	Value of sil. in \$	Feb.	St. Ex.	London Pence.	N. Y. Cts.	Value of sil. in \$
8	4 87 1/2	30 3/4	67 3/4	521	12	4 87 1/2	30 3/4	67 3/4	522
10	4 87 1/2	30 3/4	67 3/4	521	13	4 87 1/2	30 3/4	67 3/4	522
11	4 87 1/2	30 3/4	67 3/4	521	14	4 87 1/2	30 3/4	67 3/4	522

Owing to the strong India Exchange buying for that quarter has set in and has supported the silver market, causing an advance to 30 3/4. This rate brought out London sellers and the market closes easier at 30 3/4.

The United States Assay Office in New York reports the total receipts of silver at 109,000 oz. for the week.

Gold and Silver Exports and Imports.

At all United States ports, December, 1895, and years 1895 and 1894 in coin and bullion:

	Gold.		Silver.		Total excess, Exp. or Imp.
	Exports.	Imports.	Exports.	Imports.	
Dec.	\$15,481,317	\$1,311,048	\$5,159,537	\$870,759	\$18,459,077
1895.	104,605,023	32,529,336	53,833,153	11,273,277	\$114,625,563
1894.	101,819,924	20,607,561	47,014,205	9,824,408	\$118,432,160

The statements in the table above include only gold and silver in coin and bullion. The exports and imports of gold and silver in ores are reported as below for the year ending December 31st:

	Gold.		Silver.	
	1894.	1895.	1894.	1895.
Imports.....	\$743,046	\$1,810,357	\$7,809,186	\$12,610,327
Exports.....	29,811	361,315	201,602	368,351

Excess exports, \$713,235; \$1,479,042; \$7,607,584; \$12,241,976. Adding the exports and imports in ores to those in coin and bullion, we have the following statement for the year 1895:

	Exports.	Imports.	Excess.
Gold.....	\$104,966,338	\$34,379,693	E. \$70,586,645
Silver.....	54,201,504	23,883,604	E. 30,317,900
Totals.....	\$159,167,842	\$58,263,297	E. \$101,904,545
Totals, 1894.....	149,095,512	38,981,201	E. 110,114,311

This shows an increase in 1895 of \$10,072,300 in exports and of \$19,279,096 in imports, the result being a decrease of \$9,206,796 in the balance exported.

The figures above are furnished by the Bureau of Statistics of the Treasury Department and include all United States ports.

Gold and Silver Exports and Imports, New York

For the week ending February 14th, 1896, and for year from January 1st, 1896, 1895, 1894, 1893 and 1892:

We'k	Gold.		Silver.		Total Excess, Exp. or Imp.
	Exports.	Imports.	Exports.	Imports.	
1896	\$8,000	\$1,463,522	\$909,133	\$17,192	\$563,551
1895	9,199,137	11,360,639	4,889,738	182,730	E. 2,236,104
1894	25,498,693	760,846	4,140,552	188,419	E. 28,899,670
1893	2,692,658	1,639,018	6,933,851	194,87	E. 7,792,904
1892	20,816,567	133,757	3,913,232	477,975	E. 24,118,089
1891	2,563,922	2,018,755	3,810,533	248,415	E. 4,106,291

The gold exported for the week, this year, went to the West Indies; of the silver \$13,600 went to the West Indies, \$64,698 to South America, and the balance to London. The gold imported was chiefly from London and the silver from South America.

FINANCIAL NOTES OF THE WEEK.

Last week the principal topic was the probable price which would be bid for the Government 4% bonds, and toward the end of the week those who had made their bids were anxiously waiting the allotment by the Treasury officials. Though this was made on Saturday last the task was too heavy to enable it to be made in time to allow payment being made at the various indicated points, Treasury, Sub-Treasuries, and National depositories, before Monday, on which day active dealings commenced, both in the bonds, corresponding to this issue, and in the prospective allotments of the various applicants.

The amount of gold deposited in payment of the first 20% in accordance with the terms of issue, has been in excess of what we indicated last week, on

the information received from the Sub-Treasury in New York, many allottees preferring, when able, to obtain the gold to pay in full in place of by installments. Naturally the work of the Sub-Treasury has been very heavy, and on Thursday night it was nearly 7:30 p. m. before the actual amount accepted could be verified. The business transacted on Friday is nearly on the same scale, and it is absolutely impossible at this hour of writing to state what the total increase of the gold reserve amounts to.

There have been some curious features in the bullion market. For instance, the firm of J. P. Morgan & Company, deposited on one day during the current week about \$753,000, nearly all domestic bars, Harvey Fisk & Sons depositing \$348,000 domestic, and Lawrence, Turner & Company, \$50,000 in Spanish gold coin, Lazard Freres \$143,000, probably in foreign bars.

This was all for examination prior to being accepted at the Sub-Treasury.

It is estimated that at about 3 p. m. yesterday the total deposits amounted to nearly \$4,000,000, but at the same time more than \$1,000,000 had been withdrawn, \$500,000 for South America, and the balance presumably by bullion dealers who had sold gold to provide for payments on the new bonds.

The Treasury officials have naturally set their face against such transactions as undoubtedly took place early in the week, namely, the open transfer of gold from one department of the Treasury to another. A worse evil, however, than this has arisen owing to the lax conditions under which the bids were made, as it is an undoubted fact and confirmed to us officially that some of the bids made, and which have received allotments were practically "straw" bids, purely for speculation and without the least ability on the part of the bidder to make the necessary payment in gold. These allotments, of course, have been hawked for sale; thereby not improving the credit of the Government, and with the result that bona fide bidders who were disappointed and cut out by the price named by these speculators have now got to take up the allotments and provide the gold.

Deposits of gold at the sub-treasury to-day on the first instalment of the government loan exceeded \$5,000,000; withdrawals were estimated at \$1,500,000. Deposits of gold prior to this morning are officially stated as follows: On Saturday, \$10,609,640; on Monday, \$8,749,524; on Tuesday, \$6,774,716; on Thursday, \$6,984,741; a total of \$33,118,621. To-morrow, the last day in which deposits of gold against the first instalment on the loan may be made, the sub-treasury will remain open until 1 p. m. to receive deliveries.

It has been estimated by some authorities that the ultimate result of the issue will be to raise the gold reserve to \$125,000,000 the present figure of about \$74,000,000.

The statement of the United States Treasury on Thursday, February 13th, shows balances in excess of outstanding certificates as below, comparison being made with the corresponding day of last week:

	Feb. 6.	Feb. 14.	Changes.
Gold.....	\$16,912,940	\$65,877,462	I. \$48,964,522
Silver.....	22,615,878	23,969,919	I. 1,344,071
Legal tenders.....	70,176,926	69,246,620	D. 930,306
Treasury notes, etc.	26,325,194	27,618,513	I. 1,293,319
Totals.....	\$106,060,938	\$186,702,544	I. \$80,641,606

Government deposits with national banks on the same date amounted to \$10,123,123, a decrease of \$4,721,953 during the week.

Total United States Treasury notes issued under act of July 14th, 1890, in general circulation and in the Treasury, \$137,092,280. Against these are held in the Treasury 13,554,923 coined standard silver dollars, and silver bullion purchased at a cost of \$123,537,352, making a total of \$137,092,280.

The statement of the New York banks—including the 65 banks represented in the Clearing House—for the week ending February 8th, gives the following totals, comparisons being made with the corresponding weeks in 1895 and 1894:

	1894.	1895.	1896.
Loans and discounts.....	\$432,585,000	\$484,596,090	\$448,431,800
Deposits.....	534,176,400	534,754,700	492,771,900
Circulation.....	2,422,606	11,565,400	13,448,800
Specie.....	107,799,700	82,263,900	77,506,900
Legal tenders.....	111,378,100	85,191,100	85,874,500

Total reserve... \$219,177,800; \$167,454,900; \$163,375,190

Legal requirement... 133,544,100; 133,688,675; 123,192,975

Surplus reserve... \$85,633,700; \$33,766,225; \$40,182,215

Changes for the week this year were increases of \$1,289,100 in loans, \$2,324,700 in deposits; \$655,000 in specie and \$485,200 in legal tenders; decreases were \$353,200 in circulation.

Shipments of gold from San Francisco by water in January are reported as below:

	Coin.	Bullion.	Total.
To Honolulu.....	\$25,000	.....	\$25,000
" New York.....	2,790,741	\$42,461	2,833,202
" Hongkong.....	6,217	100	6,317
Totals.....	\$2,821,958	\$42,561	\$2,864,519
Totals, 1895.....	985,411	.....	985,411

The increase of \$1,879,108 shown this year was nearly all in the gold coin and gold bars shipped to New York.

Acids.—Business has eased off somewhat in this market, especially in sulphuric, but the current consumption has been enough to keep prices steady. We quote per 100 lbs. in New York and vicinity, in lots of 50 carboys or over, as follows: Acetic acids (in barrels), \$1.40@1.70. Muriatic acid, 18", 75@80c.; 20", 80@90c. Nitric acid, 36", \$3.50@4.40; 40", \$4.00@4.50; 42", \$4.75@5.25. Oxalic acid, \$7.10@7.60. Mixed acids, according to mixture. Sulphuric acid, 66", 75@85c.; chamber acid, \$6.50@7.25 per ton at factory. Blue vitriol, \$3.65@4.10 according to size of order.

Brimstone.—We quote for shipments, best un-mixed seconds, \$15. Thirds are 50c. less. Spot or nearby is \$16 for seconds.

Fertilizing Chemicals.—An improved demand is reported in the fertilizer trade, both for ammoniates and for the potash salts. Quotations are as follows: Sulphate of ammonia, gas liquor, \$2.40; bone, \$2.25@2.30. Dried blood, high grade, \$1.75@1.80; low grade, \$1.60 per unit. Azotite, \$1.80. Concentrated phosphate (30% available phosphoric acid), 70@71% c. per unit. Acid phosphate, 13% to 15%, av. P₂O₅, 57c. per unit at seller's works in bulk. Dissolved bone black, 17% to 18%, P₂O₅, 90@92c. per unit. Acidulated fish scrap, \$12, and dried scrap with few or no sales, nominally \$21 f. o. b. fish factory. Tankage, high grade, \$19@20; low grade, \$18@19. Bone tankage, \$21; ground bone, \$19@20. Bone meal, \$21@22.50.

Sulphate of Potash: 90-95%, New York and Boston, \$1.96; Philadelphia, Baltimore and Norfolk, \$1.98; Southern ports, \$2.

Double Manure Salts: 48-53%, New York and Boston, \$1.01; Philadelphia, Baltimore and Norfolk, \$1.02; Southern ports, \$1.03.

Muriate of Potash.—New prices for muriate are: New York and Boston, 1.75c.; Philadelphia, Baltimore and Norfolk, 1.76c.; New Orleans, 1.78c., for 80@85% (basis of 80%), in lots 25 tons and upward.

Kainit.—Quotations for 1896 are as follows: New York, Boston, Philadelphia and Baltimore, \$8.55 per ton; Norfolk, \$8.90, and New Orleans, \$9.05 per ton, for 25 tons and upward. Sylvinit at the same ports is quoted at 36% c., 37% c. and 38c., respectively.

Nitrate of Soda.—Quotations are \$1.67@1.70 for spot and \$1.70@1.75 for arrivals.

MINING STOCKS.

Complete quotations will be found on pages 174 and 175 of mining stocks listed and dealt in at:

New York.	Aspen, Colo.	St. Louis.
Boston.	Colorado Springs.	Paris, France.
Philadelphia.	Duluth, Minn.	Mexico.
Baltimore.	Helena, Mont.	Shanghai, China.
Pittsburg.	Salt Lake, Utah.	Valparaiso, Chile.
Denver, Colo.	San Francisco.	London, England.

NEW YORK, Friday Evening, Feb. 14.

The New York public seems to be slowly awakening to the fact that mining stocks may be bought and sold in this city. During the week there was an improved inquiry for various mining stocks and the total volume of business was greater than for some time past.

The Consolidated Stock and Petroleum Exchange has placed on the temporary list a number of Utah stocks as follows: Ajax, Anchor, Alliance, Bogan, Bullion-Beck & Champion, Eureka, Dalton, Daily West, Mammoth, Morgan, Mercur, Rover, Silver King, Sunshine, Tetro.

The Colorado stocks continue to be the favorites. Of the Cripple Creek stocks there were sales reported of 2,500 shares of Creede & Cripple Creek at 7@8c.; 3,900 shares of Cresus at 4@5c.; 1,500 shares of Favorite at 11c.; 500 shares of Gold & Globe at 24c.; 300 shares of Pharmacist at 17c.; 300 shares of Union at 46@47c. The Union Mining Company has declared a dividend of 1c. per share and an additional stock dividend of 10%. There were also sales of 1,300 shares of Victor at \$5.75@6.12 1/2.

Some of the Leadville stocks were also in demand, and show sales as follows: 2,900 shares of Leadville Consolidated at 16@17c.; 1,000 shares of Adams at 30c., and 100 shares of Small Hopes at 95c. Of Golden Fleece 2,600 shares were sold at \$1.70.

Transactions are also recorded on a great many of the Utah stocks. Mercur sold at \$6.75@7.38. Of Ontario 200 shares sold at \$11@11.25.

Sales were also made of Centennial-Eureka at \$60.13@60.50; Dalton at \$11@12; Daly at \$7.13; Bullion-Beck & Champion at \$7.25; Bogan at 11c.; Silver King at \$14.50@14.63; Sunshine at \$3.25.

The New York Mining Exchange announces that the opening of the Exchange may not take place until Tuesday or possibly Wednesday, instead of Monday next, as had been reported.

Boston. Feb. 13.

(From Our Special Correspondent.)

The market for copper stocks has been completely demoralized the past week by the depression in Butte & Boston, the condition of which is being gradually brought to light by the persistent efforts of the stockholders to find out the true status of the company. As it could not stand the light thrown upon it the stock was pressed for sale, resulting in a decline from \$13 1/4 last week to \$3 3/4. Boston & Montana and Butte were linked together in weakness; the former dropped from \$76 1/4 to \$72, but of course was better sustained. The policy of managerial silence in each company carries distrust and lack of confidence in the managers of both concerns and until the companies show the stockholders just how

they stand, it will be hard to recover the lost ground. After selling down to the points mentioned to-day there was a slight recovery. Montana sold up to \$73 1/2 and Butte to \$4 1/2.

The Lake stocks were generally quite firm, the market not being so speculative in its character. Calumet & Hecla sold at \$302 1/2 ex \$5 div., and later at \$300. Quincy was firm at \$122 1/2@123; a dividend of \$4 per share was announced, payable February 17th. The question of an extra dividend was discussed, but it was considered wise to postpone it for the present.

The scrip sold at \$69 1/2@72. Tamarack improved to \$115, but fell off again to \$112, and closed later at \$113. Osceola was heavy, for some unknown reason, and declined from \$26 1/2 to \$24. Kearsarge lost \$0 1/2 to \$12 1/2, and Franklin gained \$1 to \$14 1/2. Atlantic, after selling at \$18, declined to \$17 on small sales. Tamarack, Jr., gained \$1 to \$17 1/2 and held the advance. Wolverine was strong at \$63 1/2@67. Old Dominion Copper sold at \$19 1/2, but lost \$1 in later sales.

The gold stocks were generally a shade lower. Boston and Cripple Creek sold at 42 1/2 c., but lost to 40c. Santa Ysabel advanced to \$13 1/2, but did not hold, closing at \$13. Pioneer was stronger this week and sold at \$5. Gold Coins steady at \$5@97 1/2 c. Merced, after selling at \$32 1/2, declined to \$30 1/2. Napa Quicksilver sold at \$7.

Chicago. Feb. 11.

(From our Special Correspondent.)

The mining stock market during the past week has been very encouraging, and the sales reported at the American Board of Mining Industries, and the Chicago Mineral and Mining Board have greatly increased since the organization of these exchanges.

The following table gives the quotations and sales of stocks dealt in on the Chicago Mineral and Mining Board. The two most active stocks were Royal Age with sales of 257,000 shares, and Stockholm with 105,200 shares. Finance, Boston & Colorado and Defender were also in good demand.

The closing quotations and total sales recorded on the Chicago Mineral and Mining Board for the week ending February 11th were:

Name.	5	6	7	8	10	11	Sales.
Anaconda
Annapolis
Anchorage Leland
Bankers
Bol. Let.
Boston-Colo	81,900
Defender	77,000
Delaware Chief	5,200
Favorite	25,000
Finance	1,613 1/2
Golden Fleece	12,000
Golden Stars
Henrietta
Isabella
Jefferson
Justice
Lincoln Boy
Mollie Gibson
New Haven
Pharmacist
Portland
Rhyolite
Royal Age	257,000
Sleepy Hollow
Squaw Mountain
Stockholm	105,200
Union Gold

Total shares sold, 714,401.

Cleveland, O. Feb. 13.

(From Our Special Correspondent.)

Iron ore stocks are perceptibly stronger this week. Greatest activity is shown in Republic, which has jumped up several points, transactions having been made at \$19. Lake Superior has sympathized and is also quoted several notches higher. It has become generally known that the best ore companies made some money last year. With these prices to average a dollar or more higher than in 1895, and with an output probably somewhat in excess of last year's, the strength of the market generally is being realized and buyers are coming to the views of the sellers.

The vein of ore uncovered several weeks ago on the property of the Jackson Iron Co. does not yield over 40% ore and is not regarded here as a specially valuable find.

Following are current quotations:

Name of Company.	Par val.	Feb. 13.	
		Bid.	Ask.
Aurora	\$25	.....	.....
Chandler	25	\$38	40
Cleveland-Cliffs Iron Co.	100	40	42
Jackson Iron Co.	25	70	75
Lake Superior Iron Co.	25	32	35
Lake Superior Consolidated	100	20	21
Minnesota Iron Co.	100	70	.....
Pittsburg & Lake Angeline	25	75	85
Republic Iron Co.	25	18	20

Colorado Springs, Colo. Feb. 8.

(From Our Special Correspondent.)

We have experienced during the past fortnight a decline on nearly all the mining stocks traded in at the exchanges of this city. A number of causes, outlined in this correspondence in previous issues, led to a comparatively dull period at holiday time, and since then many customers have been giving selling orders to their brokers, thus preventing a more rapid recovery. Prices continue to de-

cline, and this in turn induced the not over plucky holders of certain active stocks to part with their holdings, fearing that the market would be very slow in re-acting in their favor. Toward the close of this week the news of the great success of the government with the new loan and the return of business confidence everywhere has had a favorable influence on the mining stock market. The volume of business done during the week was large.

The Board of Trade-Consolidated, is doing well, and its members say they have reason to be pleased with the consolidation of the two exchanges, as it has concentrated the trading.

The Mining Stock Association also continues in its career of prosperity. Work has begun on the new exchange building, which, when finished, will cost about \$35,000. The building will be owned by a stock company, but the association will hold a large majority of the stock.

Many inquiries have been received here concerning the brokers who resigned from the Board of Trade to join the Colorado Springs Mining Stock Association. The list is as follows:

Edwin Arkell, S. S. Bernard, G. M. Carter, P. S. Delaney, H. L. Fagin, Jas. H. Gardner, W. F. Hendrickson, J. L. Holman, M. Kinney, J. P. Kane, G. M. Logan, J. W. Miller, H. H. Mitchell, F. A. Morath, D. P. Sill, H. H. Dorsey, H. R. Wray, L. C. Wayand, G. G. Avery, H. S. Hawkes, Russell Prentice, H. A. Young, A. Hemingway, F. Heron, T. J. Kearney.

This brings the membership of the association to 63.

BY TELEGRAPH.

Messrs. Gardner & Co. wire us the closing quotations of the Colorado Springs Mining Stock Exchange for the week ending February 13th, as follows:

Name of Company.	Feb. 7	Feb. 8	Feb. 10	Feb. 11	Feb. 12	Feb. 13
Aiamo
Anaconda
Argentum-Juliana
Blue Bell
Cripple Creek Con.
Golden Fleece
Isabella
Mollie Gibson
Mount Rosa
Pharmacist
Portland
Silver State
Union
Work

In addition to the above quotations Messrs. A. Pick & Co., of New York, furnish the following:

Name.	7	8	10	11	12	13
Bankers
Des Moines
Gold & Globe
Old Standard
Isabella
Jefferson
Keystone

Salt Lake City, Utah. Feb. 8.

(Special Report of James A. Pollock.)

Business in the local stock market was very well maintained during the past week, the inquiry being especially heavy in the high priced investment stocks. There was some business in the speculative shares, but the market is an investment one.

Another change has taken place in the management of the Ajax. Alliance is again at work. The delinquent list is not heavy, and it is anticipated that all of the stockholders will pay up rather than have their stock sold. Another well has been turned in at the gas fields, and the company reports increased consumption for lighting and heating purposes. Anchor is at work with a diamond drill and will prospect a great stretch of country. The mill is doing well. There was some demand for the stock, but not at figures which holders cared to accept.

Bullion-Beck will pay a monthly dividend of \$25,000 on the 15th. The reports from the properties of the company are of a gratifying nature. Another attempt is being made to settle the differences between the majority and minority stockholders of Bogan. Centennial-Eureka was again a prime favorite. Holders were firm at \$60 and above. The company paid another double dividend of \$1 per share, or \$30,000 on the 1st of the month, and the usual double will come on the 15th. The annual meeting has been held and a new board elected. All of the reports submitted were of an extremely gratifying nature. They showed that from September, 1894, to January 1st, 1896, the company paid \$630,000 in dividends and has a surplus of \$172,152.31, as compared with \$77,924 at the time of the last report. Ore sales for the 16 months covered by the reports netted the company the sum of \$919,766.22. The disbursements, covering labor, materials and improvements were \$200,957.60. The properties are in magnificent shape.

Dalton has held its annual meeting and elected a new board of directors. It will be the policy of the company to push development work energetically and make shipments of high grade ore as soon as Spring comes. No assessment will be made. Daly was very strong, bidding for the stock being very brisk. The company has not declared a dividend yet, but will probably do so soon. It may pay quarterly. Daly-West's new mill is doing good

work and the properties are in first-class shape. Elko is pushing development work. Mill work is to be resumed at the Geyser without delay, the water troubles having been adjusted. Horn Silver is working away on the same old lines. Shipments of ore and concentrates about hold their own. Mammoth was in demand, but not at holders' figures. The annual meeting of the company was deferred for twenty days. Morgan (Meeers) is developing and making some shipments. The Mercur Company will declare its usual monthly dividend of \$25,000 on the 10th and pay on the 20th. Extensive development work is now in hand, and the showing in the properties never was as satisfactory as at present. The mill increases will not be made before the spring months. The stock was held very strongly, bidding being active, and sales were made at \$7 and even above.

Ontario was very strong, and held so firmly that few sales were made, but those went in at advanced figures. Rover is looking well, and a strike of arsenical ore down on the flat is reported. Great ore bodies have been blocked out. Its neighbor, the Gold Dust, is prosecuting development work vigorously and has a splendid showing. Silver King pays its monthly dividend of \$37,500 on the 7th, making a total of \$525,000. The stock is held very strongly above \$15. Sunshine will probably increase its mill capacity to 300 tons, without much delay. The plant is doing splendid work, and the properties look very well. Utah will probably pay its usual dividend of \$1,000 on the 10th.

San Francisco. Feb. 8.

(From Our Special Correspondent.)

The market this week has been altogether dull and inactive and there has been hardly anything worth noting. The prices have been low, dropping gradually through the week, but on dealings of a petty order.

Consolidated California & Virginia closes at \$2@ \$2.05; Ophir, \$1.25@ \$1.30; Hale & Norcross, \$1.15@ \$1.20; Confidence, \$1.05@ \$1.10; Occidental, \$1@ \$1.05. There was little done in the Bodies, and Bodie Consolidated closes at 37@38c.; Bulwer, 15@16c.; Mono, 16c.

Sales on regular call at the San Francisco Stock and Exchange Board in January amounted to 295,415 shares, against 254,315 shares in January of last year.

The monthly financial statements of the Comstock mines of date February 1st, show balances on hand as follows: Alpha, \$5,602; Andes, \$1,683; Belcher, \$4,695; Best & Belcher, \$16,350; Bullion, \$5,775; Caledonia, \$133; Challenge, \$1,652; Chollar, \$19,821; Confidence, \$5,674; Consolidated Imperial, \$2,907; Consolidated California & Virginia, \$14,578; Consolidated New York, \$1,121; Crown Point, \$694; Exchange, \$3,865; East Sierra Nevada, \$27; Gould & Curry, \$6,088; Hale & Norcross, \$3,955; Julia, \$256; Justice, \$259; Kentucky, \$3,145; Lady Washington, \$16; Mexican, \$16,012; Ophir, \$11,643; Overman, \$8,909; Occidental, \$9,788; Potosi, \$14,854; Scorpion, \$25; Sierra Nevada, \$2,129; Segregated Belcher, \$2,596; Silver Hill, \$482; Union, \$2,415; Utah, \$1,916; Savage, reports an indebtedness of \$461.

The monthly statements of the Bodie companies show balances on hand as follows: Bodie Consolidated, \$9,246; Bulwer, \$1,763; Mono, \$920; Standard, \$21,903; Syndicate, \$882.

Following were the sums disbursed by mining, milling and other companies on and around the Comstock to employees for the month of January: Hale & Norcross, \$3,866; Andes (estimated) \$1,200; Consolidated California & Virginia, \$12,925; Mexican, \$2,085.50; Ophir, \$3,673; Best & Belcher, \$1,501; Gould & Curry, \$1,103; Alta (estimated) \$1,300; Utah, \$365; Occidental, \$2,500; Brunswick Exploration Company, \$3,432; Kentucky, \$75; Savage, \$2,968; Crown Point, \$2,414; Yellow Jacket, \$1,587; Confidence, \$530; Challenge, \$156; Belcher, \$3,100; Segregated Belcher, \$852; Imperial, \$106; Bullion, \$1,083; Chollar, \$2,766; Potosi, \$4,050; Union Shaft, \$2,795; Sierra Nevada, \$811; Alpha, \$956; Nevada Mill, \$2,500; Electric Light, \$500; Water Company \$3,000; Quartz mills, \$5,000. Total, \$69,239.

THE NEW EXCHANGE.

The first regular monthly meeting of the Gold Mining Exchange, of San Francisco, was held Wednesday, February 5th. The Mines and Mining Committee offering the following important additions to the by-laws in the form of requirements governing the sale or development of mining properties: "All applicants who desire to have mining properties, which are to be developed or sold, placed upon the book list of the Exchange, shall fill out a descriptive blank (which shall be furnished by the secretary of the Exchange) giving extent of improvements, if any, character of the mine, kind and value of ore, title and any other information which may be required, and shall pay an application or listing fee of \$20. The Committee on Mines and Mining shall examine and pass upon the application and statement, and if necessary, shall also personally examine the applicant. If the property be considered meritorious by the committee, an expert mining engineer shall be appointed by the Committee on Mines and Mining, who shall proceed, as soon as convenient, to the property for the purpose of making a proper examination, and he shall submit a written report to the said committee giving a detailed statement of the condition and his views upon the property.

"Previous to the expert proceeding to make an examination of mining property, the owner of the said property shall enter into a bond, option or

agreement to deliver such property to investors upon such terms as may have been agreed upon by and between the mine owner and the Mines and Mining Committee.

"The cost of the expert examination shall be borne by the applicant, but it shall not exceed the sum of \$5 per day and actual expenses. An amount of money approximately covering the cost of his expert examination must be deposited with the secretary of the Exchange before the departure of the expert.

"Should the Committee on Mines and Mining, after the examination and inquiry above provided for have been made, then deem the property submitted for its consideration a meritorious and a safe investment, it may enter into mutual arrangements on behalf of the Exchange, with the aforesaid applicant for such material assistance as may be thought proper.

"It shall be the duty of the Committee on Mines and Mining to inform the applicant, at as early a date as possible, what its decision may have been. If favorable to the property under consideration, arrangements shall be made for selling the same by bond, or securing money for development purposes. All money advanced for development purposes, through the recommendation of the Exchange, shall be expended under its supervision; unless the party so investing shall elect to direct the expenditure of his money to suit his own ideas.

"For consummating a sale of mining property a commission of not less than 5% shall be added to the price of the property, and said commission must be paid at the time of sale, and as shall have been agreed upon to the Secretary of the Exchange, by the person in whose behalf the sale is made.

"A fee of not more than 50% of the selling commission may be allowed a member of the Exchange who makes the sale on the consummation of a sale, but not more than 33 1/3% shall be allowed a non-member.

"When required, the secretary shall furnish non-members copies of reports of mines listed on the Exchange books, and reported upon by the committee on mines and mining, at a cost not exceeding 25c. per folio. A member shall have the privilege, however, of obtaining a report from the book-list, at his own expense. The secretary or his assistants shall not furnish reports to anyone at the expense of the Exchange. From the time the Exchange shall enter into a contract for the promotion or sale of a property, all the details of the transaction shall be open to both the seller and the purchaser."

These were unanimously adopted. During the discussion, Mr. M. F. Tarpey stated that the aim of the Exchange should be to prevent the burdening of the public, as far as possible, with bad investments. He believed that there are plenty of people seeking legitimate investments in California gold mines. The President announced that the rooms of the Exchange would be ready for public business about February 15th or 20th. The Exchange unanimously agreed that a fitting opening should inaugurate the work of the Exchange and that the Governor, public officials and the leading mining and business men of the Coast be invited to attend. The President was directed to appoint a committee on reception to attend to the necessary details.

BY TELEGRAPH.

SAN FRANCISCO, Cal., February 11th.—The opening quotations to-day were as follows: Best & Belcher, 76c.; Bodie, 31c.; Bulwer, 15c.; Consolidated California & Virginia, \$2; Chollar, 62c.; Crown Point, 18c.; Eureka, 25c.; Gould & Curry, 41c.; Hale & Norcross, \$1.15; Mexican, 57c.; Mono, 15c.; Ophir, \$1.25; Potosi, 52c.; Sierra Nevada, 47c.; Savage, 41c.; Union Consolidated, 32c.; Yellow Jacket, 38c.; Occidental, \$1.05.

Paris. Feb. 2.

(From Our Special Correspondent.)

The foreign merchandise trade of France for the full year is reported by the Ministry of Commerce as below, in comparison with 1894:

	1894.	1895.
Imports:	Francs.	Francs.
Food.....	1,197,677,000	1,925,578,000
Raw materials.....	2,104,486,000	2,095,386,900
Manufactures.....	548,282,900	577,778,000
Total.....	3,850,445,900	3,698,742,900
Exports:		
Food.....	666,240,000	617,537,000
Raw materials.....	754,658,000	806,372,000
Manufactures.....	1,578,414,000	1,787,320,000
Postal parcels.....	78,833,000	116,622,000
Total.....	3,078,145,000	3,387,851,000
Excess, imports.....	772,300,900	310,891,900

The decrease in imports was chiefly in food, and resulted from the lighter amount of grain. The increase in exports was largely in manufactures. The movement of gold for the year is reported as follows:

	1894.	1895.
Imports.....	Francs.	Francs.
Imports.....	461,543,561	253,013,473
Exports.....	216,873,170	325,397,122
Excess.....	244,670,391	77,626,349

The Transvaal embroglio continues the chief topic under discussion, and the more clearly the facts are brought out, the more apparent becomes the nefarious nature of the Chartered Company's plot to seize the Transvaal. The Johannesburg people did not cover themselves with glory. In the light of the de-

tailed accounts, the outbursts of the English rhymsters (one cannot say poets) over "Jameson's ride," appear most ridiculous. One hopes that the talk about "British pluck and dash" will not be heard for a time; but who knows? Our insular neighbors are very thick-skinned sometimes, and it is very hard to make them see that they have made themselves absurd.

The Transvaal gold stocks are generally lower, and dealings in them have been light. Everyone feels a little uncertain as to the result, but the doubt is not serious enough to induce selling.

The copper stocks continue strong, and Rio Tintos are in demand. Tharsis and Cape Copper also find buyers readily. The rest of the market is without event, except that there has been some activity in the nitrate shares.

Imports of other coin and bullion, including silver of all kinds and also copper and nickel coins, in 1895 were 140,917,341 fr., and exports were 80,926,434 fr., showing a balance of 59,990,907 fr. imported.

We are watching with interest the result of your new loan and wish you success. Permit us to wish you also wisdom to reform your currency conditions, and make such issues unnecessary. AZOTE.

MEETINGS.

Name of Co.	Location of office.	Date.	Time.
Detroit (Copper).....	15 Cliff Street, New York.....	Mar. 5.	12 noon.
Elda.....	Midland Block, Colorado Sprgs., Colo.....	Feb. 24	4 p. m.
Lehigh C. & N.....	226 So. Third Street, Philadelphia, Pa.....	" 25	11 a. m.
New Park.....	Montana Club Bldg., Helena, Mont.....	Mar. 4.	2 p. m.
Pacific O.I.....	13 Pine Street, San Francisco, Cal.....	Feb. 20.	12 noon.
Uncle Sam.....	1638 Stout Street, Denver, Colo.....	" 21	2 p. m.
Watt Blue.....	323 Montgomery St., San Francisco, Cal.....	" 17	1 "

ASSESSMENTS.

Name of Co.	Loc'n.	No.	Divq.	Sale.	Amt
Alta.....	Nev.....	51	Feb. 17	Mar. 9	.10
Anchor Coal.....	Wash.....	6	" "	" 5	.03
Andes.....	Nev.....	42	Mar. 6	" 28	.15
Channel Bend.....	Cal.....	1	Feb. 21	" 13	.35
Crown Point.....	Nev.....	66	" 20	" 12	.20
Florence G. & S.....	S. D.....	8	" 1	" 1	.024
Good Hope.....	Cal.....	1	Jan. 30	Feb. 20	.70
Gray Eagle.....	" "	42	Feb. 7	Mar. 3	.05
Granite Hill.....	" "	13	" 19	" 11	.10
Hite.....	Nev.....	2	Jan. 20	" 10	.10
Home.....	Cal.....	9	Feb. 1	Feb. 19	.05
Jenny Lind.....	" "	"	" 1	Mar. 18	.0146
Julia Con.....	Nev.....	27	" 20	" 11	.05
Justice.....	" "	"	" 17	Mar. 10	.10
Lady Wash. Con.....	" "	11	" 17	" 10	.05
Minnie Quartz.....	Cal.....	4	Mar. 2	" 19	.004
Orleans.....	" "	1	Jan. 29	" 24	.10
Savage.....	S. D.....	88	Feb. 6	Feb. 26	.20
Shasta.....	Cal.....	3	" 20	Mar. 10	.001
Sierra Nevada.....	Nev.....	110	Mar. 7	" 27	.25
Silver King.....	" "	13	" 9	Apr. 6	.25
Trinity Con.....	" "	"	Feb. 10	Feb. 27	.04
Union Con.....	" "	52	" 17	Mar. 17	.20

DIVIDENDS.

NAME OF COMPANY	Current Dividends Payable.		Paid since Jan. 1, 1896.	Total to date.
	Date.	Amount.		
Alta Con.....	Mar. 2	\$10,000	\$10,000	\$50,000
Alaska-Mexican.....			18,000	
Alaska-Treadwell.....			75,000	2,750,000
Belden, F. E.....			4,000	221,000
Boston & Mont.....	Feb. 29	300,000	300,000	3,725,000
Bullion-Beck & Ch.....			25,000	
Cadmet & Hecla.....	Mar. 3	500,000	500,000	43,850,000
Centennial-Eureka.....			60,000	1,530,000
Dominion Coal.....			600,000	
Gold Coin.....			15,000	30,000
Golden Fleece.....			18,000	187,000
Gold & Globe Hill.....			15,000	
Highland.....			25,000	
Homestake.....			31,250	5,712,500
Horn Silver.....			50,000	5,137,500
Isabella.....	Feb. 20	22,500	22,500	45,000
Mercur.....			25,000	375,000
Moose.....			6,000	186,000
Napa Con.....			20,000	760,000
Ontario.....			15,000	13,190,000
Osceola Con.....			75,000	2,022,500
Portoquachy.....	Mar.	1,000	1,000	1,000
Quincy.....			65,000	683,000
Silver King.....	Feb. 17	200,000	200,000	7,870,000
Smuggler-Union.....			75,000	725,000
Utah.....			500,000	1,610,000
*Victor.....			1,000	38,000
Victor M. & L.....			40,000	515,000
			3,000	27,000
Totals.....		\$1,022,400	\$2,789,250	\$91,000,500

* February dividend paid.

This table does not give all the dividends paid by mining companies, as it is impossible to obtain a complete list of dividends declared. Many companies are close corporations and refuse to give the information. 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.

STOCK QUOTATIONS.

BOSTON, MASS.*

Table of stock quotations for Boston, Mass. listing companies like Allouez, Arnold, Atlantic, and others with columns for location, par value, and sales.

* Official quotations Boston Stock Exchange. † Holiday. Total sales, \$1,594.

INDUSTRIAL COAL AND COAL RAILROAD.*

Table of industrial coal and coal railroad stock quotations for Boston, Mass., listing companies like Bait & Onio, Ches. & Ohio, and others.

* Official quotations N. Y. Stock Exchange. † Holiday. Total shares sold, 159,912.

NEW YORK.*

Table of stock quotations for New York, listing companies like Adams, Anchor, Bogan, and others with columns for location, par value, and sales.

* Official quotations N. Y. Stock and Con. Stock & Petroleum Exchanges. Total sales, 41,305. † Holiday.

PITTSBURG, PA.*

Week ending Feb. 13.

Table of stock quotations for Pittsburgh, Pa., listing companies like Mansfield, N.Y. & C. Gas Co., and others.

* Official quotations Pittsburgh Stock Exchange.

COLORADO SPRINGS, COLO.*

Table of stock quotations for Colorado Springs, Colo., listing companies like Ajax, Alamo, Americana, and others.

* Official quotations and sales Board of Trade Exchange. † Mining Stock Association.

ST. LOUIS, MO., STOCKS.

Week ending Feb. 9.

Table of stock quotations for St. Louis, Mo., listing companies like Central Lead, Con. Coal, and others.

SAN FRANCISCO, CAL.*

Table of stock quotations for San Francisco, Cal., listing companies like Alta, Belcher, Best & Belcher, and others.

* Official telegraphic quotations, San Francisco Stock Exchange.

BALTIMORE, MD.*

Week ending Feb. 13.

Table of stock quotations for Baltimore, Md., listing companies like Balt. M. & S. N. C., Conrad Hill, and others.

* Official quotations Baltimore Stock Exchange.

MISCELLANEOUS SECURITIES.

Table of miscellaneous securities quotations, listing companies like American Coal, Chattanooga Ore, and others.

LONDON. Jan. 31.

Table with columns: NAME OF COMPANY, Country, Product, Capital stock, Par value, Last dividend, Quotations (Buyers, Sellers), and various company names like Alaska-Mexican, Alaska Treatwell, Banner, etc.

PARIS. Week ending Jan. 30.

Table with columns: NAME OF COMPANY, Country, Product, Capital Stock, Par value, Div. last year, Prices (Op'n'g, Closing), and various company names like Acleries de Creusot, Firminy, Fives-Lille, etc.

MEXICO. Week ending Feb. 6.

Table with columns: NAME OF COMPANY, State, No. of shares, Last dividend, Last assessment, Prices (Opening, Closing), and various company names like Amistad y Concordia, Angustias, Arvalo y Anexas, etc.

NOTE.—In most Mexican mining companies the shares have no fixed par value. The capital is formed of a certain number of shares, the total value not being named. Prices are in Mexican dollars.

VALPARAISO, CHILE.* Week ending Dec. 21.

Table with columns: NAME OF COMPANY, Capital, Share value (Nominal/Paid up), Last Dividend, Prices (Bid, Asked, Last sale), and various company names like Arturo Prat, Caracoles, Descub. de Huantajaya, etc.

* Special Report of Jackson Bros. Values are in Chilean pesos or dollars.

SHANGHAI, CHINA.* Jan. 3.

Table with columns: NAME OF COMPANY, Country, No. of shares, Value (Par, Paid up), Last dividend, Price, and various company names like Jelebu Mg. & Trad., Pundon Mg. Co., Ltd., etc.

* Special Report of J. P. Blissett & Co. The prices quoted are in Shanghai taels.

DENVER, COLO.

Table with columns: NAME OF COMPANY, Par val, Feb. 3, Feb. 4, Feb. 5, Feb. 6, Feb. 7, Feb. 8, Sales, and various company names like Addie C., Agate, Alamo, Amity, etc.

* All the companies are located in Colorado. Total shares sold: listed, 3,346,450; unlisted, 3,167,000.

PHILADELPHIA, PA.*

Table with columns: NAME OF COMPANY, Location, Par Val, Feb. 6, Feb. 7, Feb. 8, Feb. 10, Feb. 11, Feb. 12, Sales, and various company names like Acety. L.H. & P., Bethlehem, Cambria Iron, etc.

* Official quotations Philadelphia Stock Exchange. Total sales, 6,348.

SALT LAKE CITY, UTAH.* Week ending Feb. 8.

Table with columns: Name of Company, Par value, Bid, Asked, Actual selling price, Name of Company, Par value, Bid, Asked, Actual selling price, and various company names like Ajax, Alliance, Amer. Nat. Gas, etc.

* Special Report of James A. Pollock. * All the companies are located in Utah.

ASPEN, COLO.* Week ending Feb. 5

Table with columns: NAME OF COMPANY, Location, Par value, Bid, Asked, Sales, Price, and various company names like Alta Argent., Argentinum-Juniata, Aspen Contract, etc.

* Special Report of J. F. MacMillan. Total sales, 9,400.

HELENA, MONT.* Week ending Jan. 28.

Table with columns: NAME OF COMPANY, Location, Company's Office, Par value, Bid, Asked, Shares sold, Price, Date, and various company names like Am. Dev. & M. Co., Bald Butte, Bi-Metallic, etc.

* Special Report of Samuel K. Davis. Total shares sold, 7,900.

DULUTH, MINN.* Week ending Feb. 8.

Table with columns: NAME OF COMPANY, Location, Company's Office, Par value, Bid, Ask, Price, and various company names like Adams Iron, Biwabik Mt. Iron, Lake Superior Con., etc.

* Special Report of Dwight E. Woodbridge.

DIVIDEND-PAYING MINES.

NON-DIVIDEND-PAYING MINES

Main table with columns: Name and Location of Company, Capital Stock, Shares, Par, Dividends, Date and amount of last, and 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 \$42,330,000. ‡ 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 100,000 in dividends against \$425,000 in assessments.

CLASSIFIED LIST OF ADVERTISERS.

Air Compressors and Rock Drills
 Bostelmann, Louis F.
 Bullock, M. C., & Co.
 Burlington Rock Drill Co.
 Clayton Air Compressor Works.
 Fraser & Chalmers.
 Gates Iron Works.
 Ingersoll-Sergeant Drill Co.
Aluminum Bronze
 Fairbanks Co.
Amalgamators
 Bucyrus Steam Shovel & Dredge Co.
 Fraser & Chalmers.
 Gates Iron Works.
Amalgam Plates.
 Western Plating and Mfg. Co.
Anti-Friction Metals
 Besley, Chas. H., & Co.
 Chester Steel Cast. Co.
Architects and Builders
 Berlin Iron Bridge Co.
 Pittsburgh Bridge Co.
 Pollock, Wm. B. & Sons.
Assayers' and Chemists' Supplies
 Alinsworth, Wm.
 Baker & Adamson.
 Baker & Co.
 Becker, Christian.
 Bullock & Crenshaw.
 Denver Fire Clay Co.
 Elmer & Amend.
 Gates Iron Works.
 Henry Hill Chem. Co.
Attorneys, Corporation
 Emig, C. E.
 Jones & Rieft.
 McIndoe, H.
Automatic Boiler Feeds
 D'Este & Seeley.
 Penberthy Injector Co.
Habbutt's Metal
 Besley, Chas. H., & Co.
Bankers and Brokers
 Arkell, E., & Co.
 Bartlett & Co.
 Boy, R. C., & Co.
 Bonbright, W. P., & Co.
 Carnduff, A. A.
 Crandall & Huff.
 Crisp, C. R. Inv. Co.
 Decker, L. B.
 Duer, G. A. C.
 Dorsey, H. H.
 Doubleday, Rope & Co.
 Edsall, Clarence & Co.
 Fall, Brooks & Cramer.
 Farnsworth, C., & Co.
 Fitts, G. W., & Sons.
 Fletcher, C. S., & Co.
 Freyschlag, Kirby & Co.
 Gardner & Co.
 Grant, E. R.
 Handy & Harman.
 Harriott, W. M.
 Hendrickson, W. J.
 Heron Bros.
 Hodgins, W.
 Hicks & Benzle.
 Johnson, L. L.
 Keeth, F. M.
 Kenrick, W. F.
 Key, J. J.
 Kinney, M.
Belting
 Carpter, Geo. B., & Co.
 Hendrie & Bolthoff Mfg. Co.
 Lelphelmer, N.
 Miller, Chas. N., & Co.
 Mayer, Andrew
Belt Lacing.
 Bristol Co.
Blasting Caps.
 Metallic Cap Mfg. Co.
Blasting Batteries
 Climax Fuse Co.
 Lau, J. H., & Co.
Pressure Blowers
 Rensselaerville Blower Co.
Boilers
 Denver Eng. Wks. Co.
 Enterprise Boiler Co.
 Fraser & Chalmers.
 Gates Iron Works.
 Philadelphia Eng. Wks. Ltd.
Brattice Cloth
 Besley, Chas. H. & Co.
Brewers.
 Pabst Brewing Co.
Brick Machinery
 Freese, E. M., & Co.
Bridges
 Berlin Bridge Co.
 Pittsburgh Bridge Co.
Buckets
 Scaife, Wm. B. & Sons.
Carbons
 Bishop, Victor, & Co.
 Bostelmann, Louis F.
 Lexow, Theodore.
Chain and Link Belting (See Belting.)
Chemicals
 Baker & Adamson.
 Bullock & Crenshaw.
 Elmer & Amend.
 Henry Hill Chem. Co.
Coal
 Berwind-White Coal Mfg. Co.
 Ostner & Curran
 Consolidation Coal Co.
Coal Cutters
 Ingersoll-Sergeant Drill Co.
 Jeffrey Mfg. Co.
 Leyner, J. Geo. (See Machinery.)
 Link Belt Machinery Co.
Compressors.
 Clayton Air Compressor Works.
 Norwalk Iron Works Co.
Concentrators, Crushers, Pulverizers, Separators, Etc.
 Allis, Ed. P. & Co.
 Beckett Foundry & Machine Co.
 Blake, Theo. A.
 Boston Ore Machinery Co.
 Bradley Pulverizer Co.
 Colorado Iron Works.
 Denver Eng. Works Co.
 Edgebach Mach. Mfg. Co.
 Fraser & Chalmers.
 Fues Vanner Concentrator.
 Gates Iron Works.
 Hendrie & Bolthoff Mfg. Co.
 Joplin Mach. Co.
 Krom, S. K.
 Krupp, F.
 Link Belt Machinery Co.
 McCully, R.
 Scoville, H. H., & Co.
 Stedman Foundry & Mach. Co.
 Walburn-Swenson Mfg. Co. (See Machinery)
Contractors. (See Machinery.)

Copper Dealers and Producers.
 American Metal Co.
 Arizona Copper Co.
 Atlantic Mining Co.
 Balbach S. & Ref. Co.
 Baltimore Cop. Wks.
 Bath, H., & S. N.
 Boston & Mont. Mfg. Co.
 Bridgeport Copper Co.
 Butte & Boston Mfg. Co.
 Canadian Copper Co.
 Copper Queen Mfg. Co.
 Detroit Copper Co.
 Elliott's Metal Co., Ltd.
 Corrugated Iron Co.
 Berlin Iron Bridge Co.
 Scaife, W. B. & Sons
Crucibles, Graphite, Etc.
 Stedman's Foundry & Machine Works.
Dampers Regulators
 D'Este & Seeley.
Cyanide.
 Rosell & Hasselacher Chemical Co.
Diamonds
 Bishop, Victor, & Co.
 Bostelmann, L. F.
 Lexow, Theodore.
Diamond Drills
 Bishop, Victor, & Co.
 Bostelmann, L. F.
 Bullock Mfg. Co., M.C.
 Sullivan Machinery Co.
 (See Air Compressors and Rock Drills.)
Draughtmen
 Young, Wm. H.
Drawing Materials.
 Besley, Chas. H., & Co.
 Dietzgen, E. & Co.
 (See Engineering Instruments.)
Dredges
 Bucyrus Steam Shovel & Dredge Co.
 Southern & Co.
Dryers
 Brown, Horace T.
 Cummer, F. D. & Son Co.
 Denver Eng. Wks. Co.
Dump Cars
 Denver Eng. Works Co.
 Gates Iron Works Co.
 Hendrie & Bolthoff Mfg. Co.
Educational Institutions
 Arizona School of Mines.
 Columbian University.
 Chicago School of Assaying.
 Correspondence School of Mines.
 Lehigh University.
 Mass. Inst. of Technology
 Michigan Mining School.
Electrical Batteries
 Macheth, James, & Co.
Electrical Machinery and Supplies
 Besley, Chas. H., & Co.
 Card Electric Co.
 Denver Eng. Wks. Co.
 Gates Iron Works
 General Electric Co.
 Jeffrey Mfg. Co.
Elevators, Conveyors and Hoisting Machines
 Brown Hoist & Conv. Mach. Co.
 Caldwell, H. W., & Co.
 California Wire Wks.
 Cooper, Hewitt & Co.
 Crook, W. A., & Bros. Co.
 Denver Eng. Wks. Co.
 Field & Gostzman.
 Vulcan Iron Works.
 (See Wire Rope Tramway and Machinery.)
Emery Wheels
 Besley, Chas. H. & Co.
 New York Belting & Packing Co., Ltd.
Engineers, Chemists, Metallurgists
 See Directory Pages 4, 5 and 6.
Engineers' Instruments and Supplies
 Bullock & Crenshaw
 Dietzgen, E., & Co.
 Fauth & Co.
 Gurley, W. & L. E.
Engines
 Bucyrus Engine Co.
 Bullock, M. C. Mfg. Co.
 Dayton Gas Engine & Mfg. Co.
 Enterprise Boiler Co.
 Ellison, Wm., & So.
 Fraser & Chalmers.
 Lidgerwood Mfg. Co.
 (See Machinery.)
 Philadelphia Eng. Works, Ltd.
Excavators
 Bucyrus Steam Shovel & Dredge Co.
 Southern & Co.
 Vulcan Iron Works.
Fire-Brick and Clay
 Chur, A. T.
 Denver Fire Clay Co.
Furnaces
 Brown, Horace.
 Gates Iron Works.
 Hoskins, Wm.
 (See Machinery.)
Fuses, Powder
 Ingersoll-Sergeant Drill Co.
 Fues, Suley.
 Climax Fuse Co.
Gas Engines.
 Dayton Gas Engine & Mfg. Co.
 Norman, J. J., & Co.
Gas Works
 Pollock, Wm. B. & Co.
 Woca, B., & Co.
Gauges, Recording, Etc.
 Bristol Mfg. Co.
Geology
 Besley, Chas. H., & Co.
 Chester Steel Cast. Co.
 Denver Eng. Wks. Co.
Grease, Graphite, Etc.
 Besley, Chas. H., & Co.
 Dixon, Jos., Cruc. Co.
Hurveys and Steel
 Pierce & Miller Engineering Co.
Heavy Machinery
 Denver Eng. Works Co.
 Fraser & Chalmers.
 Gates Iron Works.
Ice, Rubber, Etc.
 New York Belting & Packing Co., Ltd.
Injectors.
 Penberthy Injector Co.
Insulated Wires and Cables
 Okonite Co., Ltd.
Insurance Companies
 Hartford Steam Boiler Inspect'n and Ins. Co.
 Mutual Life Insurance Co.
Joint Fittings
 Tight Joint Co.
Lead Linings for Chlorination Tubs.
 Raymond Lead Co.

Locomotives
 General Electric Co.
 Hunt, C. W. Co.
 Porter, H. K., & Co.
Machinery, Milling and Other Machinery
 Jeffrey Mfg. Co.
 Jessop, W. & Sons, Ltd.
 Leyner, J. Geo.
 Lidgerwood Mfg. Co.
 Link Belt Mach. Co.
 Krupp, F.
 McCully, R.
 McKiernan Drill Co.
 Meeklenburg Ir. Wks.
 Merralls' Mill Co.
 Moore, Sam. L. & Son.
 Rock & Garside
 Norwalk Iron Wks. Co.
 Philadelphia Eng. Wks., Ltd.
 Pollock, Wm. B. & Co.
 Scaife, W. B. & Sons.
 Stedman Fdy. & M. Co.
 Scoville, H. H., & Co.
 Sullivan Machinery Co.
 Tod, Wm., & Co.
 Union Iron Works.
 Vulcan Iron Works.
 Walburn-Swenson Mfg. Co.
 Walker Mfg. Co.
 Webster, Camp & Lane Mach. Co.
 Westinghouse Elect. Mfg. Co.
Manganese Steel.
 Taylor Iron & Steel Co.
Metal Dealers
 American Metal Co.
 Am. Zinc-Lead Co.
 Baker & Co.
 Bath, Henry & Son.
 Besley, Chas. H., & Co.
 Bridgeport Copper Co.
 Elliott's Metal Co., Ltd.
 Kureka Co.
 Foster, Blackett & Wilson.
 James & Shakspeare.
 Johnson, Matthey & Co.
 Lambert's Wharf, Co.
Metallurgical Works and Ore Purchasers' Processes
 Amer. Zinc Lead Co.
 Balbach Sm. & Ref. Co.
 Baltimore Copper Wks.
 Bridgeport Copper Co.
 Canadian Copper Co.
 Denver Eng. Wks. Co.
 Elliott's Metal Co., Ltd.
 Foster, Blackett & Wilson.
 Fraser & Chalmers.
 Gates Iron Works.
Nine Cars
 Crandall & Huff.
 Denver Eng. Wks. Co.
 Gates Iron Works.
 Hendrie & Bolthoff Mfg. Co.
 Hunt, C. W. Co.
 Sheffield Car Co.
 (See Machinery.)
Mine, Mill and Smelters Supplies.
 Carpenter, Geo. B. & Co.
 Crandall & Huff.
 Denver Eng. Wks. Co.
 Gates Iron Works.
 Park & Wilkinsons.
 Rosell & Hasselcher Chemical Co.
 (See Machinery.)
Mining and Lash Companies
 Atlantic Mfg. Co.
 Detroit Copper Mfg. Co.
 Eureka Co.
 Kearsarge Mfg. Co.
 Osceola Con. Mfg. Co.
 Tamarack Mfg. Co.
 Tamarack, Jr., Mfg. Co.
Nickel
 Canadian Copper Co.
Ore Roasters
 Brown, Horace F.
 Cummer, F. D. & Sons Co.
 Davis-Colby Ore Roaster Co.
Ore Crushing
 Hunt & Robertson.
 Ledoux & Co.
Packing and Pipe Coverings
 Brandt, Randolph.
 New York Belting & Packing Co., Ltd.
 Jenkins Bros.
 Wyckoff & Son, A.
Perforated Metals
 Aitchison, R., Perf. Metal Co.
 Fraser & Chalmers.
 Harrington & King Perforating Co.
Phosphor-Bronze
 Phosphor-Bronze Smelting Co.
Pile Drivers
 Bucyrus Steam Shovel and Dredge Co.
 Ingersoll-Sergeant Drill Co.
Pipes
 Pollock, Wm. B., & Co.
 Baker & Co.
 Johnson, Matthey & Co.
Powder
 Atlantic Dynamite Co.
 Astra Powder Co.
 Ingersoll-Sergeant Drill Co.
Pressure Blowers
 Connersville Blower Co.
Pressure Regulators
 D'Este & Seeley. (Curtis.)
Publishations
 Ir'n & C. Trade Review
 Lixivation of Silver Ores.
 Australian Mg. Stand.
 Bullionist.
 Colliery Guardian.
 Denver Republican.
 Economic Mining.
 El Minerio Mexicano.
 Electrical Plant & Electrical Industry.
 Financial Times.
 Indian Engineer.
Pumps
 Blake, Geo. F. Mfg. Co.
 Cameron, A. S., & Sons.
 Pump Works.
 Denver Eng. Wks. Co.
 Fraser & Chalmers.
 Gates Iron Works.
 Gouids Mfg. Co.
Quarrying Machines
 Bostelmann, L. F.
 Gates Iron Works.
 Ingersoll-Sergeant Drill Co.
 Rand Drill Co.
 Sullivan Machinery Co.
Quickstiver
 Eureka Co.
Railroads
 C. B. & Quincy R. R.
 Denver & Rio Grande R. R.
 Denver, Leadville & Gunnison Ry.
 Florence & Cripple Creek R. R.
 Midland R. R. of Kentucky.
 Rio Grande Southern R. R.
 U. P., D. & G. R. R.
Railroad Supplies and Equipment
 Carpter, Geo. B. & Co.
 Channon, R. Co.
 Crandall & Huff.
 Fairbanks Co.
 D'Este & Seeley Co.
 Eddy Valve Co.
 Jenkinson & Co.
Return Steam Traps
 D'Este & Seeley. (Curtis.)
Rock Drills. (See Air Compressor.)
Roofing
 Berlin Iron Bridge Co.
 Phelps, Dodge & Co.
 Pittsburgh Bridge Co.
Rubber Goods
 New York Belting & Packing Co., Ltd.
Scales.
 Fairbanks Co.
Screens
 Aitchison, R., Perf. Metal Co.
 Denver Eng. Wks. Co.
 Fraser & Chalmers.
 Gates Iron Works.
 Harrington & King Perforating Co.
 Link Belt Machinery Co.
 Ludlow-Saylor Wire Co. (See Machinery.)
Second Hand Machinery
 Robinson & Orr.
Separators
 D'Este & Seeley Co.
Shoes and Dies
 Chester Steel Cast. Co.
 Grooms Steel Works.
 Crescent Steel Co.
 Denver Eng. Wks. Co.
 Fraser & Chalmers.
 Gates Iron Works.
 Pierce & Miller Eng'g & Mach'ry Co.
Shovels (Steam)
 Bucyrus Steam Shovel & Dredge Co.
 Southern & Co.
Smelting and Refining Works
 Balbach S. & Ref. Co.
 Baltimore Cop'g Wks.
 Bostelmann Copper Co.
 Elliott's Metal Co., Ltd.
 Ricketts & Banks.
 Russell Process Co.
 State Ore Sampling Co.
 Walburn-Swenson Mfg. Co.
 Orford Copper Co.
 Penna. Sait Mfg. Co.
 Pennington Copper Co.
 Redding Works.
 Phosphor Bronze Smelt. Co.
Steel Rails, Castings, Rolls, Drill Steel
 Bethlehem Iron Co.
 Carpenter Steel Co.
 Chester Steel Cast. Co.
 Chrom Steel Works.
 Crandall & Huff.
 Crescent Steel Co.
 Garrison, A., Fdry. Co.
 Moore, S. L., & Sons Co.
 Jessop Wm. & Sons Ltd.
 Walker Mfg. Co.
 Williams Mfg. Co.
Telegraph Wires and Cables
 Okonite Co., Ltd., The.
Temperature Regulators
 D'Este & Seeley. (Curtis.)
Testing Laboratories
 Fairbanks Co.
Tools
 Besley, Chas. H., & Co.
 Pratt & Whitney Co.
 Pollock, Wm. L. & Co.
 Williams Bros.
Tubes
 Besley, Chas. H., & Co.
Tabling-Rubber
 New York Belting and Packing Co., Ltd.
Turbine Water-Wheels
 Gates Iron Works.
 Stillwell-Bierce & Smith Valle Co.
Typewriters.
 Wyckoff, Seamans & Benedict.
Valves
 D'Este & Seeley Co.
 Eddy Valve Co.
 Fairbanks Co.
 Jenkins Bros.
Ventilators
 Bullock, M. C. Mfg. Co.
 Tod, Wm., & Co.
 Fraser & Chalmers.
Vulcanite Emery Wheels
 New York Belting and Packing Co., Ltd.
Water-Wheels
 Girard Water Wheel Co.
 Leffel, James, & Co.
 Stillwell-Bierce & Smith-Valle Co.
Well Drilling Machinery
 Bostelmann, L. F.
 Sullivan Machinery Co.
 Williams Bros.
Wharfage
 Lambert's Wharfage Co.
Wheels, Car
 Baltimore Steel Cast. Co.
 Sheffield Car Co.
 Taylor Iron & Steel Co.
 Foster, Blackett & Co.
White Lead
 Foster, Blackett & Co.
Wire Cloth
 Aitchison, R., Perf. Metal Co.
 Barrum, E. F.
 Gates Iron Works.
 Harrington & King Perforating Co.
Wire Rope & Wire
 Besley, Chas. H., & Co.
 Broderick & Bascom
 Rope Co.
 California Wire Wks.
 Carpter, G. B. & Co.
 Carpenter Steel Co.
 Channon, H. Co.
 Cooper Hewitt & Co.
 Trenton Iron Co.
 Gates Iron Woks.
 Hunt, C. W. Co.
 Lechen, A., & Sons
 Rope Co.
 Phelps, Dodge & Co.
 R'Billig, J. A. Sons & Co.
 Ropeways Syndicate.
 Trenton Iron Co.
Wire Rope Tramway
 Brown Hoist & Conv. Machine Co.
 California Wire Wks.
 Colorado Iron Works.
 Denver Eng. Wks. Co.
 Fraser & Chalmers.
 Vulcan Iron Works.

POSITIONS VACANT.

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.

1429 WANTED—A MAN FAMILIAR with the refining of sulphur from its ores, by the most improved modern processes, and who can give estimates of cost of such plant. Address **SULPHUR, ENGINEERING AND MINING JOURNAL.**

1431 WANTED—STEEL CASTING AND Engineering firm, in good financial condition, and with works having about 200 tons weekly capacity, requires a general manager. Must have knowledge of this special business, have general mechanical and metallurgical ability, and be well acquainted with general commercial routine, reliable costing system and able to control workmen. Preference given to one who could extend and introduce business. A very liberal salary and share of profits would be offered to one of special ability. Applications will be treated in strict confidence. Address **SPECIAL STEEL CASTINGS, ENGINEERING AND MINING JOURNAL.**

1432 WANTED.—ELECTRO-CHEMIST for work on the Pacific coast. Must be familiar with the latest advances in electrolytic manufacture of commercial products from salt. Address **PACIFIC, ENGINEERING AND MINING JOURNAL.**

1434 WANTED—THOROUGHLY COM- petent draftsman, familiar with designing steel buildings, roofs and columns, to take charge of office. Must understand how to handle men to good advantage. None others need apply. State where employed, remuneration required, and give full copies of recommendations. Address Box 22, **ENGINEERING AND MINING JOURNAL.**

1435 WANTED—A MINING MACHINERY salesman. State experience, age, salary desired, etc. Address **SALESMAN, ENGINEERING AND MINING JOURNAL.**

1436 WANTED—A CHEMIST PRACTI- cally familiar with the manufacture of petroleum products. Address **PARAFFINE, ENGINEERING AND MINING JOURNAL.**

1437 WANTED—ASSAYER AND ASSIST- ant chemist, by a firm of refiners of the precious metals, near New York City. Address **REFINERS, ENGINEERING AND MINING JOURNAL.**

1438 WANTED—AN EXPERT PROS- pector to take charge of an expedition to the Orinoco country in South America. One thoroughly familiar with mineral-bearing, especially gold-bearing ores, and with experience and training to qualify him to take three or four men from the company's headquarters, which are to be established on the Orinoco, and thoroughly explore the interior. The company intends leaving New York near the middle of February, taking their boats and supplies with them. None but a first-class man need apply, and preference will be given to one understanding Spanish. The necessary expenses of traveling will be paid and reasonable compensation given in stock of the company at its cash value. Address, with references, qualifications, etc., **ORINOCO, ENGINEERING AND MINING JOURNAL.**

1439 WANTED—A PRACTICAL ME- chanic, to have charge of large twisting and compressing machinery, and also supervise machine shop, at an iron ore mine in Michigan. Must be a draftsman. Address **A., ENGINEERING AND MINING JOURNAL.**

1440 WANTED—CHEMIST FOR LABO- ratory of iron mine in Michigan. State qualifications and references and also salary required. Address **C., ENGINEERING AND MINING JOURNAL.**

SITUATIONS WANTED.

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

A THOROUGH BOOKKEEPER AND competent Office Manager, a Spanish scholar, having many years' experience in Latin America, is open for engagement. Address **COMPETENT, ENGINEERING AND MINING JOURNAL.** No. 17,363, March 7.

POSITION BY MAN OF GOOD ADDRESS and habits, age 33. Has been with leading firms 15 years as machinist, draftsman and foreman. Competent to fill position of trust. Address **H., ENGINEERING AND MINING JOURNAL.** No. 17,364, March 21.

WANTED BY COAL EXPERT AND MIN- ing Engineer, now in private practice, position as Mining Superintendent. Last charge mines of 2,000 tons daily capacity. All references from large companies. Through in all departments. Go anywhere. **J. MCKENZIE, 1198 San Antonio street, El Paso, Texas.** No. 17,365, March 7.

SITUATION WANTED—BY AN EXPE- rienced graduate mining engineer. Metal and bituminous coal mining. Best references. Address **THEO ENGINEERING AND MINING JOURNAL.** No. 17,359, March 21.

A YOUNG CHEMIST AND ASSAYER, with thorough and practical business education, desires position where hard work and efficiency will insure promotion. Experienced in surveying, keeping of mine accounts, etc. North or West preferred. Address **ASSAYER, ENGINEERING AND MINING JOURNAL.** No. 17,351, March 14.

GRADUATE MINING ENGINEER AND chemist desires position. Eleven years' successful experience in the economical management and development of mining properties and the milling of ores by amalgamation and cyanide process. Understands Spanish. Best of references. Address **COLORADO, ENGINEERING AND MINING JOURNAL.** No. 17,323, Feb. 22.

MINING ENGINEER, of 20 years' experience in gold and silver exploration, mining, and milling, desires to change location. No objection to foreign countries or the Tropics. Ten years as superintendent and general manager. Familiar with amalgamation, leaching and concentration. Speaks Spanish. New York and Chicago references. Address **MINING, ENGINEERING AND MINING JOURNAL.** No. 17,358, Feb. 29.

Contracts Open.

TREASURY DEPARTMENT, Office Super- vising Architect, Washington, D. C., February 12, 1896. —Sealed proposals will be received at this office until 2 o'clock p. m. on the 11th day of March, 1896, and opened immediately thereafter, for all the labor and materials required for furnishing and erecting complete one electric passenger elevator, including electric elevator engine, car, guides, wire screen work, bestwick folding gates, etc., for the U. S. Custom House and Post Office Building at New Haven, Conn., in accordance with drawings and specification, copies of which may be had at this office or at the office of the Custodian at New Haven, Conn. Each bid must be accompanied by a certified check for \$150. 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 enclosed in envelopes, sealed and marked "Proposal for Furnishing and Erecting Complete One Electric Passenger Elevator in the U. S. Custom House and Post Office Building at New Haven, Conn.," and addressed to **WM. MARTIN AIKEN, Supervising Architect.** Orig.

TREASURY DEPARTMENT, Office Super- vising Architect, Washington, D. C., February 10, 1896. —Sealed proposals will be received at this office until 2 o'clock, p. m. on the 6th day of March, 1896, and opened immediately thereafter, for all the labor and materials required for the low pressure, return circulation, steam heating and ventilating apparatus for the U. S. Post Office building at Roanoke, Virginia, in accordance with drawings and specification, copies of which may be had at this office or at the office of the Superintendent at Roanoke, Virginia. Each bid must be accompanied by a certified check for \$100. 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 enclosed in envelopes, sealed and marked "Proposal for the Heating and Ventilating Apparatus, etc., for the United States Court House and Post Office Building at Wilmington, Del., and addressed to **WM. MARTIN AIKEN, Supervising Architect.** Orig.

TREASURY DEPARTMENT, Office Super- vising Architect, Washington, D. C., February 10th 1896. —Sealed proposals will be received at this office until 2 o'clock p. m. on the 3d day of March, 1896, and opened immediately thereafter, for all the labor and materials and fixing in place complete the low pressure, return circulation, steam heating and ventilating apparatus, elevator power boiler, etc., for the United States Court House and Post Office Building at Wilmington, Del., in accordance with the drawings and specification, copies of which may be had at this office or the office of the Superintendent at Wilmington, Del. Each bid must be accompanied by a certified check for the sum of one hundred and fifty dollars (\$150). The right is reserved to reject any or all bids, and so 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 for opening will be returned to the bidders. Proposals must be enclosed in envelopes, sealed and marked "Proposal for the Heating and Ventilating Apparatus, etc., for the United States Court House and Post Office Building at Wilmington, Del., and addressed to **WM. MARTIN AIKEN, Supervising Architect.** Orig.

PUMPING ENGINE.—Notice is hereby given that sealed tenders addressed to the "Chairman of the Board of Administration," and endorsed "Tender for Pumping Engine," will be received by registered post only until February 27th, for one compound duplex pumping engine having a daily capacity of 500,000 imperial gallons, with independent condenser and necessary boiler, the whole to be set up on foundations provided by the city, and delivered in working order as per plans and specifications, which may be seen at the office of the City Engineer on and after Monday next, the 10th February inst. A deposit, cash or marked check, payable to the order of the City Treasurer, equal to 2 1/2 per cent. of the amount of the contract (which will be returned to the unsuccessful tenderers as soon as the contract is awarded, and to the successful tenderer upon the proper execution of the contract by himself and his sureties), must accompany each tender, or the same will not be entertained. Each tender must bear the signatures of two satisfactory sureties, who will be required to sign a bond for the proper fulfillment of the contract. The lowest or any tender not necessarily accepted.—**DANIEL LAMB, Chairman Committee on Works, City Hall, Toronto.**

BRIDGE SUBSTRUCTURE.—Sealed proposals will be received at the office of the Board of Administration, Cincinnati, Ohio, until March 2d, A. D. 1896, for the building of the masonry substructure for the bridge over Florence avenue, from Gilbert avenue to Kenton street, making the necessary excavation and building masonry pier, abutments and approach walls, in accordance with specifications on file in the office of the Board of Administration and plans on file in the office of the Chief Engineer of the Board of Administration. The Board reserves the right to reject any or all bids. Bidders must indorse their names on the outside of the envelopes containing their proposals. Each bid must be accompanied by two disinterested sureties, or a certified check in lieu of sureties. Bidders will use printed forms, as none others will be received.—**AUG. HERMANN, President; A. P. BUTTERFIELD, Clerk.**

STEEL BRIDGE.—Sealed proposals will be re- ceived at the office of the Board of Administration, Cincinnati, O., until March 2, A. D. 1896, for the construction of the steel superstructure of a bridge over Florence avenue from Gilbert avenue to Kenton street, furnishing all necessary labor and materials and paving the roadway and sidewalks with asphalt, in accordance with specifications on file in the office of the Board of Administration and plans on file in the office of the Chief Engineer of the Board of Administration. The work herein advertised consists of: 2 plate girder spans of 60 ft. long each; 1 plate girder span 90 ft. long; 1 plate girder span 75 ft. long; 70 in. ft. of band railing on masonry approaches; the total length of the bridge is 285 ft.; width of roadway in the clear, 32 ft. Width of sidewalks in the clear, 8 ft. The Board reserves the right to reject any or all bids. Bidders must indorse their names on the outside of the envelopes containing their proposals. Each bid must be accompanied by two disinterested sureties, or a certified check in lieu of sureties. Bidders will use printed forms, as none others will be received.—**AUGUST HERMAN, President; A. P. BUTTERFIELD, Clerk.**

CEMENT.—U. S. Engineer Office, Charleston, S. C.—Sealed proposals for furnishing and delivering 10,000 to 15,000 barrels American Natural Cement will be received here until March 9th, 1896, and then published or opened. Information furnished on application.—**FRED ERIC V. ABBOT, Capt. Engrs.**

The American Fertilizer.

An illustrated magazine, devoted to fertilizer manufacturing, phosphate mining, packing house fertilizer products, cotton seed meal production, fish scrap industry, and all matters dealing directly with modern fertilizing science and practice.

THE AMERICAN FERTILIZER

is the official press representative of all the Associations in its field; it is the only journal specially devoted to these industries. Subscription, United States and Canada, \$2 per year; Foreign, \$2.50.

THE AMERICAN FERTILIZER,
Philadelphia, Pa.

P. O. Box 2068, Station A.

THE ENGINEERING AND MINING JOURNAL									
ADVERTISING RATES. (NONPAREIL MEASUREMENT.)									
	Lines.	Inches.	Regular Edition 1 time.	One Month 4 times.	Three Months 13 times.	Six Months 26 times.	Nine Months 39 times.	Twelve Months 52 times.	
1/4 Column.	6	1 1/2	\$2	\$5	\$12	\$20	\$28	\$34	\$47
	9	2 1/4	3	8	20	35	47	60	79
	12	3 1/4	4	11	29	50	68	87	113
	15	4 1/4	5	14	38	66	89	113	148
	18	5 1/4	6	17	46	79	108	137	181
	21	6 1/4	7	19	50	86	117	149	196
	24	7 1/4	8	20	54	93	125	161	204
	27	8 1/4	9	21	58	100	135	172	224
	30	9 1/4	10	23	61	106	143	183	234
	33	10 1/4	11	24	65	112	151	194	244
1/2 Column.	6	3 1/2	\$3	\$7	\$15	\$26	\$34	\$43	\$58
	9	5 1/4	4	10	24	42	55	71	93
	12	7 1/4	5	13	32	57	75	96	125
	15	9 1/4	6	16	39	73	96	125	164
	18	11 1/4	7	19	46	88	115	150	193
	21	13 1/4	8	22	53	101	133	174	222
	24	15 1/4	9	25	60	114	151	195	251
	27	17 1/4	10	28	67	127	169	222	280
	30	19 1/4	11	31	74	140	187	243	309
	33	21 1/4	12	34	81	153	205	264	338
3/4 Page.	6	10 1/2	\$4	\$10	\$20	\$34	\$43	\$55	\$73
	9	15 3/4	5	15	30	51	66	84	110
	12	21 1/4	6	20	40	68	88	112	146
	15	27 1/4	7	25	50	84	109	141	184
	18	33 1/4	8	30	60	100	130	169	222
	21	39 1/4	9	35	70	114	149	198	251
	24	45 1/4	10	40	80	128	168	222	280
	27	51 1/4	11	45	90	142	187	243	309
	30	57 1/4	12	50	100	156	206	264	338
	33	63 1/4	13	55	110	170	225	285	367
1 Page.	6	21 1/2	\$5	\$12	\$24	\$40	\$51	\$65	\$85
	9	32 1/4	6	18	36	60	77	99	129
	12	43 1/4	7	24	48	80	103	133	175
	15	54 1/4	8	30	60	100	130	169	222
	18	65 1/4	9	36	72	120	156	206	264
	21	76 1/4	10	42	84	140	180	222	280
	24	87 1/4	11	48	96	160	206	264	338
	27	98 1/4	12	54	108	180	231	285	367
	30	109 1/4	13	60	120	200	251	309	396
	33	120 1/4	14	66	132	220	280	338	425
1 1/2 Page.	6	32 1/2	\$6	\$14	\$28	\$46	\$58	\$73	\$95
	9	48 1/4	7	21	42	70	89	113	148
	12	64 1/4	8	28	56	93	120	154	199
	15	80 1/4	9	34	68	110	141	181	234
	18	96 1/4	10	40	80	130	169	214	277
	21	112 1/4	11	46	92	150	195	243	309
	24	128 1/4	12	52	104	170	222	280	352
	27	144 1/4	13	58	116	190	243	309	396
	30	160 1/4	14	64	128	210	264	338	425
	33	176 1/4	15	70	140	230	285	367	464
2 Page.	6	43 1/2	\$7	\$16	\$32	\$52	\$66	\$83	\$107
	9	64 1/4	8	22	44	74	94	121	158
	12	85 1/4	9	28	56	93	120	154	199
	15	106 1/4	10	34	68	110	141	181	234
	18	127 1/4	11	40	80	130	169	214	277
	21	148 1/4	12	46	92	150	195	243	309
	24	169 1/4	13	52	104	170	222	280	352
	27	190 1/4	14	58	116	190	243	309	396
	30	211 1/4	15	64	128	210	264	338	425
	33	232 1/4	16	70	140	230	285	367	464
Full Page.	6	54 1/2	\$8	\$18	\$36	\$58	\$73	\$91	\$117
	9	81 1/4	9	24	48	80	103	133	175
	12	108 1/4	10	30	60	100	130	169	222
	15	135 1/4	11	36	72	120	156	195	243
	18	162 1/4	12	42	84	140	180	222	280
	21	189 1/4	13	48	96	160	206	264	338
	24	216 1/4	14	54	108	180	231	285	367
	27	243 1/4	15	60	120	200	251	309	396
	30	270 1/4	16	66	132	220	280	338	425
	33	297 1/4	17	72	144	240	309	367	464

Front page, double regular rates. Back outside page, 80 per cent. above regular rates. Page facing editorials, 50 per cent. above regular rates. Page facing market reports, 25 per cent. above rates. Inside front cover, 50 per cent. above regular rates. Inside back cover 25 per cent. above regular rates.

LANDS AND MINES FOR SALE.

GOLD MINES FOR SALE.

WE have some splendid propositions for you on dividend paying gold mines in Cripple Creek and Gilpin County districts. Investigate.

THE CLARK LAND & MINES CO.,
Room 10, Opera House Block, Denver, Colo.

GOLD MINES FOR SALE

For full particulars address

CHARLES D. POSTON, Phoenix, Arizona.

GOLD MINES FOR SALE

On Pacific Coast. Correspondence solicited.

J. F. CROSETT,

No. 628 Sacramento St., San Francisco, Cal.

California Gold Properties.

Party in conjunction with a miner of forty years' experience on California's mother lode wishes to establish connections with responsible Boston, Chicago, New York and London correspondents for the purpose of getting capital interested for actual development of first class gold mines, water and power properties.

With opportunities at hand am in a position to obtain gilt edge properties to offer.

Liberal terms will be made with parties who can negotiate capital for above purposes.

No propositions for Stock Board speculation entertained.

Address, with particulars and references, MINING, Room 5, 405 Front Street, San Francisco, Cal.

FOR SALE.

Manufacturing Sites, New York Harbor—Large blocks with bulkhead water front, on Newtown Creek, accessible to seagoing vessels. S. B. SCHIEFFELIN, e. o. w. 353 Madison Ave., New York

MACHINERY AND SUPPLIES FOR SALE.

FOR SALE.

The following selected second-hand steel T-rails:

- 500 tons 60-lb., Western New York delivery.
- 1,000 " " Eastern New York delivery
- 60 " " Baltimore delivery.

ROBINSON & ORR,

No. 419 Wood St., PITTSBURGH, PA.

JUST PUBLISHED.

ECONOMIC MINING.

A PRACTICAL HANDBOOK.

By C. C. WARNFORD LOCK, M. I. M. E.

PRICE \$5.00.

SPON & CHAMBERLAIN, 12 Cortlandt St., N. Y.

Established 1860.

THE COLLIERY GUARDIAN

AND JOURNAL OF THE COAL AND IRON TRADES.

Published every Friday in London, England, by the Colliery Guardian Co., Ltd. Per annum, post free, to U. S. A. and Canada, \$1 7s. 6d., or \$6.00.

THE RECOGNIZED ORGAN OF THE COAL AND IRON TRADES.

H. KIRBY ATKINSON, F. G. S., Manager.

Offices: Essex St., Strand, London, W. C.

WANTED

Volume 37—Engineering and Mining Journal.

ADDRESS

THE SCIENTIFIC PUBLISHING COMPANY,

253 Broadway, New York.

WATER COLOR DRAWINGS FOR SALE.

Six exquisite water color landscapes by D. Fowler. Handsomely framed—three in gold and three in gold and white. These paintings can be seen at the "Visitor's Headquarters" of the ENGINEERING AND MINING JOURNAL. Address . . .

ARTIST, care of Engineering and Mining Journal,

253 BROADWAY, NEW YORK.

MISCELLANEOUS WANTS.

WANTED—To purchase, or lease on royalty, Virgin Placer Ground, suitable to work dredging system. No water head required, only sufficient water necessary to float a flat-boat. Sand bars, shallow lakes, river beds, etc. Value of gravel must be assured rich and free from large boulders. Give exact location, full details, amount of water and value per cubic yard. Address L. J. BUCHANAN, Kansas City, Mo.

WANTED—A process to treat fine or powdered raw Mineral Ores, such as Messaba, Iron Sand, Flue Dust and Wad Manganese, eliminating water, chemically combined moisture and organic matter, concentrating the ore to a matte. Communications or interview strictly confidential. Address "REVERSED DRAFT," P. O. Box 716, New York.

DIVIDENDS.

GOLD COIN MINES COMPANY (CENTRAL CITY, GILPIN COUNTY, COLORADO).
Office 53 Broadway, Room 34, New York, February 17th, 1896.
A dividend of ONE AND ONE-HALF PER CENT. has this day been declared upon the capital stock of this Company, payable at their office, No. 53 Broadway, New York, on March 16th, 1896, to stockholders of record of February 29th, 1896. Transfer books will be closed on the 29th inst. and reopened March 17th. J. A. EDWARDS, Sec etary.

HOMESTAKE MINING COMPANY.

MILLS BUILDING, 15 Broad St.,

New York, Feb. 15, 1896.

DIVIDEND NO. 211.

The regular monthly dividend, TWENTY-FIVE (25) CENTS PER SHARE has been declared for January, payable at the office of the company, San Francisco, or at the transfer agency in New York, on the 25th inst. Transfer books close on the 20th inst.

LOUNSBERY & CO., Transfer Agents.

ONTARIO SILVER MINING COMPANY.

MILLS BUILDING, 15 Broad Street,

NEW YORK, February 17th, 1896.

DIVIDEND NO. 199.

A dividend of TEN (10) CENTS PER SHARE has been declared, payable at the office of the company, San Francisco, or at the transfer agency in New York, on the 29th inst. Transfer books close on the 25th inst.

LOUNSBERY & CO., Transfer Agents.

NOTICE OF ASSESSMENT.

(Civil Code of California.)

BULWER CONSOLIDATED MINING COMPANY.

Location of Principal Place of Business, San Francisco, California.

Location of Works, Bodie, Mono County, California.

Notice is hereby given that at a meeting of the Board of Directors, held on the third day of February, 1896, an assessment No. 12 of five (5) cents per share was levied upon the Capital Stock of the Corporation, payable immediately in United States Gold Coin, to the Secretary, at the office of the Company, Room 35, Nevada Block, No. 309 Montgomery street, San Francisco, California, or to the Farmers' Loan & Trust Company, Nos. 20 and 22 William street, New York.

Any stock upon which this assessment shall remain unpaid on the 11th day of March, 1896, will be delinquent, and advertised for sale at public auction; and unless payment is made before, will be sold on Friday, the 31 day of April, 1896, to pay the delinquent assessment together with the cost of advertising and expenses of sale.

By order of the Board of Directors,

J. E. JACOBUS, Secretary.

Office: Room 33, Nevada Block, No. 309 Montgomery street, San Francisco, California, and Nos. 20 and 22 William street, New York.

NOTICE.

Mr. LEO VON ROSENBERG returned from Colorado on the 21st, and may be seen at his office, No. 35 Broadway, New York City.

MINING.

Reports, Maps and Prospectuses prepared of mining properties. Examinations made and advice given in mining matters. Mining properties prepared for presentation in the Eastern and European markets. Sales negotiated.

ORGANIZED APRIL 12, 1842.

THE MUTUAL LIFE INSURANCE CO. OF NEW YORK.

RICHARD A. McCURDY, President.

Insures every approved description of Life and Endowment Policies on terms as favorable as those of any other company. Cash Assets, \$204,638,783.96.

Received Too Late for Classification.

A COMPETENT CHEMIST AND ASSAYER desires position, either in the United States, Mexico or South America. Has a knowledge of Spanish. Can furnish best of references. Address T. M., ENGINEERING AND MINING JOURNAL, No. 17,367, March 14.

POSITIONS VACANT.

Continued from Page 18.

U. S. CIVIL SERVICE COMMISSION WILL hold an examination at New York City and Philadelphia on the 28th inst., for the positions of map printer and engraver in the Geological Survey. The subjects of each of the examinations will be confined to spelling, penmanship, copying and arithmetic, including simple fractions. No person will be examined for either of these positions who has not thoroughly mastered the business of map printing or engraving. Applicants must show that they have had at least six years' experience, and at least three years as journey-men. Applicants for the map printer must be specially qualified as lithographic steam pressman in color work. The salary will not exceed \$3.40 per diem. Applicants for engraver must be thoroughly competent copper-plate engravers, especially qualified in the map work of the Survey. The salaries of engravers range from \$3 to \$5 per diem, according to ability.

Requests for application blanks and other information should be made to the U. S. Civil Service Commission, Washington, D. C., which will also furnish specimen work, etc., required of engravers.

UNITED STATES CIVIL SERVICE COMMISSION will hold an examination, commencing at 9 a. m., on March 10th, to fill a vacancy in the position of topographic draftsman in the United States Coast and Geodetic Survey at a salary of \$900 per annum. The subjects of the examination will be letter writing, geography, scale drawing, geographic projections and mathematics (algebra, arithmetic and geometry). Persons desiring to compete should write to the Civil Service Commission for an application blank and file their applications at once. Arrangements may be made to give the examination at some of the large cities outside of Washington if there are applicants.

CONTRACTS OPEN.

Continued from Page 18.

DAM, ETC.—SEALED PROPOSALS, MARKED "Proposals for Building Dam," will be received by the Town Clerk until the 25th day of February, A. D., 1896, for the building of a dam and public road in Butler Township, Schuylkill Co., Pa. Plans and specifications can be examined in the office of the Town Clerk, Frank Rentz, Centre street, Ashland, Pa. Specifications will be mailed on application. By order of the Town Clerk, ABEL M. WATTS, H. F. BRIGHT, FRED. KRAPP, Water Committee.

WATER-WORKS AND ELECTRIC LIGHT plant.—Sealed bids will be received by the undersigned up to April 2d, 1896, for the erection or construction of a combined system of water-works and electric lights for the city of Dublin, Va., in accordance with the survey and plans now in the hands of the City Clerk of Dublin. Specifications and drawings will be furnished bidders at a cost of \$11 one dollar each. Work to commence on said plants by May 1, and must be completed by September 1, 1896. For further particulars apply to the Chairman or to Jno. D. Prince.—N. B. BAUM, Chairman.

CIVIL SERVICE EXAMINATIONS.—On Tuesday, February 25th, the United States Civil Service Commission will hold the examinations in New York City and Philadelphia of candidates for positions as map printers and engravers in the United States Geological Survey Department. The subjects of examinations will be spelling, penmanship, arithmetic and copying. Examinations will shortly be held for the positions of computers, transitmen and topographical draftsmen. Application blanks may be secured and filed now. These candidates will receive due notice of examination. S. WILLIAM BRISCOE, Secretary, New York City Civil Service Boards, New Criminal Court Building, New York.

FRED. F. HUNT,
77 Pine St., New York,
ANALYST AND ASSAYER.
Weighing, Sampling and Assaying of Ores, Mattes,
Lead Bullion and all Mineral Products.

STUDENTS
Instruction in Assaying, Chemistry and
Mineralogy for Business Men.
SIMONDS & WAINWRIGHT,
CHEMICAL & MINING ENGINEERS & ANALYSTS.
Laboratories, 20 Platt St. (cor. of Gold), New York.
Assays, Analyses, Experimental Research and Consultation.

NICKEL
GRAIN—for Anodes, German-
Silver and Steel.

THE CANADIAN COPPER CO.,
201 Perry-Payne Bldg., Cleveland, O.

THE BRIDGEPORT COPPER CO.
BRIDGEPORT, CONN.
Refiners of Copper. . . .
Argentiferous Material treated
on favorable terms.
Advances Made on Consignments . . .



If you visit New
York City, call at
the headquarters
of the Mining
Industry—at the
office of the Engineering and
Mining Journal, 253 Broadway,
New York—you will find your
home paper on file there.

THE AMERICAN METAL CO.
LIMITED,
80 Wall Street (P. O. Box 957), NEW YORK.
Security Building, ST. LOUIS, MO.
COPPER, COPPER ORES AND MATTES, TIN, LEAD,
SPELTER, ANTIMONY, NICKEL, ALUMINUM.
ADVANCES MADE ON CONSIGNMENTS.
Agents for Henry R. Merton & Co., London, Birmingham
Manchester and Glasgow; Metallgesellschaft, Frankfurt-on-
Main; Williams, Foster & Co., Ltd., Swansea, Eng.; Societe
le Nickel, Paris, France; Balbach smelting & Refining Co.,
Newark, N. J.

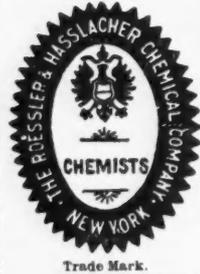
THE ORFORD COPPER CO.
COPPER SMELTERS

Works at Constable's Hook, N. J., opposite New
Brighton, Staten Island, Copper Ore, Mattes, or Bullion
purchased. Advances made on consignments for refin-
ing and sale. Specialty made of Silver-
Bearing Ores and Mattes.

SELL
INGOT AND CAKE COPPER.
President, **ROBERT M. THOMPSON,**
Office, 27 to 39 Wall Street, New York.

LAMBERT'S WHARFAGE CO.,
Prince of Wales Dock, SWANSEA.
Ores, Mattes, Regulus and Bars Received and
Prepared for Market.
Copper, Lead, Tin, Spelter and Pig Iron Received
Weighed and Sampled and Warrants
issued against same.
N. B.—Warrants are on the Accepted List of the London
Metal Exchange.
Regular lines of Steamers from America, Europe, etc.
Consign Goods to Lambert's Cranes,
Prince of Wales Dock, Swansea.

Advertising not only brings trade; it
directs trade, it creates trade.



CYANIDE
OF POTASH,
Ferricyanide of Potash,
Peroxide of Sodium,
Hyposulphite of Soda,
Sulphide of Iron and all other
Mining Chemicals.
**The Roessler & Hasslacher
Chemical Co.,**
73 PINE ST., NEW YORK.
Trade Mark.

LEDOUX & CO.,
9 Cliff Street, New York.
Assayers and Engineers.
ORES, BARS, BULLION AND ALL FURNACE
PRODUCTS SAMPLED AND ASSAYED.
Public Ore Yards and Sampling Works.
ADVANCES OBTAINED ON CONSIGNMENTS. PRINCIPAL
BANKS AND METAL BUYERS ACCEPT OUR
CERTIFICATES AS FINAL.
**ASSAYERS BY APPOINTMENT TO NEW
YORK METAL EXCHANGE.**

RICKETTS & BANKS,
104 JOHN ST., NEW YORK.
ORES TESTED.

Complete Ore Milling and Testing Works
for making practical working tests of ores to determine
the Best Method of Treatment. Milling, Metal-
lurgical and Chemical Processes investigated.

ASSAYS AND ANALYSES.
Assayers by appointment to New York Metal Exchange.

JAMES & SHAKSPEARE,
ENGLAND.
1 Metal Exchange Buildings, London, E. C.,
AND
17 Irwell Chambers West, Liverpool, Eng.

METALS, MATTES AND MINERALS.
Cable Address, METALLURGY, LONDON.
Use A B C Code, 4th Edition.

HENRY BATH & SON,
London, Liverpool and Swansea,
BROKERS.
All Description of

Metals, Mattes, Etc.
Warehouses, Liverpool and Swansea.
Warrants Issued under their Special Act of
Parliament.
NITRATE OF SODA.
Cable Address: BATHOTA, LONDON.

VIVIAN, YOUNGER & BOND,
117 Leadenhall St., London, E. C.

Copper, Tin, Lead, Spelter, Antimony, Silver
Bullion and all kinds of metals.
Best terms for Copper Mattes, Lead and Silver
Ores, Silver-Lead Bullion, Etc., Etc.
Tinplates, Galvanized Iron, Railway Material,
Etc., Etc.
Cable Address: "BOND," London.
Telegraph Codes Used: Bedford McNeill's
A B C 4th Edition, Moreing & Neal's.

BALTIMORE
COPPER SMELTING AND ROLLING COMPANY
(The Baltimore Copper Works),
Office: KEYSER BUILDING,
BALTIMORE, MD.
Ingot Copper. Sheet Copper.

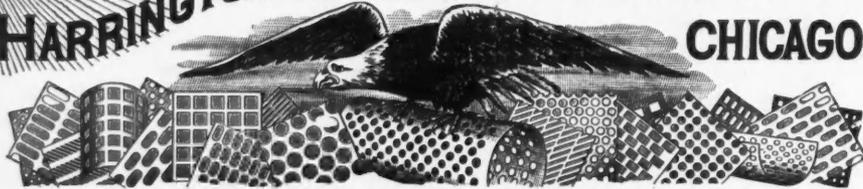
LEWISOHN BROTHERS,

P. O. Box 1247. 81 and 83 FULTON STREET, NEW YORK.

Advances made on Copper, Matte and Ores.

Agents for the following Mining Companies: Boston & Montana C. C. & S. Mining Co.
Tamarack Mining Co.; Butte & Boston Mining Co.; Osceola Consolidated Mining Co.
Arizona Copper Co., Ltd.; Kearsarge Mining Co.

THE HARRINGTON & KING PERFORATING CO.
CHICAGO.



METALS PERFORATED AS REQUIRED.
FOR MINING SCREENS OF ALL KINDS.
FOR USE IN
MILLING AND MINING MACHINERY. COAL AND ORE SCREENS,
REDUCTION AND CONCENTRATING WORKS. STAMP BATTERY SCREENS,
WOOLEN, COTTON, PAPER AND PULP MILLS. BRICK AND TILE WORKS, FILTERS,
RICE, FLOUR AND COTTONSEED OIL MILLS. SPARK ARRESTERS, GAS AND WATER WORKS,
SUGAR AND MALT HOUSES. OIL, GAS AND VAPOR STOVES,
DISTILLERIES, FILTER PRESSES. COFFEE MACHINERY, ETC., ETC.
STANDARD SIZES PERFORATED TIN AND BRASS ALWAYS IN STOCK.
Main Office and Works, 222 to 240 N. Union St., Chicago, Ill., U. S. A.
Eastern Office, No. 284 Pearl St., New York.

HIGH GRADE HOISTING ENGINES AND DRUMS.

We have some of the heaviest plants in the world in Iron, Copper and Silver Districts of United States.

OUR **CORLISS ENGINES ARE DESIGNED EXPRESSLY FOR HOISTS.**

Cable Address: "BULLOCK"

OTHER SPECIALTIES.

Diamond Core Drills.
Rock Drills and Air Compressors.

DENVER BRANCH:
925 17th Street.

M. C. BULLOCK MFG. CO.,
1170 W. LAKE STREET, CHICAGO, U. S. A.