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Illustrated.

Table listing various sections like 'Personal', 'Obituary', 'Societies and Technical Schools', 'Industrial Notes', 'Trade Catalogues', 'Machinery and Supplies', 'Mining News', 'United States', 'Arizona', 'California', etc., with page numbers.

The accounts which continue to come from the Nome District in Alaska indicate that a gold-field of unusual richness has really been found there, the extent of which is not yet fully defined. The reports are making a great impression on the Pacific Coast, and the spring will probably see a rush to Northeastern Alaska of considerable proportions, though it will not approach the first rush to the Klondike.

One point in relation to the effects which the war in South Africa may have on the Transvaal gold mines has been but little noted. The great importance of the cyanide process, by which from 30 to 40 per cent. of the Transvaal gold is recovered, is well known.

The United States Supreme Court, in the so-called Addyston pipe case, has confirmed the decision of the lower courts, and holds that the combination of the corporations engaged in the manufacture of cast-iron pipe to control the trade and divide the business of the country among them was illegal.

While the decision is of importance, it does not appear that it will affect most of the trusts or combinations recently formed. The law prohibits agreements among different companies or groups of companies; but it does not appear to cover the case where one company has bought the property of a number of others for the purpose of controlling trade or manufacture.

Some reminiscences are suggested by the announcement from London that the Poorman Gold Mines, Limited, have been asking the stockholders for further capital. The company owns properties in Owyhee County, Idaho, and our readers will remember that it was originally brought to London by Van Ee and Brotherton, and that we referred to it in our editorial columns as a thing to be avoided.

Canadian laws are very strict in some respects, and they are enforced sometimes with results not at all pleasant to the offenders. It appears that in Toronto last week the managers of two companies, one a mining and the other a promoting company, were brought before the police court charged with a breach of the joint stock companies act in publishing misleading advertisements.

tisement was calculated to mislead intending buyers of stock, but only imposed the lowest penalty authorized by the law.

If such a law existed in New York and Massachusetts—or perhaps if some of our present laws could be enforced—the financial advertising pages of some New York and Boston dailies would be good ground for an active public prosecutor.

The Province of Ontario, as will be seen from the order and the accompanying papers published on another page, has decided on a new policy with relation to the nickel mines of Sudbury and the adjacent region. Hereafter no grants of nickel-bearing property will be made except on the condition that the ores obtained shall be worked and the nickel converted into metallic form and refined in the Province. Moreover, a formal request has been made to the Dominion Government to impose the export duty on nickel ores and matte which was authorized by Parliament last year, although the levying of the duty was left to the discretion of the Government. This action has been urged for some time by parties who have always resented the fact that the Sudbury ores were simply reduced to matte at the mines, the refining being done in the United States or in England. The condition required applies, of course, only to future grants, and does not affect the mines already owned and worked by the two American companies and by the English refiners; but the export duty, if imposed, will probably make some change in their plans and perhaps require the removal of their refining works to Canadian territory. The definite adoption of this somewhat narrow policy is to be regretted; but it is, perhaps, to be accepted as a natural result of the present economic policy governing our trade relations with Canada. It seems to be generally expected that the Dominion Government will comply with the Ontario request, and that the duty will be imposed.

There has been great activity lately in the Sudbury District, and nickel properties are in demand, while those readily accessible from the railroad are for the most part taken up. The principal buyer lately has been the Mond Syndicate, which ships the ores and matte from its mines to England for treatment and refining by the Mond process. The mines or claims near the railroad have been generally taken up, and those in the hands of prospectors or locators are held at high prices.

MISSOURI COAL MINES.

Through the courtesy of the State Bureau of Mines, we have received an advance statement of the coal production of Missouri for the fiscal year ending June 30th, 1899. These figures are of interest as an indication of the general course of coal output west of the Mississippi during the year, about one-half of which was a period of moderate activity, while the second half was one of large demand and increasing production. The coal mined in Missouri is given as follows, in short tons:

	1898.	1899.	Increase.	Per ct.
Tons coal mined.....	2,538,152	3,191,811	353,659	12.4
Total received for coal.....	\$3,148,862	\$3,581,111	\$432,249	14.1
Average per ton at mines.....	\$1.10	\$1.12	\$0.02	1.8

The number of mines or openings where work was carried on during the year was 369, a decrease of 8. The larger number of these, however, were small mines, as we find that there were only 114 mines which employed more than 10 men each; an increase of 1 over the preceding year. These 114 mines were the shipping mines, the other 255 being small openings operated chiefly for local trade, though their aggregate output is considerable. There were 11 new mines opened during the year, while 6 were worked out or finally abandoned. Coal was mined in 36 counties.

The increase in the average price received was small, but it showed at least some reaction in the course of prices, which has been downward for several years.

The accidents reported for two years past have been as follows:

	1898.	1899.	Changes.	Per ct.
Number of men killed.....	9	14	I. 5	35.7
Number of men injured.....	27	23	D. 4	17.4
Total casualties.....	36	37	I. 1	2.7
Tons mined per man killed.....	315,350	227,986	D. 87,364	27.7
Tons mined per man injured.....	105,117	138,774	I. 33,657	32.1
Tons mined per casualty.....	78,838	86,265	I. 7,427	9.4

Taking the highest number of men employed, there was 1 death to each 629 men; 1 man injured to each 383; and 1 casualty to each 238. The number of employees at the mines varies considerably according to the season, about one-fourth more working in winter than in summer. The total reported for the winter was 8,806, of whom 7,195 were classed as miners; showing an increase of 170 miners and 91 other workers over the preceding year. The summer report shows 6,778 employees, of whom 5,393 were miners; an increase of 399 miners and 142 others. Taking the average of the two seasons, we find that the average mined was 410 tons to each employee, or 501 tons to each miner. This shows an increase of 26 and 29 tons respectively, indicating a longer average working time.

Among miscellaneous statistics we find that 66,714 kegs of blasting powder were used last year, an increase of 5,684 kegs. There were 50 mines provided with ventilating fans, a decrease of 2 in number.

The report shows that the Missouri coal mines were generally more prosperous and active than in 1898. As they do not ship much coal to points outside of the State, this indicates an increase in local demand; a condition which obtained all through the West.

THE MISSOURI ZINC AND LEAD MINES.

Advance figures from the report of the Missouri State Bureau of Mines—for which we are indebted to the courtesy of the Bureau—give some very interesting particulars of the output of zinc and lead ores in the State for the fiscal year ending June 30th, 1899. The second half of the year under consideration was the period during which rising prices of ores directed general attention to the Missouri mines and there was an influx of prospectors, miners and buyers of property, into the region where zinc ores are chiefly produced, in the southwestern portion of the State. The lead district in the southeastern section attracted much less attention, though work was steadily carried on.

The production figures of the Bureau are as follows, the lead output, of course, including the southeastern mines as well as those in the Joplin Region. The figures are in short tons:

	1898.	1899.	Changes.	Per ct.
Shafts operated.....	661	1,001	I. 340	31.4
Tons lead ore mined.....	73,687	70,829	D. 2,858	3.7
Tons zinc ore mined.....	139,668	181,430	I. 41,762	29.8
Amount received for lead ore.....	\$3,011,093	\$3,146,237	I. \$135,179	4.5
Amount received for zinc ore.....	2,927,321	5,974,624	I. 3,047,303	104.1
Total.....	\$5,938,379	\$9,120,861	I.\$3,182,482	53.6
Av. per ton lead ore.....	\$40.23	\$44.40	\$4.17	10.3
Av. per ton zinc ore.....	21.13	34.33	13.20	62.4

The remarkable increase in the number of mines worked was in the Joplin District almost entirely. As soon as the prices of ores began to rise in 1898, work in the district began to extend. New openings were made, old ones reopened and there was a general rush for leases. The purchasing period did not begin until about the opening of 1899, when the formation of new companies to buy and hold large tracts of property began in the East. For the time this did not affect the methods of working nor the number of leases, as the new owners did not make changes in this respect as a rule. Some of them announced their intention of exploiting the deposits on a large scale, but they have not done so as yet; nor is it probable that they will begin new work on the present falling market.

The increase of 29.8 per cent. in the zinc ore output shows the degree of activity. On the other hand, there was only a small change in lead mining, and the total production of lead ores showed an actual decrease of 3.7 per cent. The rise in prices of lead ore was much less than in those of zinc ore, being only 10.3 per cent. Zinc ores showed a large increase, no less than 62.4 per cent., in average prices for the year, and the amount received for those ores was more than double that recorded in 1898. The totals of 181,430 tons of zinc ore mined, and of \$5,974,624 received for these ores were by far the largest figures ever recorded for a year.

As might be expected under these circumstances, there was a large increase in the number of persons employed in the mining industry, and the figures of the Bureau give the following comparison for the two years:

	1898.	1899.	Changes.	Per ct.
Miners employed.....	4,910	6,002	I. 1,092	22.3
Outside men.....	1,683	3,617	I. 1,934	114.9
Prospectors.....	1,016	1,378	I. 362	35.6
Total.....	7,609	10,997	I. 3,388	44.6

The most notable feature in this table is the very large increase of outside men or employees on the surface. The increase in the number of miners was larger proportionately than that in production; but this is partly accounted for by the opening of new mines, which had not become productive before the close of the year, and which would absorb the work of a considerable number of men. The increase in outside workers is out of all proportion, however, and it is quite possible that many who reported themselves or were reported under this head would be more properly classed as prospectors.

Considering the number of small mines in the State and the methods of mining in use, the proportion of accidents was not very large. The figures of the Bureau for two years are given in the following table:

	1898.	1899.	Changes.	Per ct.
Employees killed.....	29	27	D. 2	6.9
Employees injured.....	15	19	I. 4	18.8
Total casualties.....	45	46	I. 1	2.2
Tons mined for 1 man killed.....	7,357	9,343	I. 1,986	27.0
Tons mined for one man injured.....	13,335	13,277	D. 58	0.4
Tons mined per casualty.....	4,741	5,484	I. 743	15.8

Comparing the casualties with the number of men employed, we find that last year 1 man was killed for each 407 employed; 1 injured for each 579; or 1 casualty to each 239. For the preceding year the figures

were 1 to 262; 1 to 476, and 1 to 169 respectively. Last year's averages showed a marked improvement.

The zinc mine boom is just now meeting with a serious set-back. The highest prices for ores were reached after the close of the fiscal year covered by the report under consideration; but this was followed by a heavy fall which appears to be ended. At the present time top grade ore, running over 63 per cent. zinc, is selling about \$30 a ton, while ordinary grades do not average \$25. Taking the whole zinc ore region, and making necessary allowances for ores of low grade and those containing iron pyrites, the average receipts are not over \$20 a ton. They have practically fallen back to the level of 1897-98. It is true that miners managed to get along and at least make a living at those prices; but there has been an important change. Properties have been sold at high values and capitalized at much higher ones, and stockholders have been led to expect dividends. How companies capitalized on the basis of \$45 ore can be made to pay on \$20 or \$25 quotations is a question: especially when leases are thrown up, as will probably be done by many if low prices continue. There are, however, indications of an upward movement in prices.

It is evident that the Missouri zinc ore region has before it a period of retrenchment and economy. Costs of mining must be reduced and better ore-dressing plants provided in some cases, if the mines are to continue to pay. This process of retrenchment is not usually a pleasant one, but it is inevitable, and the sooner mine-owners face the condition the better for them.

The lead mines have not suffered from a fall in prices as have the zinc mines. The prices of lead and lead ores have been well maintained, and it looks as if they would stay near their present level for some time to come. The uses of spelter are not so wide nor so generally established as those of lead, and it is usually the first of the metals to find a declining market. In the present case the fall is artificial in some part; but it is hardly probable that there will be a return to the high quotations of a few months ago.

NEW PUBLICATIONS.

"The Columbia Engineer; Transactions of the Engineering Society of Columbia University, 1898-99." New York; published by the Society. Pages, 144; illustrated.

In addition to the report of proceedings and the lists of members, etc., this volume contains a number of lectures and papers on engineering subjects of local and general interest. Thus, Mr. J. V. Davies writes on Tunnels and the proposed Long Island Railroad Passage under the East River; Mr. Walter B. Snow on Mechanical Draft and its influence on steam boilers; Mr. Hiram F. Maxim on the Evolution of the Automatic Gun. Other interesting lectures were delivered by G. F. Sever, Cornelius C. Vermeule, Charles Macdonald, C. S. Aylmer-Small and Thomas Commerford Martin. The titles of the lectures and their authors will indicate the high character of the instruction which the members of the Columbia Engineering Society have received from this course of papers and lectures.

"Proceedings of the Lake Superior Mining Institute; Fifth Annual Meeting, August, 1898." Houghton, Mich.; published by the Institute. Pages, 68, with plates.

The Lake Superior Mining Institute is an active and progressive body, and we are a little surprised at receiving this volume of "Proceedings" over a year after the meeting to which it refers took place. We can only account for it by the fact that all the members, practically, have been very busily employed during the past year by the unexampled activity of the iron and copper mines of the Upper Peninsula. Besides the record of proceedings, reports, etc., this volume contains several valuable papers, including "Some Observations on Benefit Funds and their Place in the Lake Superior Iron Mining Industry," by Wm. G. Mather; "Mine Accounts," by A. G. Yungbluth; "A System of Mining Ore Bodies of Uniform Grade," by E. F. Brown; "A New Iron-Bearing Horizon in the Kewatin in Minnesota," by N. H. Winchell; "History of Exploration for Gold in the Central States," by C. W. Hall. All of these are solid and valuable papers, and, indeed, in the meetings of the Institute generally there has been surprisingly little waste of time in papers and discussions, nearly all of those presented having been instructive and of a high order.

"Some Unrecognized Functions of our State Universities." By J. B. Johnson. Madison, Wis.; published by the University of Wisconsin. Pages, 20. Price, 25 cents.

This pamphlet contains an address made by Prof. Johnson, on the occasion of his inauguration as dean of the College of Mechanics and Engineering in the Wisconsin State University. Its object is to show that the State University has not yet recognized the full measure of the services which it can and ought to render to the people, and to suggest some ways in which its usefulness can be extended. The chief points which Prof. Johnson considers are the necessity of more practical instruction, and, to a certain extent, of a greater degree of specialization in the courses. While fully recognizing the advantages of general education, he sees that there is a necessity for technical education on certain well-defined lines in which the University has been rather behind the engineering profession. Among the new courses which he suggests are the education of teachers of sanitary science, the establishment of courses in chemical engineering, the extension of the work

of the engineering schools to the education of young men employed in manufacturing industries, and a college of commerce, devoted to education in the higher branches, including the study of foreign markets, of the general course of trade, and of transportation and similar problems. These suggestions are all good, and at least one of them—instruction in chemical engineering—has often been referred to and advocated in our columns. Prof. Johnson's address is well worth reading, and its suggestions deserve careful consideration.

"A Preliminary Report on the Artesian Well System of Georgia." By S. W. McCallie, Assistant State Geologist. Atlanta, Ga.; State Printer. Pages, 214; illustrated.

This excellent monograph, which is Bulletin No. 7 of the Geological Survey of Georgia, contains a careful examination of the facts so far developed by different borings for water throughout South Georgia. It treats of the geological conditions, of the water-bearing strata, of the nature of the water supply, and other topics of local importance. The notes show that in South Georgia very few attempts have been made to obtain water by deep boring which have not been successful, while nearly all the failures can be attributed rather to mismanagement than to lack of the necessary geological conditions. There is still much to be learned about the underground water system of the Coastal plain, which constitutes the greater portion of Southern Georgia, but enough has been ascertained to warrant the statement that almost the whole of it is underlaid by previous beds which will furnish abundance of good water when pierced by the drill. The wells rarely attained the depth of 1,000 ft., the average being about 450 ft., while the strata penetrated consist generally of clay, sand and soft limestone, making the cost of constructing wells generally light.

The monograph contains a brief but compact introduction on Artesian Wells in general, the methods of boring them and the conditions of success. It then proceeds to the consideration of the main topic, the wells of South Georgia, which is divided into six heads, topography, geology of the Coastal plain, history of artesian wells in South Georgia, water-bearing strata, a list of the artesian wells and special notes by counties. There is added a short chapter on surface wells in South Georgia, and also some notes on the artesian waters in North Georgia. The structure of that part of the State lying north of the Cretaceous and Tertiary formations, and including the Crystalline and Paleozoic areas, is, geologically, unfavorable for artesian wells. Much money has been expended by various towns and cities in boring for water which might have been saved by a careful consideration or survey of the geological conditions. Mr. McCallie's work is exceedingly practical and useful in its scope, and is calculated to be of much service to the people of the State and to prevent such mistakes as has been referred to.

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.

"Transactions of the Institution of Mining and Metallurgy, London." Eighth Session, 1898-99. London; published for the Institution. Pages, 346; illustrated.

"Jahrbuch der Elektrochemie; Berichte ueber die Fortschritte des Jahres, 1898." By W. Nernst and W. Borchers. Halle, Germany; Wilhelm Knapp. Pages, 496; illustrated.

"Railroad Curves and Earthwork." By C. Frank Allen. New York; Spon & Chamberlain, and London; E. & F. N. Spon, Limited. Pages, 200; with tables and diagrams. Price, \$2.

"How to Run Engines and Boilers." Fourth Edition. By Egbert Pomerooy Watson. New York; Spon & Chamberlain, and London; E. & F. N. Spon, Limited. Pages, 160; illustrated. Price, \$1.

"Annual Report of the Mine Inspector for the Indian Territory for the Fiscal Year Ending June 30th, 1899." Luke W. Bryan, Inspector. Washington; Government Printing Office. Pages, 82; illustrated.

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 will only 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.

The Great Lakes Copper Company.

Sir: The Great Lakes Copper Company, located near Sudbury, has lately been trying a new process for treating ores, invented by one Dr. A. Graf, for which very big claims were made. The result is that this wonderful process would neither roast nor smelt the ore; while the learned Dr. Graf has disappeared from these parts and nobody really expects to see him back. The Great Lakes Company, I believe, had good enough intentions, and their local agent, Mr. Ross, is evidently a straight man. But the windy literature they have sent out had no regard to facts. The copper mine, 1,000 ft. wide and 3½ miles long, is only stained rock with seams of quartz carrying a little copper pyrites and a few dollars in gold here and there. "The Mount Nickel Mine"—what a name—is a small pocket of fairly good ore. I would not call it a mine at all; but I saw a report on it lately by a professor in Boston figuring out \$60,000,000 worth of nickel in it. It is time to stop that sort of fake work. The company has another small nickel property down the range, but 10 miles back from the railway. They may work around into legitimate mining, but must first quit blowing, get some good mines, and adopt another process for treating the ore, when they get any.

Sudbury, Ont., Nov. 30, 1899.

A.

A GRAPHITE MINE.

Written for the Engineering and Mining Journal by R. H. Palmer.

One of the finest fissure veins of graphite at present known in this country is located in the town of Cranston, Rhode Island, near the Providence line. For some years prior to 1892, it was known that graphite could be obtained in certain quantities, and of good quality at this point. In 1892 capitalists became interested, and it was decided to remove the face of the ledge of granite back to the vein itself.

At considerable expense this was done, and thousands of tons of granite and earth, comprising a mass some 60 ft. in height, and running back into the ledge from starting point, a distance of some 50 to 60 ft., by 125 ft. wide, was removed, and the vein of graphite revealed.

The buildings comprising their part of the plant, would appear to many to be on nearly the original level when going to them from the street, but the smoke-stack for the boilers, which are in a building also containing a 50 H. P. engine (while the boiler is an 80 H. P.), is below the original level of the hill-side. The hoisting-house is over the mouth of the second level. Near it is a storehouse with a run from the hoisting-house.

The hoisting power is transmitted from engine house to hoisting-house by steel cable. Looking over the run between the two highest buildings most of the ledge seen is granite. The mouth of the first drift is 67 ft. below the original surface; the drift runs in some 35 ft.

In the excavation we pass over graphite, while the vein runs very near to the surface of the ground. The foot wall, from which graphite

facture of pencils, and is especially valuable for foundry facings. Its chemical analysis gives on the average 52 per cent. of graphitic carbon, traces of oxide of iron and a little asbestos, the rest being silica.

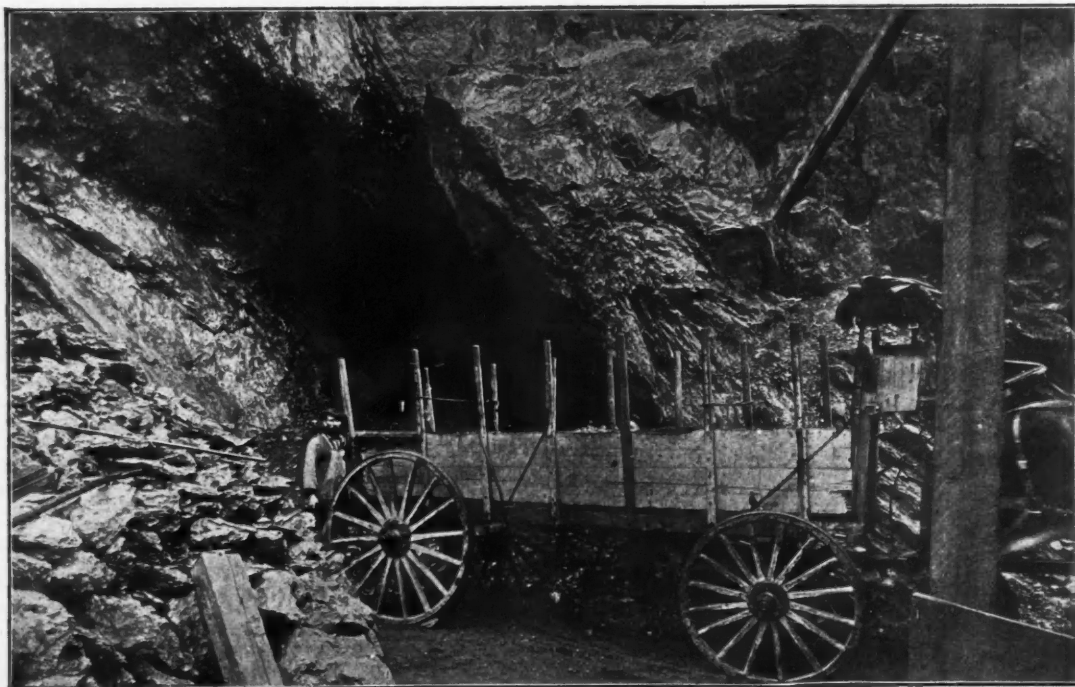
Some veins of asbestos are found running through parts of it, the thickest I have seen being some 2½ in. thick, but of no great extent. The proportion of graphitic carbon runs from 52 up to 58 per cent.

At a distance of about ½ mile from the mine a well was bored, and at a depth of 500 ft. the vein was struck.

Large quantities as it comes from the mine in the lump are shipped to western firms. It has been tested in regard to its ability to withstand fire, by being placed in a hot furnace fire and kept there for a long time, also by the use of the blow-pipe. The fire had no effect on it.

A few days ago a block weighing some 2,500 lbs. was forced out with a blast, while lumps from 500 lbs. up to nearly the above weight are common. Near the vein of graphite is a ledge of slate containing 10 to 20 per cent. of graphite, while the formation around the vein proper is largely granite. This mine is the property of the Rhode Island Graphite Company.

COAL MINING IN YORKSHIRE.—London "Engineering" says that interesting statistics have been published with regard to the coal mining industry of Yorkshire. It is stated that from 1894 to 1898, inclusive, the number of workers employed in and about mines in Yorkshire has decreased by fully 20 per cent., while the output has increased by nearly 10 per cent. The output of the county in 1894 was 23,442,174 tons, got by 90,995 men, or an average of 257½ tons per man for the year. In 1898 the output was 25,630,758 tons; men employed, 72,556; average, 353¼



OPENING AT GRAPHITE MINE, CRANSTON, R. I.

has been removed above the level on which buildings stand, runs below it at an angle of about 45°. The graphite continues, no one knows how far at present. The vein runs east and west.

Fig. 1 is a flash light photograph, taken at the end of a drift, where two of the miners are at work. As we stand facing them, we see only the vein itself, or rather we see only graphite. The vein is some 15 ft. thick, or perhaps it would be better to say, in width. On looking over some of the masses blown out by a charge of dynamite, I found a fossil of a portion of a *Lepidodendron*, and, I am informed, fossils of *Lepidodendriids*, also various kinds of ferns, such as *Pecopteris*, *Odontopteris*, *Neuropteris*, also *Calamites*, and *Asterophyllites* are found. Some of the students from Brown University are constant visitors at this mine.

The main shaft under the hoisting house is 45 ft. in depth, and about 25 ft. square. A drift 115 ft. in length extends from the mouth of the shaft; the distance between foot wall and hanging wall in this drift is anywhere from 12 to 15 ft.

In entering this second level, one accustomed to see a mine timbered remarks the absence of anything like timbering, and bracing, save for a very few feet beyond the mouth of the drift, and finds the hanging wall is nicely arched at the top. When blasting, two and three sticks of dynamite are used at a time, and huge masses are detached. At times 12 men are employed, and 15 tons of graphite are hoisted per day.

Fig. 2 gives an excellent idea of the formation of this vein, as there is no difference apparently between the production of the first and second levels in quality.

The machinery for preparing the product of the mine for market is very complete, and the graphite finds its way to crusher, dryer, pulverizer, bolts, and all prepared at the mine, is put through a bolt, made of silk 160 meshes to the square inch, and then to the barreling machine, and is handled by elevating and conveying machinery wherever possible. A part of the product is ground for paint, and is used in painting smoke-stacks, boilers, giving excellent results. A steamer's smoke-stack which required painting with some paints every trip, needed painting with this paint but once, to remain in good condition for eight trips. It is also used on all kinds of structural iron work. It is also used in the manu-

facture of pencils, and is especially valuable for foundry facings. Its chemical analysis gives on the average 52 per cent. of graphitic carbon, traces of oxide of iron and a little asbestos, the rest being silica. Some veins of asbestos are found running through parts of it, the thickest I have seen being some 2½ in. thick, but of no great extent. The proportion of graphitic carbon runs from 52 up to 58 per cent. At a distance of about ½ mile from the mine a well was bored, and at a depth of 500 ft. the vein was struck. Large quantities as it comes from the mine in the lump are shipped to western firms. It has been tested in regard to its ability to withstand fire, by being placed in a hot furnace fire and kept there for a long time, also by the use of the blow-pipe. The fire had no effect on it. A few days ago a block weighing some 2,500 lbs. was forced out with a blast, while lumps from 500 lbs. up to nearly the above weight are common. Near the vein of graphite is a ledge of slate containing 10 to 20 per cent. of graphite, while the formation around the vein proper is largely granite. This mine is the property of the Rhode Island Graphite Company.

AN OLD HOISTING ENGINE.—The *Oesterreichische Zeitschrift für Berg- und Huttenwesen* says that a hoisting engine possessing a certain amount of interest on account of its age and peculiar construction has recently been dismantled at the Heinrich shaft of the Ostrau-Karwin Montangesellschaft, Peterswald, where it had been in use since 1844. Initially employed as the principal winding engine for raising the cage from a depth of 100 m., this engine, which was built by Daniel Schmidt of Vienna, and worked with a steam pressure of 2 atmospheres, was subsequently used as a sinking engine and subsidiary winding engine in the deepening of the shaft. Even up till quite recently, when the shaft had attained a depth of 310 m., and a steam pressure of 6 atmospheres was required, this engine served for lowering material, packing, etc., into the mine, and for letting down and bringing up the miners, official permission for which service was granted on the attachment of an automatic steam brake for the prevention of over-winding. The engine was of the single-cylinder, vertical type, with a cylinder diameter of 12½ in., 27½ in. stroke, and fitted with flat valve gear, the slide valve being worked from an eccentric on the crank shaft. The motion of the piston was transmitted by a connecting rod and crank to a flywheel shaft, which, in addition to the 13-ft. flywheel, carried a cogwheel. A hand brake, actuated by a worm wheel, was mounted on the rim of the flywheel, the steam brake acting on the winding drum. Power was transmitted to the drum from the small cogwheel through a larger toothed wheel (7 ft. 10 in. in diameter) and a pair of bevel wheels, the ratio of speed being 1 : 4.98 and the maximum velocity of the cage 9.8 ft. per second. The winding drums measured 11 ft. in diameter and the head pulleys 62 in., the distance between drum and pulley being 12 ft.

NOTES ON LEAD SMELTING AND GOLD AND SILVER REFINING.*
III. SLAG SETTLING FURNACES.

Written for the Engineering and Mining Journal by Malvern W. Iles.

(Concluded from Page 669.)

This furnace must be watched closely in order to obtain the maximum efficiency. For example, the average saving for 14 days with watchful supervision showed the furnace would collect upon each ton of slag 0.41 oz. silver and 0.29 per cent. lead more than if the slag had not passed through the settler, but the savings previous to the 14 days without supervision showed a gain of 0.15 oz. silver and 0.13 per cent. lead—that is a gain in saving of 0.26 oz. silver and 0.16 per cent. lead. This saving figured on a basis of 500 tons ore smelted would of itself make a handsome profit. The foreman on each shift should watch the kind of coal, have the bars always properly cleaned, as the fire should be a remarkably steady one. For the best work, never change the temperature; find out what temperature gives the best and cleanest slag, and hold the heat at this point.

Use the old-fashioned 1 in. square or 1¼ in. square wrought-iron grate-bars; protect the bridge-wall very thoroughly with 3 in. water cooled pipes, having the piping so that in case one pipe burns out it can be shut off, but keep on running as if nothing had happened. Be sure and hold the 3-in. pipes quite low in the bridge-wall, otherwise the matte may cut through into the ash-pit; so, likewise, is there a tendency for metallic lead to seep through at this point, commingle with the ashes and be lost. The furnace foreman should take samples hourly, night and day, and these should be assayed; they should at all times watch to see that the slag shells do not enter this furnace on dumping, by carelessness. This is a very vital point.

The hopper should be made of four cast-iron plates converging to a

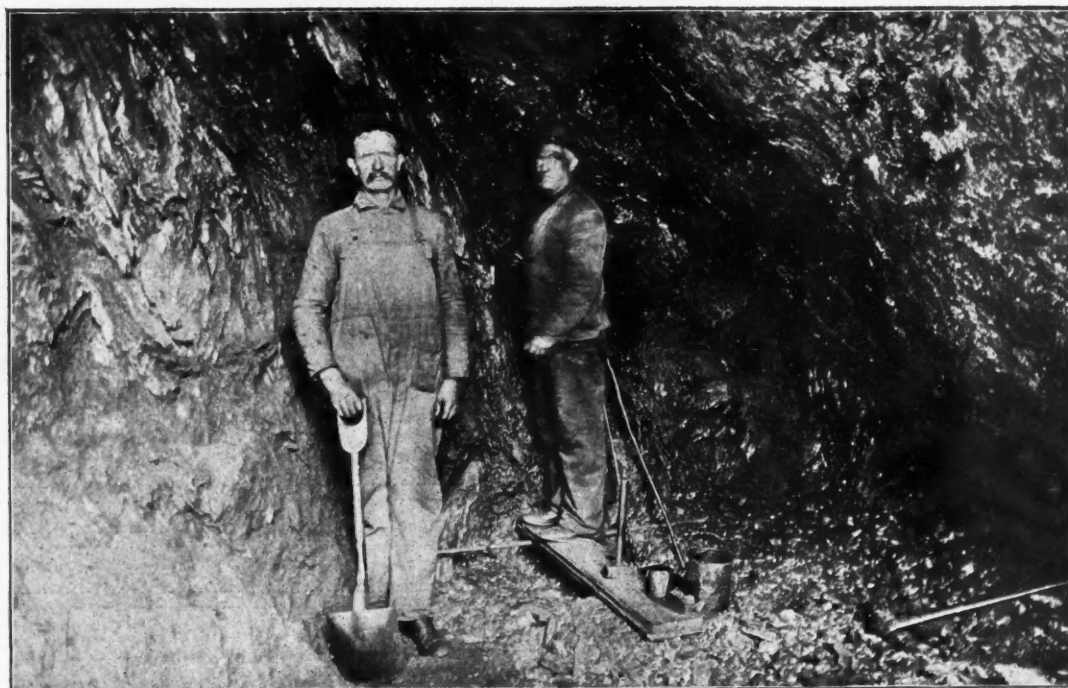
square water block, with a coil of pipe cast in the iron, and have the water tapping block very close to the matte; it is even good practice to let the block project a little through the inner furnace wall. Some little time after the matte has been tapped, shut off the water on the tapping block.

The brick of the furnace should be encased in 1¼ in. cast-iron plates, bound up with 10-in. I-beams and two 1¼-in. round rods, with heavy wrought washers to each set of I-beams.

While the extreme corners may be of red brick and a hollow space filled with sand, yet it is not economy to use too many red brick. Make the walls of fire-brick, which must be hard, strong and good; rather of a basic nature for the lead smelters, but of course for copper smelting—where the slag is more silicious than that generally made by lead smelting—no difficulty will be encountered by rapid corrosion of the walls. This corrosion takes place very rapidly when the slags are very basic, but even on a silicious slag of the lead smelter, the furnace walls are noticed to stand in direct ratio to the percentage of silica. Upon silicious slags, say running 33 per cent. and over, of silica, the furnace gives but little trouble, but on slags carrying high percentages of iron or lime, trouble will sooner or later come, unless some special kind of basic resisting fire-brick be employed.

I have used wrought-iron water jackets in the bridge-walls to prevent rapid corrosion, but was led to use wrought-iron pipes, as I found this practice far cheaper and gave rise to very much less trouble.

Mr. Robert D. Rhodes used water-jackets of wrought iron both in the bridge-wall and also curved wrought iron jackets along the side-walls of this class of furnaces at the Arkansas Valley Smelting Works, at Leadville, Colorado; and while I have also used water-jacketed pipes along the side-walls of such furnaces, yet I have abandoned this practice, as I deem it quite unnecessary, as it not only adds to the cost of the original construction, but needs more care and attention, and furthermore the loss of heat is entirely too great, and the cam-



DRIFT IN GRAPHITE MINE, CRANSTON, R. I.

hole, say, 1 ft. square at the bottom, and after each dumping the thin shell should be broken off. The shell of the hopper will, of course, fall into the furnace, but as stated, the pot shells should not so enter. The foreman must watch to see that the slag hopper be slushed over with marl or clay every time after a dumping of slag, otherwise trouble is sure to arise.

Make the breast where the slag is tapped out thin, and well in to the slag. With care it should not tap hard, but on certain kinds of zinc slags and on slags with too much lime the breast generally taps a trifle hard. Therefore, until the slag of the blast furnace changes, one should keep handy a few sticks of dry pine wood, say limbs 3 to 5½ in. diameter; point these, and when slag-pots are full, first plug with clay and then quickly force in the wooden plugs. After the men have a long training, these plugs are found to be unnecessary.

Watch that the matte does not get too high, and also watch that the furnace is not robbed of matte. Keep in the bottom always from 5 to 8 tons of molten matte. Test the depth of this matte at least two or three times per each shift. In order to do this, insert a steel bar through the arch or roof of the furnace (through a hole made for this purpose), let the bar go to the bottom, and after remaining in the matte and slag a few minutes, quickly withdraw the bar and it can at once be seen where the matte and slag joins, and the depth of the matte, plainly marked upon the bar. It took me two years to find out where in the roof of the arch was the best place to introduce the slag. I found by my experience it was a little back of the center, and reasonably close to the point where the heated gases escaped. If anything, have the hole a trifle pushed over toward the matte tap-hole, the closer the better. Tap the matte through a

paign of the furnace is necessarily shortened, particularly in the presence of much zinc in the slag. Upon exceedingly basic slags possibly water-cooled pipes along the side-walls could be used to advantage.

Mr. Alfred Ropp, of the Selby Smelter at San Francisco, has used coarse lumps of chrome iron ore and the interstices filled with finer particles of chrome ore around the walls of the furnace, for a number of cases, with marked success, particularly upon his copper matting furnaces.

I have tried chrome brick, made at Pittsburg, for lining up the inner walls of these slag settlers, but the experiment did not prove successful. So, likewise, magnesite brick have been used for this purpose. While they last longer than the ordinary fire-brick, yet their life was not so much longer as to make their use a commercial success.

I have heard of marked successes by the use of actinolite blocks for furnace linings, but the few experiments I made with this material were far from promising, and when one compares the cost of chrome brick, magnesite brick and the actinolite blocks, with a good fire-brick ranging from \$15 to \$20 per thousand, delivered at the furnace itself, I think it far wiser and better to use fire-brick, but with exceedingly heavy walls. But little radiation then takes place and the walls can withstand an enormous corrosion without stopping the furnace. The bottoms of these furnaces are always built of fire-brick, using, of course, a good convexity, so they are properly keyed into place. The mortar should not be too thick and ample time should be taken in order to form a close joint. Use a piece of 1-in. thick plank frequently for hammering the brick securely into place.

The bottom should have a pitch toward the tap hole. I have never known of any of these bottoms coming up, or even a few brick floating up from the bottom, but there is always a tendency for the bottom to

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chill, either from letting the furnace cool down too much, and there will not infrequently form a "zinc sow," composed often of practically pure sulphide of zinc, very free from any of the valuable metals, silver and gold, and also nearly free from copper or lead. This sow will grow from the bottom at that portion of the furnace where the matte and slag is most free from disturbance, and grow to a size sufficiently large to interfere with the proper workings of the furnace. In such cases, as well as where there has been a partial cooling of the slag, the only thing left to do is to "burn down the furnace"—keep drawing matte and slag from their respective tap holes until the crust projects above the level of the remaining molten material. This firing and drawing from the tap hole a mixture of matte and slag will sometimes have to continue three or four shifts or more. The mixed matte and slag are allowed to cool, broken up, and sent back to the blast furnaces. This would at first thought appear crude, but it is not only simple, but saves much money over the method of burning out the zinc crust with scrap iron, and is far cheaper than barring out or chiseling out the solidified mass.

The absorption in the bottoms of these furnaces is always large; and it is surprising what a large amount of gold, silver, lead and copper will be hid away; but this generally comes in as profits not usually considered on the book records of the office. I have tried placing the entire furnace in a large 5/16-in. thick steel pan, covering the entire bottom of the furnace. This pan was made with every precaution to insure tightness, such as double butt-joint straps, calked seams, etc.; and furthermore, the entire pan was supported on either 56 or 60-lb. railroad iron resting upon brick piers with cast-iron caps. With all of these precautions the absorption below the furnace was quite large, amounting to \$15,000 to \$30,000, according to the length of the campaign.

To make the lower bottom of the furnace of slag is bad, as the metallic lead will so seep down into the cracks so as to make one solid mass, which is difficult and expensive to dig out. Fire-brick placed far below the floor-level absorbs far more than where red-brick are used. The cheapest and the simplest way is to dig out a hole at least 6 ft. deep below the furnace bottom proper, and tamp in, layer by layer, a strong plastic clay up to 1 ft. of the furnace floor level; now make cross layers of red-brick, laid in gray-lime mortar, and upon this construct the furnace bottom. By making these clay bottoms, I find less absorption and greater ease in the removal of the furnace absorption.

I have no doubt the ultimate solution of this furnace absorption (as in all furnace bottom absorption), will consist in water-jacketing the bottom and sides, in a water-jacketed pan; or possibly, it may be only necessary to have one large single pan extending over that portion of the furnace where the absorption takes place. The furnace absorptions are exceedingly large at all lead smelters.

Some actual data obtained while operating two reverberatory slag settlers from April 22d to May 1st, 1898, is as follows: Average time allowed to settle, 49½ minutes; weight of slag, 3,715.5 tons; matte produced, 23.4 tons; coal used, cost, \$458; cost of labor, \$471; cost of settling one ton of slag, 25c.; value of matte per ton, \$74.39; total value of saving, \$1,741. The average assay of the matte caught in the settler was: Gold, 0.14 oz. per ton; silver, 99.00 oz.; lead, 14.80 per cent.; copper, 15.50 per cent.

According to actual tests, these furnaces save from \$98 to \$200 per day of 24 hours. There is an increased cost in running the slag settlers or reverberatories over the matte-box system only, but this increase is far more than compensated for by the closer saving of the silver, lead, copper and gold. For example, I will take a typical day, January 20th, 1897; on this day the following accurate figures are presented:

Labor (for Jan. 20th, 1897).....	\$30.50
Fuel (for steam and furnace).....	15.00
Wear on furnace.....	3.00
Total	\$48.50
Assay of slag for ten days (from boxes).....	Ag .95 — .65
Same from reverberatory slag settlers.....	Pb 0.65 — .48
Dif. in favor of reverberatory slag settlers.....	0.30 — 0.17

Value of silver and lead in slag at present prices is 25c. per ton. There was made January 20th, 1897, 400 tons of slag per day, which, at 25c., makes \$100. On 400 tons of slag per day, the reverberatory slag settler would produce 56 tons less slag to re-smelt at a cost of \$2 per ton smelting charge, or \$112, making a total of \$212. If now we subtract \$48.50 from the \$212, we would have \$163.50, or the saving in favor of the reverberatory slag settlers per day, as an additional saving over that by the use of the matte-box.

It has been stated that the fume given off from the slag settlers was not very rich. Experiments were made upon this product. On July 24th and 25th, 1897, a portion of the slag fume was withdrawn from the 60-ft. stack of the reverberatory slag settler, by using two connected barrels of oak, and of known capacity as an aspirator. The fume was filtered through the meshes of muslin, by using two large glass funnels, about 4 in. wide at the largest part. These funnels held the muslin firmly, by placing the large end of each funnel against the cloth and holding them firmly against the cloth by the use of electrician's sticking tape, then coating the tape with paraffine and for additional safety the funnels may then be tied securely together.

By taking the element of time into consideration, the capacity of the barrels and the number of times they were filled; together with the velocity of the gases, we were enabled to obtain qualitative results. During this experiment, all the slag which was formed daily in blast-furnaces was passed through the reverberatory upon which the test was being made. In all, 33 grams of fume were caught, which assayed as follows: Gold, trace; silver, 10.0 oz. per ton; lead, 35.2 per cent; zinc, 15.7; sulphur, 8.9; arsenic, 0.4. Based upon the price of silver and lead then prevailing, the fume would be worth \$16.33 per ton, and 115.2 tons yearly would amount to \$1,881. These figures are based upon smelting 650 tons of ore daily, and that one ton of ore will produce one ton of slag.

We made two large experiments in January, 1899, with appliances

especially constructed for these quantitative tests. The smoke was withdrawn from the top of the stack of one of the settlers, by means of a 4-in. wrought-iron pipe, extending down into the stack 2 ft.

The iron pipe was attached to a 4-in. galvanized sheet-iron pipe, after the wrought-iron had dropped down a few feet below the top of the stack. This 4-in. pipe led the smoke to a 4½-in. fan, thence into a sheet tin box 3 by 3 by 5 ft. The smoke was then filtered through a flannel bag 18 in. in diameter when distended, and about 15 ft. long, and attached by a thimble to the box. This arrangement worked admirably. Two experiments were made which checked each other closely.

Recapitulating, then, we have shown an annual loss varying in the experiments from \$532 to \$1,881. In two other experiments we found \$437 and \$223, representing the annual loss. The average of the two experiments upon which the greatest reliance can be put shows on two slag settlers there would be an annual loss of \$558, which is, of course, very small.

The slag settler is surely one of the greatest improvements which has been made in modern lead smelting. It is quite obvious that this same idea or method can be extended to other departments of metallurgy, particularly copper-smelting. This method is the safest, and to my mind the most rational of all methods.

I. Statement of Silver and Lead saved in the Hies Reverberatory Slag Settling Furnaces during 1898, at the Works of the Globe Smelter, Denver, Colo.:

Month	Tons.	Ag. oz. per ton.	Pb per cent.	Silver oz.	Lead lbs.
January	21,250	0.244	0.271	5,185	115,175
February	19,007	0.294	0.208	5,588.1	79,069
March	17,547	0.323	0.253	5,667.7	88,788
April	17,477	0.337	0.325	5,889.7	113,600
May	18,296	0.301	0.301	5,507.1	110,142
June	16,800	0.283	0.287	4,754.4	96,432
July	19,849	0.408	0.279	8,098.4	110,757
August	21,396	0.344	0.237	7,360.2	101,417
September	20,406	0.397	0.359	8,101.2	146,515
October	22,072	0.368	0.359	8,122.5	158,477
November	21,896	0.329	0.328	7,203.8	143,638
December	21,896	0.351	0.355	7,247.6	155,462
Total	237,892	Avg. 0.330	Avg. 0.300	78,725.7	1,419,472
Total value silver.....					\$45,857.72
Total value lead.....					40,880.79
Total saving.....					\$86,738.51

Statement of Silver and Lead Contents in Slag during 1898.

Month	Tons.	Ag. oz. per ton.	Pb per cent.	Silver oz.	Lead lbs.
January	21,250	.53	.39	11,262.5	163,750
February	19,007	.58	.37	11,024.1	140,652
March	17,547	.56	.41	9,826.3	143,885
April	17,477	.55	.44	9,612.3	153,798
May	18,296	.54	.39	9,879.8	142,709
June	16,800	.51	.28	8,568.	94,080
July	19,849	.56	.26	11,115.4	103,215
August	21,396	.60	.30	12,837.6	128,376
September	20,406	.59	.40	12,039.5	163,248
October	22,072	.49	.42	10,815.3	135,405
November	21,896	.46	.36	10,072.2	157,651
December	21,896	.60	.40	13,137.6	175,168
Total	237,892	Avg. .55	Avg. .37	130,190.6	1,753,937
Total values.....					\$75,836.92
Total saving.....					\$50,513.39

These two statements show a saving by the reverberatory furnaces of 37.7 per cent. of the silver and 44.7 per cent. of the lead contained in the original slag. The cost of operating these reverberatory furnaces during 1898 was as follows:

Labor.....	\$10,950
Coal.....	6,304
Repairs:	
Labor.....	\$2,226.69
Material.....	3,144.34
Total expenses.....	\$22,625
Total saving.....	\$64,113

It is entirely unnecessary to make any comment, as the figures are sufficient.

WOOD GAS.—A gas similar to that of coal is obtained when wood is distilled in a closed chamber (observed M. Letombe to the members of the Societe Industrielle du Nord de la France); but the disadvantage is that this gas requires a complicated purification. M. Riche has, however, conceived the idea of doing away with all the purifying appliances by making the gas pass over charcoal heated to redness, either operating by reversed distillation or by employing twin retorts. The gas thus obtained is comparatively rich, since it has a calorific power of about 3,000 calories per cubic meter and contains no hydrogen. Although this gas is not illuminating, it is suitable for motive power; and the method is chiefly important for regions where wood is cheap and abundant. Relying on the sale of the by-products, the makers of the Riche gas producer hope to arrive at a very low price for the horse-power, in which case wood might compete with coal; but it does not appear likely that this gas will ever be able to compete successfully with poor gas.

POWER TRANSMISSION IN NEW HAMPSHIRE.—The Manchester Electric Company has just acquired the water power and 1,000 acres of land at Garvin's Falls, 15 miles north of Manchester, N. H., and will erect at once a modern first class fireproof power house and transmit 10,000 H.-P. to the city of Manchester for the general light, power and street railway business which the company controls, says the "Electrical World and Engineer." This water power is the largest in the State, except the Amoskeag Mills' plant, and will rank among the finest in New England. It has been only partially utilized for many years. The old Garvin's Falls Power Company will still do business under its original name and charter, although owned by the Manchester Electric Company. J. Brodie Smith is superintendent of both companies, and S. Reed Anthony and Nathan Anthony of Boston are respectively president and treasurer of the Garvin's Falls Company. The new owner will offer inducements for companies to locate on its land at the falls, and also supply light and power in the villages between Concord and Manchester.

THE BERGER SOLAR ATTACHMENT FOR TRANSITS.

The accompanying illustration shows an instrument made by C. L. Berger & Sons, successors of Buff & Berger, as a modification of the Berger solar transit. With a view of reducing the weight and cost of this attachment the declination arc is dispensed with, and in its stead the latitude or vertical arc is used for setting off the declination and refraction. To attain a greater degree of precision and simplicity of manipulation the more powerful auxiliary telescope which is used with their improved mining transits for top and side observations is used in place of the solar telescope, and thus also is avoided the necessity of carrying a third telescope into the fields. The auxiliary telescope in this case, besides the usual fine crosswires, is provided with four coarse wires, equidistant from those wires forming a square which is slightly smaller than the disk of the sun, thus permitting the observer to bisect the sun's center by equal chords. The solar attachment consists of the patented equatorial adapter, A, so named because when properly adjusted to the transit it becomes the means by which the auxiliary telescope, B, can be made to revolve in the equatorial circle, or in a plane



THE BERGER SOLAR ATTACHMENT FOR TRANSITS.

parallel to the earth's equator, and of the striding level C, which when placed upon the auxiliary telescope enables it to be levelled, thus affording the means of setting off the deductions and refraction of the sun at any hour by using the vertical circle of the transit.

The equatorial adapter consists of two parallel plates provided with two leveling screws working against opposite springs. The cover plate screws upon the central part of their mining transit, which was designed to carry the auxiliary telescope when used as a top telescope. The upper plate carries the polar axis around, which moves a socket controlled by a clamp and a tangent screw carrying a level and supporting an arm in which revolves the declination axis. The screw at the end of the declination axis serves to connect firmly the solar telescope with the declination axis, which latter permits the telescope to be pointed and clamped so that it may revolve in the declination circle whether above or below the equator. The declination axis is held to the arm by a socket. The motion of the declination axis and solar telescope is arrested by a nut between the head of the screw and the arm, and adjusted by the two vertical opposing screws.

To convert the mining transit into an instrument providing equatorial motion for the auxiliary telescope, screw the adapter to the upright post, designed for the top telescope, and screw in place the counterpoise; connect the auxiliary telescope with the declination axis, and the instrument is ready for service. To make an observation for meridian, assuming that the latitude of the place is known, and the sun's declination and refraction is correctly ascertained for the day and hour, level the vernier plate, and the main telescope, with both circles set at zero. Adjust the polar axis of the adapter to be vertical, by using its level and leveling screws. Set the auxiliary telescope in the vertical plane of the main telescope by bisecting some distant object. Elevate or depress the main telescope, as the case may be, by using the vertical circle, to an angle with the horizon equal to the angle of declination and refraction for the time of observation. Use the striding level and level the auxiliary telescope, thus causing the two telescopes to represent the angle between the equatorial and the declination circle. If now the true meridian were known and the main telescope pointed in that plane, it would only be necessary to elevate the telescope at an angle above the horizon equal to the co-latitude of the place of observation to make it parallel to the earth's equator and to bisect the equatorial circle. The polar axis of the adapter will then point to the pole of the celestial sphere and the auxiliary telescope is properly set to follow the declination circle. Trial will demonstrate that if the main telescope is moved from the plane of the meridian the auxiliary telescope is no longer adjusted to revolve in the declination circle. The line of the true meridian being sought and not known, the observer elevates the main telescope at an angle above the horizon equal to the co-latitude of the place of observation, loosens the clamp of lower plate and the clamp of polar axis socket and then moves the lower plate about its vertical center, and the auxiliary telescope about the polar axis, until the latter bisects the disk of the sun. Trial will demonstrate that when the solar telescope is pointed towards the sun and follows its course the main telescope remains stationary. If it is clamped there it may be known to bisect the meridian in the equatorial circle. By releasing the clamp of the main telescope and again leveling the main telescope, it will bisect the meridian in the plane of the horizon. Unclamp the upper plate of the transit and the azimuth of any distant object from the place of observation may be measured by reading the vernier of horizontal circle.

The equatorial adapter is in part constructed of aluminum and only weighs 9 oz., so that by careful manipulation the counterpoise of the top telescope of the mining transit will be found sufficient to balance it. The auxiliary telescope is provided with a prism and colored glass shades to facilitate solar observations.

In furnishing engineers and surveyors with this device Messrs. C. L. Berger & Sons believe that it will appeal to them from its simplicity of construction, its light weight, and its general effectiveness in accomplishing a desired end converting a mining transit into an astronomical instrument.

AN ONTARIO EXHIBIT FOR PARIS.

During the past summer the Bureau of Mines has forwarded representative samples of ore from all the working mines in Ontario to the Geological Survey Department at Ottawa, for shipment to the Paris Exposition to be held in 1900. The samples consist of free-milling gold ores from the various mines and developed prospects in the Rat Portage, Seine River, Shoal Lake, Wabigoon and Manitou Districts; also from the Michipicoten, Wahnapiatae and North Hastings Districts. Iron ores, magnetites, and hematites from the Mattawin and Atikokan ranges, which will shortly be tapped by the Ontario & Rainy River Railway under construction, together with hematite ores from the deposits being opened up in the Michipicoten District by the Algoma Central Railway, will form a collection of interest. Eastern Ontario also sends a few hematites and magnetites. The Sudbury District is represented by samples of nickel-copper bearing pyrrhotites from the extensive deposits which have been worked for several years by the Canadian Copper Company, the Vivian Company of Swansea, and other concerns.

Probably the most attractive samples in the collection are the peacock copper ores from the Parry Sound District which are rich in copper, carrying small gold values.

Eastern Ontario is represented by samples from the following working mines or prospects so far opened up as to be called mines: Arsenical gold ores, partially free-milling, from the Deloro Mine, Gatling, the Diamond Mine, the James property in North Hastings; free-milling gold ores from the Belmont Mine in Peterboro County, the Boerth Mine and Little Doris in Frontenac County, the Craig, Crescent, Landenberger and other properties in North Hastings. Hematite iron ores from the Wallbridge, Welsh, Cook and St. Charles Mines in North Hastings, also from the large deposits at Calabogie and Wilbur in Frontenac County. Magnetic iron ores from the Dufferin, Coe Hill and Irondale deposits in North Hastings, also from the Bedford and Robertsville Mines in Frontenac. The collection also includes zinc blende from the Hogan Mine at Millbridge, galena from the Hollindia and tetrahedrite copper ore from the Chisholm Mine near Cloyne, upon which extensive exploratory work is being done by New York capitalists.

The non-metalliferous minerals of commercial value are also represented by rough and thumb-dressed amber mica from Frontenac County, where seven deposits are being worked at present. Other economic minerals such as phosphate, felspar, barite and graphite, are included.

The corundum deposits in North Hastings are represented by a series of specimens prepared by W. G. Miller, professor of geology, Queen's University, Kingston, who conducted the exploratory survey for the Ontario Government. These samples range from almost pure corundum as found in Carlow to the low grade running about 12 per cent. corundum.

With the specimens of crude ore there is a series of concentration products of various grades, being the results of the treatment of 18 tons of ore in the laboratory of the Kingston School of Mines.

Building stones in Eastern Ontario are represented by the Crookston and Point Anne quarries near Belleville. The sample from the latter

quarry is an excellent square-dressed stone presented by Mr. Robert Boyd, superintendent of the quarry.

This collection, consisting of over 200 samples of ore of commercial value, will serve as a practical illustration to the metallurgists and manufacturers of the old world in search of raw material as to the extent and variety of the mineral resources of Ontario.

A carefully compiled descriptive catalogue with full information and photographs accompanies the specimens.

THE BRETHERTON BLAST HEATER.

The accompanying illustrations show a method of heating blast by utilizing the heat of the slag from the furnace, devised by Mr. Sidney E. Bretherton, and for some time past successfully used by him in the works under his charge at Silver City, New Mexico. Fig. 1 is a plan of the furnace and heater; Fig. 2 is a section, and Fig. 3 is an end elevation of the heater.

The furnace in use is 48 in. in diameter and has one single-welded steel jacket 9½ ft. high. The blast is trapped and the slag and matte flow continuously over a jacketed spout into a forehearth or settler placed within a brick chamber. The forehearth is large compared to the size of the furnace to permit the slag to separate from the matte. The slag flows from the forehearth continuously and the matte is tapped at intervals from the bottom spout.

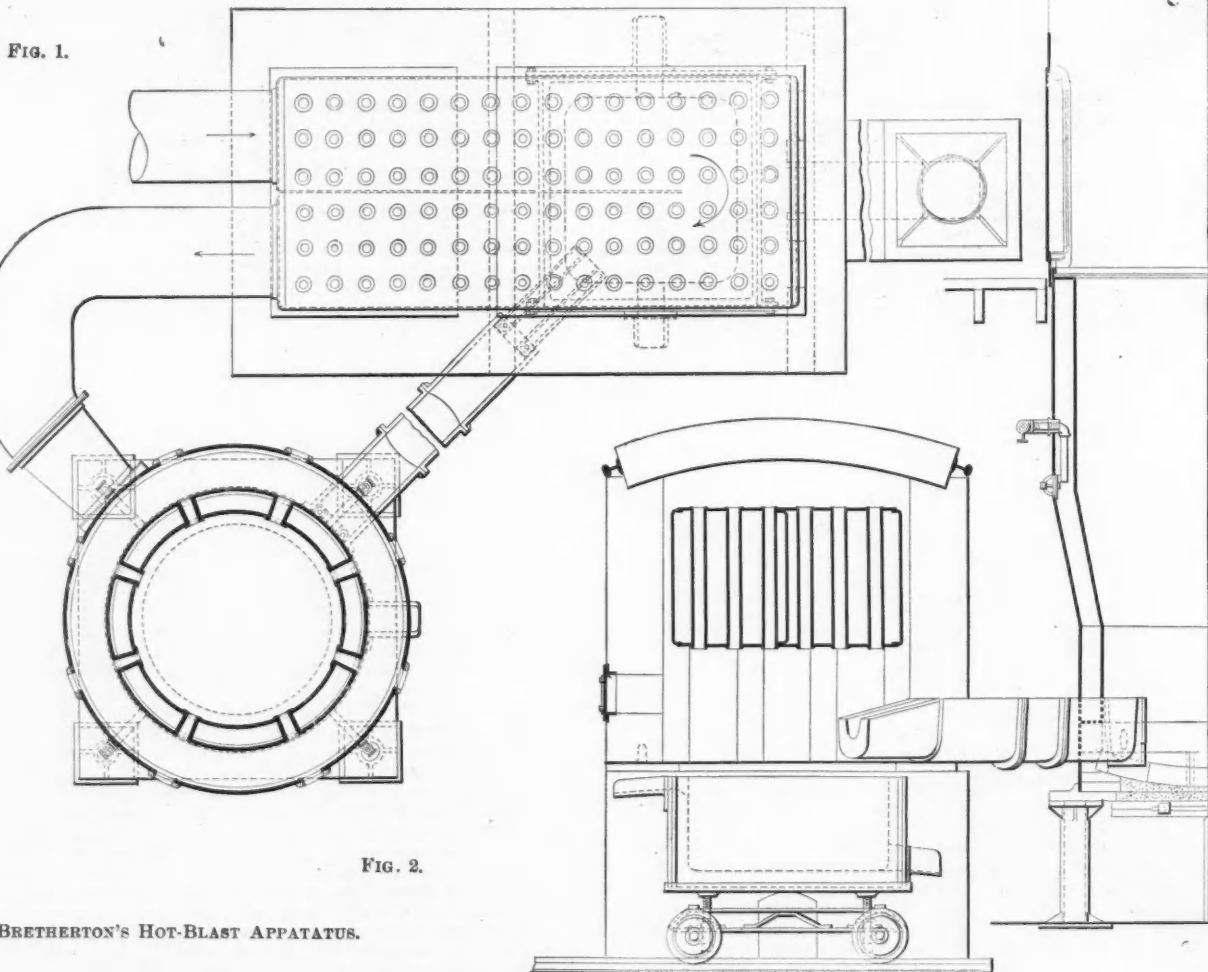
Placed over the forehearth is a large rectangular sheet-iron box which has vertical flues passing through it, the larger portion of the box being directly over the forehearth. The heat radiated from the molten slag passes upward through those flues situated directly over the forehearth, then downward through the others, after which it passes

ping box and into the spout, which gives the matte a better chance to settle from the slag. The automatic tapping of slag and matte does away with the danger of getting slag up in the tuyeres by careless furnacemen, and also saves them a lot of work.

"The increased capacity of the furnace and flow of slag enables us to use a much larger slag receiver and matte settling box; and by confining the settler within four walls, and arch overhead it can be kept from 'freezing up' for an indefinite length of time. The arrangement we have here enables us to regulate the heat under as well as over the box at will; and of course a deep settler is safer than a shallow one for clean work. As we draw our matte off from the bottom, the slag flowing over the usual way at the top is very clean and ready for any automatic method of disposal. This arrangement here enables us to get the hot blast without expense by passing the blast through a box with tubes set over the slag receiver, between it and the arch.

"To sum up: The arrangement saves us on one 60-ton furnace (using 60 tons of ore and flux): Roasting and bricking, on about 40 tons at \$3, total, \$120; coke, 4 tons at \$8, total, \$32; or a total per day of \$152. This does not include the saving made by having cleaner slag and the more satisfactory work on slag dump and around furnace, etc., and the increased tonnage. Since making up the above statement our furnaces are now smelting 80 to 95 tons each, and in addition to the above economy the saving in original cost of plant should be considered, as it does away with fine crushing and the fine-crushing machinery, roasting and roasting furnaces."

COINAGE IN JAPAN.—The report of Mr. Hasegawa Tameharu, Director of the Imperial Mint of Japan, says that during the fiscal year



BRETHERTON'S HOT-BLAST APPARATUS.

under and around the forehearth and out through the chimney, as indicated by arrows. The rectangular box is placed between the blower and the wind box of the furnace and the blast is made to traverse twice through the box by means of a vertical diaphragm contained in the same, shown by the dotted lines in Fig. 1.

The small door in the brick wall over the forehearth is for the introduction of sticks of wood for keeping a small fire on the surface of the slag; this is sometimes desirable and assists in heating the blast. By utilizing the heat of the slag, which was previously wasted, the blast is heated up to 500° to 600° F. The advantages of this system are concisely stated by Mr. Bretherton as follows:

"By using hot blast to burn the sulphur as fuel, the sulphur replaces the coke. Here we have replaced about one-half the coke with sulphur and could use less coke and more sulphur if we had it. The use of hot blast starts the ore to smelt quicker and closer to the tuyeres, keeping them brighter; and with us it has increased the capacity of the furnace about half. This fast running has enabled us to trap the

ending March 31st, 1899, the value of the total coinage executed amounted to 40,011,690 yen; consisting of gold, silver, nickel and bronze coins in seven denominations. The number of pieces coined was 75,278,014, of which 2,243,000 were gold 10-yen and 5-yen pieces; 48,031,134 were silver 50-sen, 20-sen and 10-sen pieces; 15,002,280 were 5-sen nickel pieces, and 10,001,600 were 1-sen bronze pieces. The year was remarkable for the large amount of subsidiary silver coinage and for the new bronze coinage; in value the coinage of this year shows a marked decrease, but in weight and number of pieces struck it shows a considerable increase as compared with that of last year. The exceedingly large demand for 50-sen silver coins necessitated their coinage being taken up throughout the year, with occasional insertions of gold coinage, while the smaller silver and nickel coins were struck at intervals. During this year bronze coinage was for the first time operated in the Mint. By the Imperial Ordinance No. 217, of September 20th, 1898, the types of 1-sen and 5-rin bronze coins were altered. The new die for 1-sen coins was ready in November last, and the coinage was at once taken in hand and completed in March of this year.

THE BOUNDARY DISTRICT, BRITISH COLUMBIA.

Written for the Engineering and Mining Journal by Charles A. Bramble.

The latest addition to British Columbia's mineral area is a district lying between the Arrow and Okanogan lakes, and adjacent to the 49th parallel, which is the dividing line between the Province and the State of Washington. Very high hopes have been built upon its great bodies of low-grade copper ore, and it seems likely that they will be realized in time. The Boundary District is all within the watershed of the Kettle River, which follows a serpentine course, sometimes on one side of the international line and sometimes on the other. The camps of the district, as it exists, are: Central, Hardy Mountain, Seattle, Brown's, Wellington, Phoenix or Greenwood, Pass Creek, Pathfinder, Knight's, Summit, Long Lake, Providence, Skylark, Smith, Deadwood and Copper Camps. Next spring prospectors will attempt to enlarge the known mineral area, and as there are many miles of metamorphic formations identical with those in which the located mines exist, above the present camps on the various branches and tributaries of the Kettle River, it is probable that their labors will bear fruit. The limits that should be placed upon the district are as yet unknown, for though the stream heads in a granite country, that will not necessarily mean one barren of minerals, as many prospectors believe; just a few miles to the eastward of the district, in the Burnt Basin, some very good prospects have been found in granite.

For several months previous to June, 1898, the Canadian Pacific Railway had its experts examining the Boundary country. They evidently

Miner of the Granby Rubber Company, W. H. Robinson of the Eastern Townships Bank, A. F. Gault, J. P. Whitney of Philadelphia, and other capitalists. These gentlemen are also heavy stockholders in the associated Old Ironsides and Knob Hill companies. The officers are: S. H. C. Miner, president; Jay P. Graves, vice-president; C. E. Gault, secretary; George W. Wooster, treasurer. The stock amounts to \$1,200,000, as already issued, and so great was the demand when it was placed upon the market that 2,170,000 shares were subscribed for. The company owns the Victoria, Aetna, Phoenix and Fourth of July, and is practically in control, through its affiliated companies, of the Old Ironside, Knob Hill, City of Paris and half a dozen other valuable mines.

Before the smelter was begun the ores of all the tributary mines were very carefully sampled and assayed. By courtesy of Mr. A. B. W. Hodges, the superintendent, I am enabled to give an average of the assays. The so-called "lime ore" of the Knob Hill Mine gave the following results upon analysis: Silica, 32.2; iron, 10.2; lime, 21.7; sulphur, 4.4; copper, 3.0. The heavy sulphide ore from the same mine yields: Silica, 6.0; lime, 6.0; iron, 46.0; sulphur, 17.5; copper, 3.0. The silicious ore of the Ironsides Mine has the following composition: Silica, 50.0; iron, 15.6; lime, 5.4; sulphur, 4.3; copper, 2.8. The capping of the Ironsides, of which there is a vast body in sight, is mostly an iron oxide, the composition of which is as follows: Silica, 4.8; iron, 60.0; lime, 2.0; sulphur, 1.6; copper, 2.0. These ores carry from 1 oz. down to 0.02 oz. in gold, and from 1 to 2 oz. in silver to the ton. The results were obtained by averaging up two dozen assays of carefully sampled ore.

It will be seen, therefore, that these ores contain all the elements of

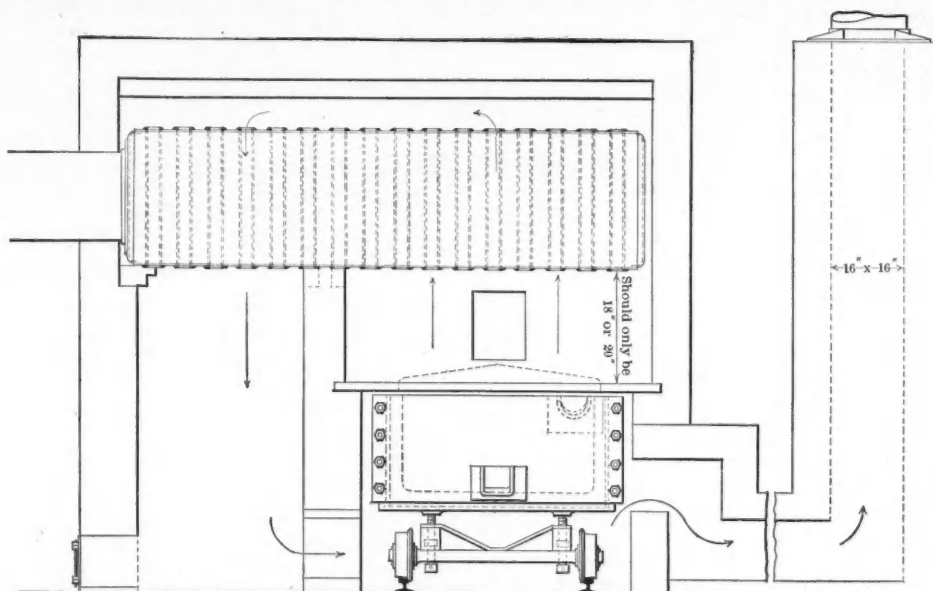


FIG. 3.—BREThERTON'S HOT-BLAST APPARATUS.

reported that it was likely to develop into a region of profitable camps, seeing that without loss of time the company sent out one of its best engineers, Mr. W. F. Tye, to find a location for a line from Robson, on the Columbia River, to the valley of the Kettle. This was in June, 1898; in November, 1899, the grade has been finished to Midway, 100 miles from Robson, and there are 27 miles of spur lines almost completed. These spurs are expected to carry a very large tonnage from Summit, Phoenix, Wellington and Deadwood camps. Surveys have also been made into Long Lake Camp, White's Camp, Copper Camp, and the North Fork of the Kettle River. Surveys have been carried as far as Penticton, and preliminary surveys have been made to connect that point with the Canadian Pacific Railroad above Hope, on the Fraser River. Another surveying party has lately returned from the West Fork of the Kettle River, where it is believed they found some very promising mineral ground.

The main line from Robson to Midway has averaged \$40,000 a mile; the most expensive road ever built in Canada. Seven tunnels on the line aggregate more than 1 mile in length, and all this expense has been cheerfully borne by the Canadian Pacific, which hopes that this branch will be to it what the Montana Central is to the Great Northern. The lines will send out feeders to any camp that will give tonnage, and it is expected that the spurs will be numerous. Robson, on the Columbia, is 1,495 ft. above the sea; the summit of the range where it is crossed by the track is 4,000 ft. above the sea. The City of Columbia, in the Kettle River Valley, is about 1,700 ft. After leaving this point the line begins to climb once more and at Eholt it is 3,100 ft.; then it drops to 2,500 at Greenwood, and 2,000 at Midway. Soon after emerging from the Bull-dog Tunnel, 3,500 ft. in length, near the summit of the divide between the Arrow Lakes and the Kettle River, Burnt Basin Camp and the small town of Gladstone are passed. There is likely to be a prosperous little camp at this point, and on the west shore of Christine Lake there are other indications of mineral wealth. This new line has brought Columbia within 5½ hours of Rossland.

As the ores of the Boundary country, so far as known, are invariably refractory, and of low grade, smelters are evidently required as near the mines as possible. The Granby Consolidated Smelter Company was one of the earliest to satisfy itself that the district had merits, and it reaped a reward for promptness when it secured the present site of the smelter on the North Fork of the Kettle River. This company is a Montreal venture, and the principal shareholders are S. C. H.

a good mix, and are self-fluxing. Hence the smelter is hardly likely to be forced to buy outside ores merely to make a good mix, though if it should prove possible to smelt the capping containing 60 per cent. of iron, they may be able to make use of outside ores of a silicious character. In view of the fact that the ores of the Boundary are much lower in sulphur than the ores of the Rossland District, and will not require as much roasting, it seems but reasonable to expect some cheap smelting, especially after the number of furnaces shall have been doubled.

The Le Roi smelter, at Northport, is able to treat ores at from \$4 to \$4.50 a ton, excluding, of course, deductions for metals which they may carry. Seeing that the Granby Smelter Works will be as well arranged, their ores, containing an abundance of iron and lime, should certainly be smelted somewhat more cheaply. Having ventured to forecast the probable cost of smelting, I shall hazard a guess that mining will not cost more than \$2 a ton; that it may possibly cost but \$1.25; and that the freight charges from the mine to the smelter should not exceed \$1 a ton.

The smelter was located on its site owing to there being an unusually good water power near by. The North Fork of the Kettle River will give at extreme low water 1,200 H.-P. The smelter will use 15,000 miners' inches, under an actual head of 45 ft., after deducting friction and all losses. The dam will give about 30 ft. of this head, the rest being made up between the dam and the power wheel. The dam is 175 ft. across the top; 75 ft. from heel to toe on bottom, built out of 12 by 12-in. sawn timbers, filled in with rock. The flume is 11 by 9 ft., and a mile long. The grade is 0.01 in. to every 33 1/3 ft.

The value of this water power to the smelter becomes apparent upon a little consideration. If steam power is used in this country it costs from \$125 to \$150 per horse-power per year. In Rossland, where electrical power is in use, the big companies pay \$60 per horse-power per year, thus saving half the cost as compared with steam. Power has been offered to the Granby Smelter Company from Bonnington Falls, on the Kootenay River, for \$75 per horse-power per year, but by generating its own power it will cost but the repairs, attendance, etc., and the interest on the investment. The saving as compared with steam will be from \$25,000 to \$75,000 a year, according to the amount of power used. At the start 350 H.-P. should be sufficient for all purposes, but the smelter has a contract with outside parties to furnish 250 or 300 H.-P. if required.

SINKING OR TUNNELING.

In mining, as in other occupations, things are often done because they are considered proper, and without any thought on the part of the miner. Men, in a certain district, get into the habit of performing certain operations in a certain way and make no attempt to see if other methods would not serve them better. Because a certain method gives a good result in one case it is too frequently assumed that it will give good results in other cases, where conditions are entirely different. The practical miner is apt to know his own particular mine very well, and this knowledge gives him a certain contempt for geologists, or other trained observers, who bring a wider knowledge and more unbiased judgment to the work in hand. Perhaps the conservatism of the average miner and prospector in the Rocky Mountains, or on the Pacific Slope, is most evident in his clinging to the idea that the best way to find out what there is in the vein he has located is to "prove it with depth" by a cross-cut tunnel.

As a matter of fact, when a miner has staked out his claim the first and most essential thing is for him to determine, as nearly as he can with the means at his disposal, the direction of the vein. Thus he will know whether his location really covers the vein, thereby very likely saving himself a heart-breaking lawsuit should the vein prove valuable. In case the surface debris is not deep, say 10 ft., or less, it will not take him very long to dig some surface cross-cuts the whole width of the vein. He will find out also whether the ore that he located is really in place, or whether it is slide or float-rock from higher up the hill side. Having determined the general direction of the ledge, and opened it, if the surface is not too deep, in at least 4 places on a claim 1,500 ft. long, the next thing to do is to sink on the ledge far enough to determine accurately its dip or the inclination at which it slopes into the ground. Then if, as stated, the vein has been opened up at at least 4 points, several hundred feet apart, a careful analysis of the rock from the bottom of the different pits or cross-cuts will show whether the vein grows richer in one direction than in another, or carries fairly uniform values. Having ascertained this much, the prospector is in a position to go to work systematically. He can decide whether he shall sink his shaft deeper or run a tunnel. He can also tell where is the best point to locate his shaft or tunnel so that it will show up the vein to the best advantage.

Generally speaking, the best advice that can be given in opening any mineral deposit is "follow the ore." There is no other way by which the ground can be shown up so thoroughly, and the ore taken out will go often a long way toward paying expenses. Even if the ore is not rich enough to pay for shipment, it is always evidence of the value of the rock in the vein, and is a tangible, self-evident thing to show a prospective investor. Again, shafts, vertical or inclined, that follow the vein, will show up any changes in the ore and give a large amount in sight. Thus four shafts 50 ft. down in a ledge 4 ft. wide would expose 1,680 sq. ft. of the vein. A tunnel driven 200 ft. through rock to cut the vein would expose but the section, the height and width of the tunnel, say 100 sq. ft. To expose a larger area, drifting must be done, and such drifts can be run with better discrimination at the foot of a shaft that has followed the ore.

In the great majority of cases the miner, working by rule-of-thumb methods and disdaining to go at a thing in a scientific way, proceeds in an altogether different way from that outlined above. Having staked off his claim, often located on the strength of an apparent outcrop of ore, or on the showing of a single shallow shaft, he proceeds to run a tunnel. The miner or prospector with limited resources wastes only his own time and money by such work. It is when the practical miner undertakes to open up a claim for some company floated with \$1,000,000 capital, or some other attractive figure, that great mischief is done. A tunnel is started to open the ledge, say at 200 ft. Now, assuming that the ledge dips into the ground vertically, that the slope of the hill is 45 degrees, and that the tunnel is driven at right angles to the course of the vein, a tunnel 200 ft. long will cut the vein at a depth of 200 ft. It is easier to tunnel than to sink this distance. The dirt and rock removed can be trammed much easier than it can be hoisted, the tunnel will drain itself and if the ground is at all wet there is no need of the expense of a pumping outfit.

So much for the advantages; as a matter of fact, the different factors are seldom as cited above. The evidence that can be gained from an apparent outcrop or one shaft is very misleading. A common error is to mistake the slope of the hill. Any ordinary hillside is very much more likely to be a slope of 25° or 30° than 45°, and the tunnel to open ground at 200 ft. may have to be driven 400 ft. In a tunnel of this length the chances are that the ventilation will become bad at the heading, long waits will be necessary after each blast, work will proceed slowly, and finally some sort of ventilating plant will be necessary. Again, the dip of the vein may be unknown, as the apparent outcrop may be slide-rock. If ore has been found in place, and the dip of the vein determined by one shaft, still the pay value may be confined to a shoot or chimney, the limits and inclination of which, in the plane of the vein, are altogether unknown. In such case the tunnel expected to strike a vein in 200 ft., approaching from the foot-wall side, may fail to reach it in 500 ft. When finally cut, the vein may be absolutely barren. The section exposed is just the size of the tunnel, whether there is rich ore to right, to left or below it, is absolutely impossible to say, except by doing what might have been done in the first place; that is, by following the vein. In the case of a mining company that has gone into such a venture on a non-assessment plan, the end comes quickly and certainly. The funds raised from selling stock are used up in driving the tunnel 200 ft. or more. Failure to find the vein where expected lessens the value of the stock. To keep on with the tunnel the treasury stock reserve is sold at a sacrifice and finally the company finds its treasury bare and nothing but a barren vein to show. The stockholders are out of pocket and the locality gets a black eye.

Of course, tunneling and drifting are used frequently to advantage in opening up mining properties, as one can see in any famous camp in the West; but tunnels should follow preliminary examination and be laid out as the result of definite knowledge. If the formation of the

vein dips with the hillside so that a tunnel will strike the hanging-wall, it may be quite possible to open up the vein at a depth of 500 ft. by a tunnel of only 200 ft. Here the advantage of the tunnel is evident. Again, if the ground is very wet, as it may be in regions where the rainfall is heavy, the cost of getting in pumping machinery may be so great as to make tunneling a necessity. Some of the newly opened districts at Washington and British Columbia show this. Then there is the case where the course of the vein cuts across the slope of the valley so that one end of a 1,500-ft. claim is considerably higher than the other. A tunnel, or, more properly drift, is then the only way to open the ore. Such a tunnel, being always in the vein, will show any variation in width and value, there will be no trouble from water, and the property will be opened at the smallest expense possible.

Though miners generally make the mistake of drifting or tunneling instead of following the vein by a vertical or inclined shaft, yet one sometimes sees opposite mistakes made. During the excitement over the discovery of the Mesabi Range in Northern Minnesota, in 1892, a company was formed to work one of the very few places along the range where the iron ore formation or jasper was exposed. The company was capitalized at \$3,000,000, built an expensive camp, and hauled in a lot of machinery, at great expense, through the virgin forest. The outcrop formed on one side a bluff 50 ft. or so high. Standing at the foot of this bluff anyone could see, as the banding of the rock was horizontal, the changes in its composition; yet those who had charge of the exploration had so little judgment that they actually started sinking on top of the bluff, so near the edge that the rock brought up was dumped over it. Such work, of course, could have but one result. The company started off with a flourish, selling stock right and left. A year later the sheriff, looking for some unattached property against which a claim could be laid, found only a desk in the office at Duluth, and even this, as it proved, had not been paid for.

RECENT DECISIONS AFFECTING THE MINING INDUSTRY.

Specially Reported for the Engineering and Mining Journal.

REMEDIES OF LAND OWNERS AGAINST TRESPASS ON COAL.—A bill in equity will not lie to restrain the mining and removing of coal from complainant's premises where there is no averment of irreparable injury and insolvency of the one taking it, the law furnishing an adequate remedy in an action of trespass.—*Rice vs. Looney* (81 Illinois Appellate Court Report, 537); Appellate Court of Illinois.

RIGHTS OF LESSEE IN LITIGATED MINING PROPERTY.—One who leases mining property from a corporation with full knowledge of a prior mortgage on same, which is contested by the corporation, takes subject to all rights of the mortgagee; and where the validity of the mortgage is sustained he is not entitled to claim the proceeds of the mines while operated by a receiver appointed in the foreclosure suit, as against the mortgagee, on the ground that he expended money to render them productive.—*G. V. B. Mining Company vs. First National Bank* (95 Federal Reporter, 35); United States Circuit Court of Appeals.

MEASURE OF DAMAGE WHERE RAILROAD DELIVERS COAL AT WRONG PLACE.—Where a party directed a railroad company to transport a car of coal from O. to H., but afterward directed that the shipment be made to another place, and afterward the car was shipped to H. and received by the shipper, through its agent, who disposed of it at H., the proper measure of damage is the value of the coal at that point where so received, less the price it actually brought, with due care in the sale, plus the cost and carriage, if the same had not been paid.—*Little Rock & Fort Smith Railway Company vs. Miller Coal Company* (51 Southwestern Reporter, 1,054); Supreme Court of Arkansas.

PROMPTITUDE REQUIRED IN SEEKING RELIEF IN MINING CONTRACTS.—Certain parties and one L. entered into a partnership for the purpose of locating, developing and operating mines. While prospecting under the agreement, L. located two mining claims in his own name, contrary to the agreement, and on July 27th, 1894, conveyed a part interest to third persons, and on March 6th, 1896, the entire interests in the claims was transferred to a corporation, organized for that purpose, in exchange for stock. The complainants were first advised of the sale of part interest in the claims in 1895, but never communicated with L. for the purpose of obtaining an accounting or ascertaining his intentions. On November 13th, 1897, about one year after they were informed of the conveyance to the corporation, and two years after the first conveyance, and after the claims had increased in value, to an amount exceeding \$200,000, and expenditures had been made in developing them, they filed a bill against L. and the corporation, asking for a dissolution of the partnership and an accounting, and that the corporation be decreed a trustee for the benefit of the complainants. The court held that they had been guilty of laches barring the right of action. One claiming an interest in mining property that is subject to great and sudden fluctuations in value, or the value of which is uncertain, cannot remain silent and inactive, awaiting developments, while those in possession are expending money in its development, and a court of equity will deny him relief, where he has failed to bring suit within a comparatively short period.

Partners bring suit to compel a co-partner to account for the proceeds of partnership mining property transferred to a corporation in exchange for stock, and to compel the corporation to transfer to them the stock, where it does not appear that the corporation had knowledge of their claim, and the stock may have passed into the hands of innocent purchasers, must proceed with reasonable diligence, and where they have waited a year before commencing suit relief will be denied. Such delay is not excused by a claim that the partnership agreement had been misplaced and was not found until shortly before the suit was begun.—*Curtis vs. Larkin* (94 Federal Reporter, 251); United States Circuit Court of Appeals.

THE CLARK PATENT TUBE MILL.

Pulverizing ores in a revolving iron or steel barrel containing iron balls or pebbles is not a new practice. Revolving barrels, or tube mills as they are generally called, have been manufactured and used in Germany and elsewhere for many years. In the United States various forms of the barrel pulverizer have been used with success. In some instances the barrel was charged with a certain amount of ore, then closed and the grinding continued until the proper reduction had been

machine is a plain cylinder of steel plate, closed at the ends by cast iron heads, having hubs or journals formed upon them, upon which the cylinder is rotated in suitable bearings. These hubs have large openings through them, lengthwise, for the purpose of feeding and discharging. Rotation is accomplished by means of a suitable gearing bolted to one head and meshing with a pinion on the counter-shaft by which the machine is driven.

The grinding surface is obtained by filling the cylinder about one-half full of hard flint pebbles. When the machine is rotated these pebbles are in constant action against each other, and between them and

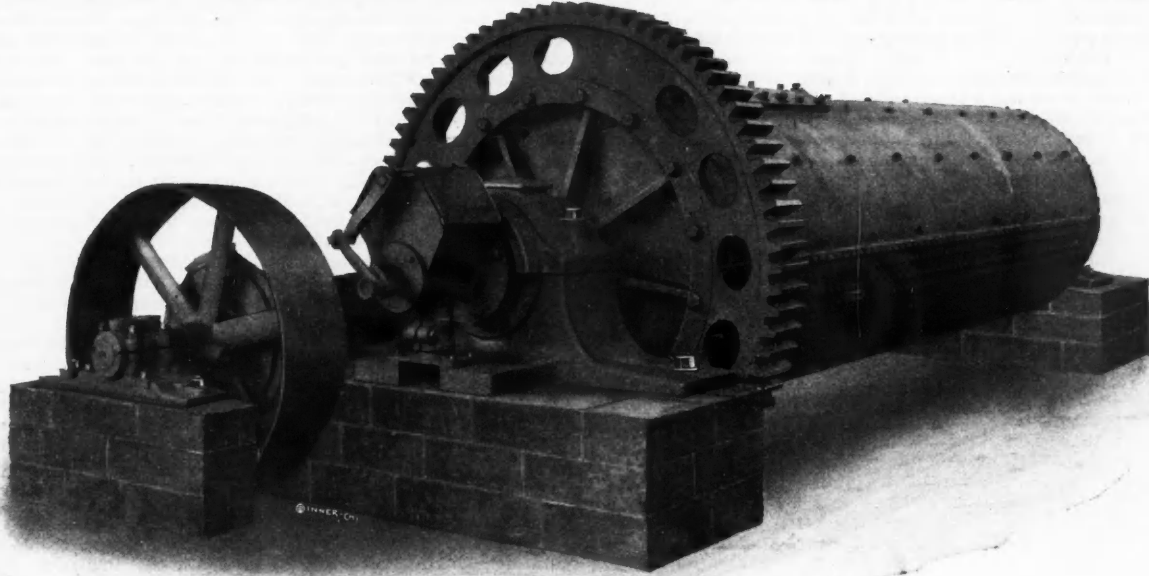


FIG. 1.—THE CLARK PATENT TUBE MILL, SHOWING DRIVING END

secured. This kind of barrel or tube mill has been quite extensively used in making cement, where it is necessary to reduce the product to 200 mesh.

A German tube mill has been introduced in the United States quite extensively, wherein the material to be pulverized is introduced into the barrel through its axis and discharged through the periphery at the other end. Mr. J. K. Clark of Montana improved upon this barrel by making not only an axial feed but an axial discharge. This mill is the subject of the illustration. Referring to the cuts, Fig. 1 shows the feed end; Fig. 2 the discharge end. The ore or pulp is fed into the machine by an automatic feeder, and is discharged from the machine through a perfectly tight spout; a great advantage, especially in dry crushing.

This barrel has marked efficiency either in wet or dry grinding and

the shell the material is ground. It is readily seen that an immense grinding surface, of so flexible a nature that no breakage can occur, is thus brought into constant action, and is renewable when the machine is in operation; a qualification which is possessed by no other known form of grinding mill. The shell is protected against the abrading action of the pebbles by a hard iron lining, which it is necessary to renew at intervals of about a year, the time depending somewhat upon the nature of the material operated upon.

The material is fed into the cylinder by a worm or screw conveyor actuated by the rotation of the cylinder. This conveyor operates a special form of feeder that long experience with machines for feeding such material has proven to be the most efficient and satisfactory. As the fineness of the product of the tube mill is governed entirely by the amount fed to it, the feeder is made adjustable within a wide range, and

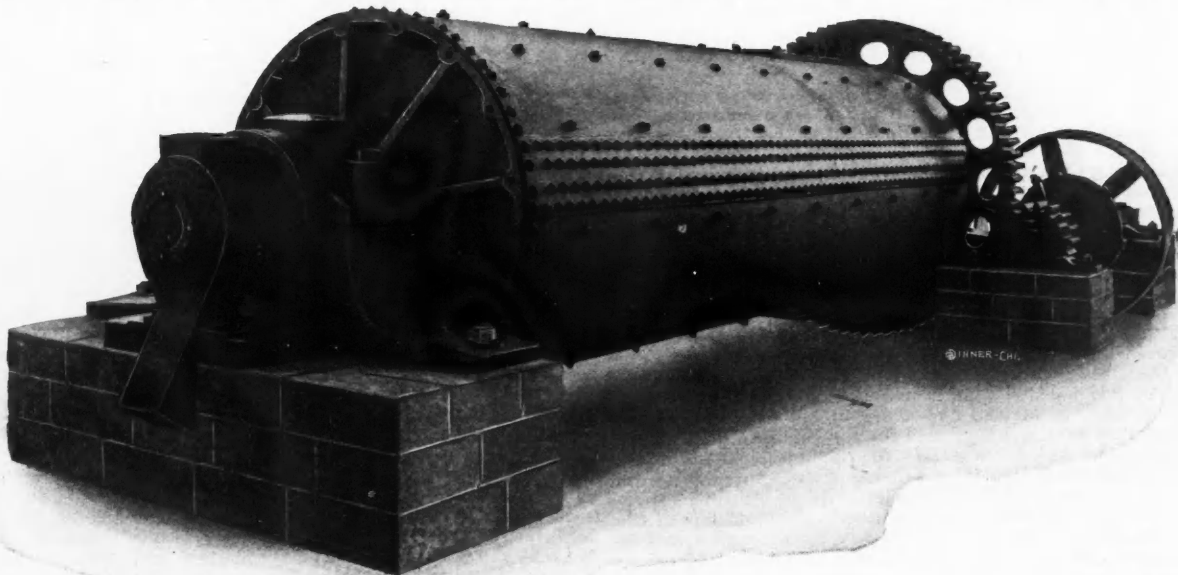


FIG. 2.—THE CLARK PATENT TUBE MILL, SHOWING DISCHARGE END.

for re-grinding tailings it has extraordinary capacity. The pulp can be sent to it at any size, but as the barrel is essentially a fine pulverizer the best results are obtained when the pulp does not exceed $\frac{1}{2}$ mesh, and of course it goes without saying that the finer the pulp the more rapidly it is reduced to the given size. The attractive feature in this form of pulverizer is its capacity.

By referring to the accompanying illustration, it will be seen that the

is an exceedingly simple device. The discharge is automatic, and requires no mechanism whatever. The outlet is housed so as to make it dust-proof, a very essential point, which, it is claimed, has so far been accomplished only in this mill. The Clark patent tube mill is essentially a dustless machine.

This mill is made by the Gates Iron Works in Chicago, which holds the exclusive right to its manufacture.

THE NEW REGULATIONS FOR NICKEL MINING IN ONTARIO.

On November 24th the Lieutenant-Governor of Ontario signed an order in council giving effect to the following memorandum of Mr. E. J. Davis, Commissioner of Crown Lands. This order applies to all future grants of nickel bearing lands, but not, of course, to grants already in force:

"1. That in the interests of our relations with the Empire it is desirable at an early opportunity to renew the negotiations opened with the British Government in April, 1891, which had for their object the concession of an interest in nickel ores of the ungranted lands of the Crown for Imperial and national uses, on such terms as may be mutually agreed upon.

"2. That having in view a larger scope for the employment of capital and labor in the copper-nickel mines and works, it is desirable to secure the establishment in the Province of refining plants in accordance with the scheme of the charter of the Canadian Copper Company, or otherwise; and, if necessary to the success of this object, to ask that effect be given to the provisions of the act (chapter 67 of 60-61 Victoria) for imposing export duties on nickel and copper, subject to such modifications in favor of the United Kingdom and the other colonies of the British Empire as may appear to be in the common interest.

"3. That for safeguarding the public interests in ungranted lands of the Crown it is advisable that all grants of mining lands hereafter issued shall provide in the patent or lease that the copper and nickel ores upon or in such lands shall be treated and refined in the Province so as to produce fine nickel and copper of marketable quality, and that for any violation or evasion of this proviso by the grantee, his heirs or assigns such lands shall revert to and be vested in her Majesty, her successors and assigns for the public uses of the Province, freed and discharged of any interest or claim from any other person or persons whatsoever, as if they had never been granted."

With the order in council there is published an interesting memorandum from Mr. Archibald Blue, Director of the Bureau of Mines, the substance of which we give below:

"When the first discovery of mineral was made in the vicinity of Sudbury during the construction of the Canadian Pacific Railway, small notice was paid to it. Interest was aroused only when the fact became known that the ore carried nickel as well as copper. Then prospectors, miners and capitalists became active, and in a very short time large areas of mining lands in the district were acquired under the existing provisions of the mining act. The price was \$2 per acre. In this situation the Government in November, 1890, decided to withdraw from location and sale the lands in the Sudbury region, pending contemplated changes in the law, that were called for by the circumstances of the time. The act was revised and amended in the session of 1891, and besides increasing the price of lands some new features were introduced. Among these were:

"1. Option to take up and hold lands by lease as well as patent from the Crown.

"2. Provision for royalties on ores and minerals raised or mined.

"3. Condition of certain expenditures in actual mining operations.

"No radical changes in the act as it affects nickel and copper bearing lands have been made since that time. During the period of depression (1892-96) prices were lowered from the scale of 1891, but they have again been increased, and are now uniform for all parts of the Province, except as regulated by distance from railways and position in surveyed and unsurveyed tracts. A graduated scale has been applied to rent charges and provision has been made for a conversion of a leasehold into a freehold at the expiration of a term of 10 years. A change has been made in the provision for working conditions, under which the holders of mining locations are required to make the improvements yearly instead of at any time within a period of 7 years, as at first provided. In addition to these amendments, a limit has been placed on the area of mining lands which any person or company may acquire in one calendar year.

"Reverting to 1891, when the value of nickel as an alloy with steel in the manufacture of a superior quality of armor plate for battleships was satisfactorily demonstrated by the officials of the United States Navy, it was proposed that in view of the important national uses to which nickel was being then applied by foreign governments, and of the consequent demand for mining locations in Ontario, an arrangement might be made, under which the Government of the United Kingdom should acquire a substantial or, possibly, a controlling interest in the nickel deposits of the Sudbury District. 'Should the Imperial Government be inclined to entertain a proposition for negotiations,' to quote the words of the order in council on the subject, 'evidence may be furnished of the existence of nickel-bearing ores in economic quantities throughout the district referred to, from scientific surveys and the reports of explorers, with a view to entering into arrangements (with the assent of the Legislature) for granting to the Imperial Government conjointly with the Province, or in such other manner as may be agreed upon, control over part or all the nickel ore in the Crown Lands of the district, subject to such arrangements for the establishment in Ontario of nickel-steel works or manufactures, the development of the mines, and considerations of royalty on ore, as may be mutually agreed upon, and as shall be approved by the Legislature.'

"The offer did not at that time commend itself to the officials of the British Admiralty, but the evidence which has since accumulated to prove the superiority of nickel-steel over every other kind of armor plate in use, and, notably, the success won in action by American battleships and gunboats in the war with Spain, suggest that possibly the time may have now arrived when the proposition made to the Imperial Government 8 years ago might be hopefully renewed. The fact that the Lords Commissioners of the Admiralty have now themselves acquiesced in the choice of nickel-steel as the best material for armor plate should have weight with your colleagues in considering the question of reopening the negotiations. The importance to Ontario of carrying into effect such a scheme as was proposed does not need to be urged.

"Much progress has been made in the methods of treating the copper-nickel ores of Sudbury since the first smelting works were established

there. None of the processes at that time in use were exactly suited for our ores, and many costly experiments had to be made before economic results were reached upon a commercial scale. It is probable that improvements will continue, and that larger economies will be effected, but in the present state of the industry there is no reason to doubt that the outlook is hopeful. The oldest establishment (organized under a charter granted by the Federal Parliament in 1886) has five furnaces in blast, smelting an aggregate of 400 to 500 tons of ore daily, and the whole of its matte product is being shipped to refineries out of the country for extraction of the nickel and copper. Two other establishments are completing plants for treating large bodies of ore by new processes, and are hopeful of winning other valuable contents of the ore besides the nickel and copper. One of these processes aims at recovering the sulphur and iron and producing ferro-nickel direct; and the other aims at recovering the precious metals, small percentages of which the ores are known to carry. A wealthy English capitalist and scientist, who has spent several years in perfecting a new method of extraction, has recently acquired from private owners a number of locations which he is developing, and it is understood that he will erect smelting works next year. It may, therefore, be assumed with confidence that the industry has passed the stages of development and experiment.

"In the seven years, 1892-98, the quantity of ore smelted and reduced to matte in the Sudbury District was 591,852 tons, and the estimated metallic contents were 29,705,000 lbs. nickel and 34,570,500 lbs. copper. At the selling price of matte at the furnaces, which is the form in which it is exported to the refineries, the total value of the nickel product for the seven years was \$3,294,060, and of copper \$1,302,865, or a total of \$4,596,865. But at the average selling price of the metals during the seven years the value of the refined metals would be \$10,396,750 for nickel and \$3,975,607 for copper, or a total of \$14,372,357. The total amount paid for wages in Ontario during the seven years was \$1,929,894, and this makes up a large proportion of the expenditure for all purposes in the Province for the production of matte. It is certain that the share of the value of the refined metals distributed outside of Ontario for wages, services and profits has been not less than \$10,000,000, or about two-thirds of the whole.

"The Canadian Copper Company, which obtained a special charter from the Dominion Parliament in 1886, was given full power to sell the produce of its mines in any part of Canada or elsewhere, and to establish treating or smelting works in any Province of the Dominion as in the interests of the company might be found expedient. No refining works have yet been erected by the company in Canada under authority of the charter, although the president has declared that this was the determination of the company, and all the matte product of the furnaces continues to be exported for refining operations in foreign countries. By an act of the Dominion Parliament (Chapter 67 of 60-61 Victoria) the Governor in Council may by proclamation published in the Canada Gazette impose export duties 'on nickel contained in matte, or in the ore, or in any crude or partially manufactured state, and upon copper contained in any matte or ore which also contains nickel—when exported from Canada—upon such nickel an export duty not exceeding 10c. per pound, and upon such copper an export duty not exceeding 2c. per pound'; but the authority conferred by this act has not yet been exercised.

"The areas of copper-nickel bearing lands of the Province are extensive, and great portions of them probably remain as the unpatented lands of the Crown. Ore bodies of considerable promise have been discovered this year between Lake Temagami and Lake Temiscaming 75 miles northeast of the working mines at Sudbury. They are within the same mineral-bearing belt of rocks of the Huronian formation which extends across the country from Lake Huron to Lake Abitibi on the boundary between Ontario and Quebec. In this extensive tract it seems probable that large bodies of copper-nickel ores may be found, and before prospecting operations are commenced upon it the public interests appear to require that measures should be taken to assure for the Province a larger share in the profits of the mining industry than is at present attainable."

COMPRESSING COKING COAL.—The tendency of coking coal to increase in bulk during calcination is prevented by the oven walls, so that a certain degree of compression ensues; but, as the volume of non-bituminous and of gas coals does not increase so much, the compression is insignificant, and it was natural to endeavor (remarks Herr Simmersbach in "Stahl und Eisen") to compress these last-named coals mechanically, in order to reduce the volume of their interstices. At first attempts were made to compress the coal in the oven itself by means of heavy plates or by rolling the coal after it was charged in the oven; but, as Herr Sachse noticed that a static or rolling load does not exert so great an effect as the fall of a heavy mass, he arranged an opening in the oven roof to permit of stamping. Not one of these methods, however, or that of thrusting the discharger into the oven, gave good results in practice; but the idea of compressing the coal before charging, in a box with movable sides corresponding with the inside of the oven, and of charging in the solid mass thus formed, proved more successful. At Witkowitz rollers adjustable to any height were moved backward and forward over the coal by means of ropes; and Herr von Mertens rammed the coal with wood stampers. This method gave better results owing to the great compression given to the coal, and it was improved in various manners. Baumgarten substituted for the coffer of boards a transportable cast-iron box; and, after the stamping, the sides were removed, when the discharger on the other side drew into the oven the coal mass remaining on the bottom plate, after which the plate was withdrawn by a winch. At the Poremba and Friedenshutte coke ovens, Guaglio fitted the bottom to a rack, which permitted of pushing the conglomerated coal into the oven by the discharger on the same side; and lastly Bremme got over the difficulty of this arrangement by constituting the machine roof a solid plate, carrying rails for charging the boxes from the top of the ovens.

THE IMPROVED SUSSMAN LAMP FOR COAL MINES.

The Sussmann lamp for mines, which has attracted much attention in Europe, has been materially modified as a result of experience. The latest form is now in use at the Strey-Bracquegnies Colliery in Belgium, and is described by M. Joseph Goffin in a recent communication to the Societe des Ingenieurs des Mines du Hainaut.

The accompanying illustrations show the various parts of the improved lamp, which comprises three essential portions, the box, a, containing the accumulators, the portion, b, carrying the incandescent lamp, the reflector and the contact plates, e e (Figs. 2 and 3), and lastly the glass holder, f (Fig. 1), with its hook for carrying and suspension.

As may be seen by Figs. 4 and 5, the two cells of the accumulator are contained in india-rubber receptacles, q q, capable of resisting any shock, and enclosed, as usual, in a tin-plate box, r, cut in two towards the top, the two parts, being joined together, after the accumulator is put in place, by the strip of tin-plate, v, soldered over the joint. The receptacles, q q, are closed by flexible india-rubber covers, s s, stuck to their boxes by a suitable solution; and each cover has the form of raised cups for receiving the connections and also tubes for allowing the gas to escape, so as to prevent the leakage of acid, while at the same time forming elastic joints perfectly tight.

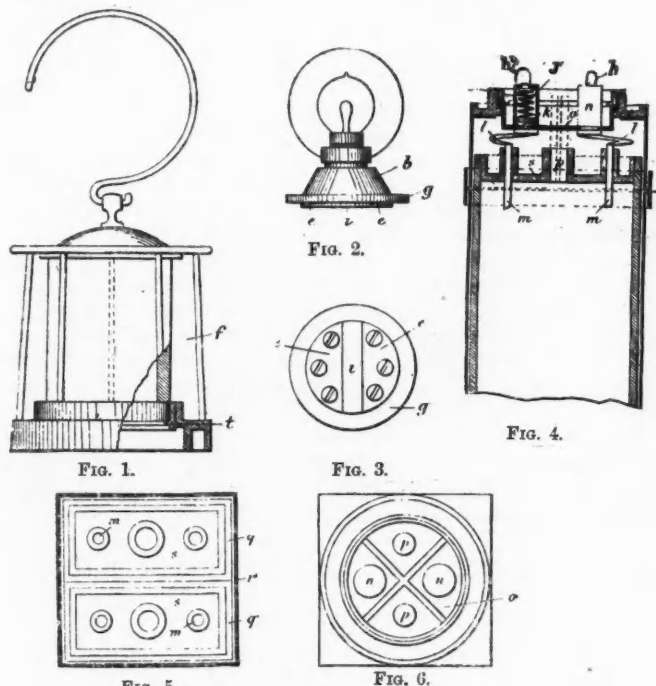
As already observed, the lamp has an original arrangement of contact and connection forming interruptor, an arrangement applicable to all lamps, formed in two parts one of which, the glass carrier with lighting arrangement proper, is connected with the accumulator box by a screw or other joint that obliges the first-named part to turn on the second.

Although, for preventing the workmen from extinguishing and re-lighting their lamps underground, the Belgian mine regulations pro-

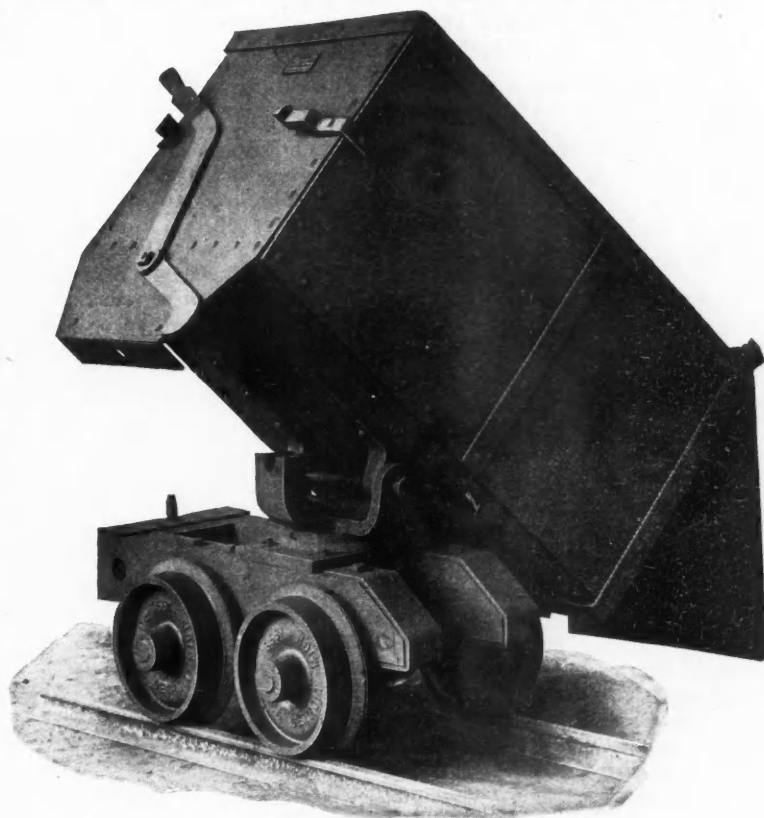
hibit the use of an external switch, it is advisable to only switch on the light at the moment of going down; and on the other hand, the present arrangements for locking are not sufficiently rapid to dispense with preparing, and therefore lighting, beforehand, a large number of lamps, thus needlessly increasing the period of lighting—it may be by three-quarters of an hour. Now the new arrangement permits of only switching on the light at the moment the lamp is given out, and even, if desired, of allowing the workman to light his lamp when he goes down by simply giving a last turn to the screw, which completes the closure; and it also affords a simple method for connecting the two parts, which turn one upon the other for opening or closing. This arrangement is specially shown by Figs. 2 and 4 in its application to the rack form of safety lock; but it may be employed generally with all arrangements in which the junction is effected by giving a turn to one part with respect to the other.

The switch arrangement is constituted by an insulated plate, g (Figs. 2 and 3), carrying on its inside face two plates of brass or copper insulated from one another, e e, in the form of circle segments, arranged symmetrically and separated by a band of ebonite, l, which completes the circle; and on this plate is mounted the lamp with its reflector, each of the poles being connected with one of the sectors, and the plate being fixed permanently in the glass carrier, where it is kept in place by a screwed ring, t, Fig. 1.

Each of the two contacts of the accumulators is constituted by a spiral spring, j, soldered, on the one hand, to one of the nipples, h h, and on the other to the screwed metal parts, k k; these are soldered to the flexible connecting wires, l l, which connect them with the accumulator poles, m m. The springs are enclosed in two small brass tubes, n n, which guide them and keep them in place in the fixed support, o (Figs. 4 and 6). It will be seen that, with this arrangement, on screwing the part, b (Fig. 2), into the glass carrier, and then the latter on to the box, a, the nipples of the spring will rub against the segments attached



THE SUSSMANN MINER'S LAMP.



THE "STANDARD" ORE CAR.

to the plate, so as to switch on the light, and then, when the nipples come into contact with the intermediate band of ebonite, the light will be switched off, to be switched on again when the poles are inverted. There are thus two interruptions for each turn; and it is, of course, easy to stop at this point in the last turn, and thus switch on the light at the moment of giving out the lamp.

As this arrangement of turning contact requires a fixed and rigid support for the spring terminals, the latter are kept in place by the support, o, which is constituted by an ebonite cup—see Figs. 4 and 6—which is traversed both by the small terminals, n n, and the tubes, p p, that permit the gas of the accumulators to pass off; and it is below this cup, o, that metal rods, m m, issuing from the cells, are connected at the inner portion, k, of the terminals by means of the flexible leads, l l. These improvements appear to be sanctioned by practice; and lamps crushed between two tubs have even continued to give light, while the appliances for charging the accumulators have also been greatly improved with a view to facilitate this work.

The accompanying illustration shows a pattern of ore car built by the American Engineering Works of Chicago. Within a few months a large number of these cars have been shipped from the works to various mines in this and adjoining countries. These cars have some peculiarities of construction; the "Anaconda" patent self-oiling axles and wheels are used. The dimensions of the car as shown in cut are: wheel diameter, 12 in.; gauge, 13 in.; height over all from top of rail, 4 ft. 0 1/4 in.; height from top of box to top of rail, 3 ft. 9 1/2 in.; shipping weight, 1,000 lbs.; capacity, 16 cu. ft. The box dimensions are: Depth, 24 in.; width, 26 in.; length, 44 in.; sides are 3/16 in. thick, and the bottom 5/16 in. The car body rests on a heavy cast-iron bolster and turntable, the latter being securely bolted to the truck. The car is thus easily swung in any direction desired, and its contents dumped on one side of the track or at the end. The discharge door in front is hinged at the top and operated from the rear end, with a wrought-iron handle fixed to the latch-rod, which runs under the car body, by means of which the car can be easily locked or unlocked as desired. The sides and bottom of the car can be made of any thickness of steel desired. The corners are reinforced with 2-in. angle iron, and the top and sides are stiffened with heavy steel bands and straps. The axles are let into the frame and all parts of the car are strongly built, making it a serviceable and lasting type for heavy work.

DEATHS FROM BLASTING IN A COAL MINE.—At a meeting of the southeast district of the Societe de l'Industrie Minerale the chairman, M. Laurans, called the members' attention to the circumstance of several miners in a German colliery having been found lifeless while their lamps were still burning, after the firing of a dynamite shot, although they had waited the regulation length of time before returning to the place. Spectroscopic analysis revealed blood poisoning by carbonic oxide; and Bergassessor Heise concluded from this fact that the reaction of the explosion products, at a high temperature, on the excess of carbon reduced the CO₂ and transformed it into CO, justifying his conclusion by calculation of the quantities of CO which might form under such circumstances, and showing that they are sufficient to cause the blood poisoning that ensued.

QUESTIONS AND ANSWERS.

Queries addressed to this department should relate to matters within the special province of this periodical, such as mining, metallurgy, chemistry, geology, mineralogy, machinery, supplies, etc. As it is manifestly impossible to devote space to all the questions and notes constantly received, preference will be given to topics which seem to be of interest to others besides the inquirer. We cannot here undertake to give professional advice on problems requiring special investigation and which should be obtained from a consulting expert. Nor can we undertake to give advice about mining companies or mining stocks. Brief replies to questions will be welcomed from correspondents. While names will not be published, all inquirers should send their names and addresses. Anonymous questions will not be answered. Preference will, of course, always be given to questions submitted by subscribers.—Editor E. & M. J.)

Firemen in English Mines.—Are firemen in mines in England required to hold a license?—T. S.

Answer.—Firemen employed in mines in England are required to pass an examination and to hold a license or certificate from the proper authority; usually, we believe, the district inspector or his deputy.

Kaolin.—I have what appears to be extensive beds of an excellent kaolin, which I would mine if I could find a market for it. The kaolin is two miles from a railroad (Versailles, Mo.). Can you give names of nearby users of this article?—A. F. N.

Answer.—The nearest market, though a somewhat restricted one, would be among the potters in St. Louis and neighborhood. Next to that would be the extensive potteries around East Liverpool, Ohio. Consult "Engineering and Mining Journal," October 28th, 1899, page 522; also "The Mineral Industry," Volume VII, pages 148-160.

Locomotive Cinders.—A locomotive boiler, owing to the strong draft, usually throws out a quantity of unconsumed coal among the cinders. Is it possible to utilize this waste?—C. S. McD.

Answer.—The Eastern Railroad Company of France collects the cinders taken from the smoke-boxes of locomotives and makes them into briquettes with a Dupuy briquette machine, using coal tar as a binder. On the Saxon State lines in Germany the cinders collected in the same way were mixed with coal and burned for some time as an experiment. This was given up because it was thought that it did not pay; but recently it has been resumed. The only case we know of where any attempt has been made in this country is on the New York, New Haven & Hartford Railroad, where the cinders cleaned out of locomotive smoke-boxes are mixed with coal and burned at the company's electric power house at Stamford, Conn. These cinders are largely fine coal and there is no reason why they cannot be burned when properly prepared.

Nickel Ores and Methods of Reduction.—What is the average percentage of nickel contained in the utilized ores of Canada and of New Caledonia? Do you know of any system, electrical or otherwise, by which large deposits of low-grade nickel ores can be economically reduced?—E. M. W.

Answer.—1. The Canadian ores vary largely in their percentage of nickel, extremes being 1.3 and 11 per cent. The New Caledonia ores exported average about 7 per cent. nickel. For the varying tenor of the Canadian ores consult a paper by D. H. Browne in the "Engineering and Mining Journal," December 2d, 1893, page 565.

2. There are a number of processes for the reduction of the complex ores in which nickel usually occurs. You will find accounts of these processes in the volumes of "The Mineral Industry." In Volume VII of that work there is a summing up of the latest progress in the metallurgy of nickel.

The treatment of your low-grade ores would depend very much on their nature and contents other than nickel. Your best course would be to consult a metallurgist who has had experience with nickel ores.

Chimneys for Steam Boilers.—Can you give me any rule for determining the size of a smoke-stack for a boiler? The boiler in question is an ordinary tubular boiler, to be set in brick-work.—B. J. N.

Answer.—A common rule is that the area or cross-section of the chimney should be one-eighth of the grate surface. Barr, in his excellent book on "Boilers and Furnaces," says: "The chimney area must bear some relation to the quantity of coal burned. In practice it is found that for sizes up to 1,000 horse-power the most satisfactory chimneys are those in which from $1\frac{1}{2}$ to 2 sq. in. of chimney area are had for each pound of coal burned per hour. According to this rule a chimney suitable for a consumption of 1,000 lbs. of coal per hour would vary between $1,000 \times 1.5 = 1,500$ sq. in., or $43\frac{3}{4}$ in. diameter, and $1,000 \times 2 = 2,000$ sq. in., or $50\frac{1}{2}$ in. diameter. . . .

"The area having been fixed, a common rule is to make the height of a small chimney 25 times its diameter, with a gradual decrease in the ratio for larger chimneys. Thus a 4-ft. chimney may be 100 ft. high, a 5-ft. chimney 120 ft. high, a 6-ft. chimney 135 ft., an 8-ft. chimney 160 ft., and a 10-ft. chimney 175 ft."

Local circumstances may alter these proportions somewhat. Thus higher buildings or land in the immediate neighborhood would affect the draft of a chimney. Anthracite coal requires a higher chimney than free-burning bituminous coal.

Organic Fertilizer.—Will you kindly let me know if there is a market for an organic fertilizer having the following composition: Phosphoric acid (P_2O_5) 1.96 per cent.; ammonia (NH_3) 7.07; sulphuric acid (SO_3) 5.56; water 4; mineral matter 71.98; non-nitrogenous and volatile 9.43 per cent.—H. M. S.

Answer.—The value of any substance as a fertilizer depends largely upon how readily the nitrogen, phosphoric acid, etc., it contains can be assimilated by plants; that is, the fertilizing value of any substance depends not only on composition as shown by such an analysis as you send, but also on the condition of the fertilizing elements. The phosphoric acid in your substance might be worth from 2 cents to 5 cents per unit at New York, and the nitrogen from 8 to 12 cents at wholesale. Roughly speaking, the material may be worth from \$10 to \$18 per ton at New York. You do not say that it contains potash, which would increase its value at the rate of about 4c. per unit of potash. If the mineral matter contains lime and magnesium the agricultural value would be greater. Any free sulphuric acid would be decidedly objectionable. It is impossible to say whether there would be a market without fuller particulars. In any event the great fertilizer companies, such as the American Agricultural Chemical Company of New York, and the Virginia-Carolina Chemical Company of Richmond, Va., would be the concerns liable to handle large amounts.

Prospects in South Africa.—I am a graduate in mining engineering and have spent some time in British Columbia, but would like a wider field. Can you tell me anything about the opportunities in South Africa? How are wages and living expenses? Is the climate healthy? Is the country hilly or level? Are gold-bearing areas believed to exist in the Transvaal not yet prospected?—J. C. E.

Answer.—Under present conditions, of course, nothing can be done in South Africa, and if you have any idea of going there you will have to wait and see what the outcome of the war may be. Generally speaking, South Africa is a country of large companies and syndicates, where mining and milling are on a large scale and are profitable only on that scale. There are few opportunities for prospectors or small miners. A young engineer should have some acquaintances or connections on which he can rely before going there; and those are probably better secured in London than in Johannesburg. As to pay, the wages for white men are generally high, but costs of living are high also. The climate is fairly healthy. The Transvaal is, generally speaking, a high plateau bordered by mountain ranges, and interspersed with some hills. There are some areas not yet prospected, but prospecting in that country is not easy work, even for a man well acquainted with the field; much less for a stranger.

We may add that North America presents a wider field and better openings for a young mining engineer than any other part of the world. If British Columbia seems too narrow for you, there are abundant opportunities on the southern side of the International boundary.

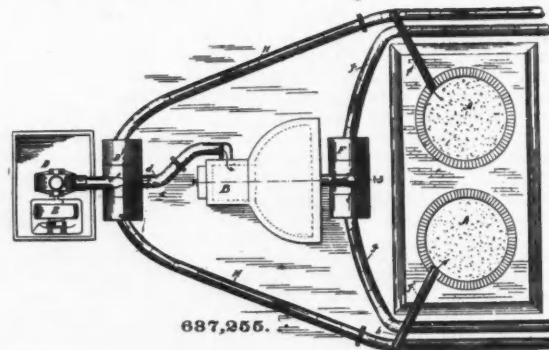
PATENTS RELATING TO MINING AND METALLURGY.

UNITED STATES.

The following is a list of the patents relating to mining and 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 November 21st.

637,255. PROCESS OF MAKING COKE. Joseph Hemingway, Spearfish, S. D., assignor to the Universal Fuel Company, Chicago, Ill. The process consists in confining the coal in an oven, firing the coal, and then subjecting the coal to a temperature sufficiently high to cause



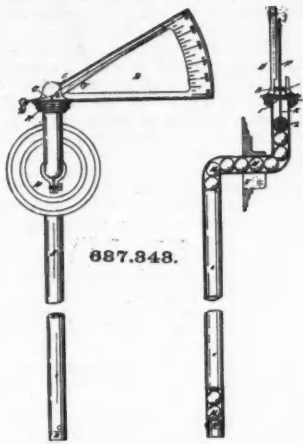
not only the generation of gases, but also the disintegration of their elements and the conversion of volatile carbons into fixed form and their disposition as constituent appreciable integral additions to the coke product.

637,313. APPARATUS FOR RECUTTING FILES BY ELECTROLYSIS. Samuel Wicks, Cleveland, Ohio. In an apparatus for recutting files electrically, means to support the files singly and separately, means to adjust said files to any depth desired in the electrolyte, cathode members supported and suspended within pockets in the walls of said apparatus, and electrical connections.

637,333. MEANS FOR TRANSMITTING FLUID UNDER PRESSURE. William S. Halsey, Pittsburg, Pa., assignor to the Pneumatic Crane Company, same place. The combination of a fluid-pressure reser-

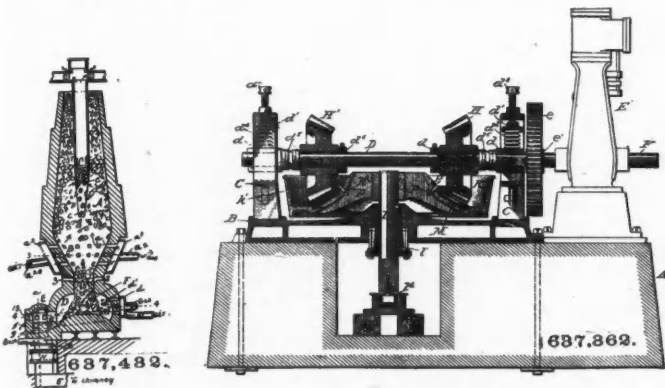
voir, a receiver surrounding and movable longitudinally on said reservoir, a fixed support, a longitudinally-divided casing surrounding and suspending the reservoir and connected to the fixed support, means for utilizing fluid-pressure supplied from the reservoir, and a fluid-pressure exhaust pipe.

637,343. **PYROMETER.** Henry von Koehring, Seguin, Tex. The combination with a continuous tube bent to form two legs extending in substantially the same direction in offset relation to each other and con-



nected by a transverse portion, of a row of expansible balls or spheres of smaller diameter than the tube and positioned in a single row in the legs and transverse portion thereof in contact with each other, a closure for one of the legs of the tube forming a support for the column of balls, and an indicator on the other leg which is actuated by the ball at the top of the column.

637,362. **PAINT MILL.** Joseph T. Trees, McKeesport, Pa. The combination with the pan provided on the inner surface thereof with an annular



toothed or corrugated surface, of a driving-shaft arranged over the pan and provided with a pair of similarly-toothed wheels in gear with said toothed surface; one of said wheels being fast on the shaft, so as to impart motion to the pan, and the other loose thereon so as to be driven by the pan.

637,369. **METHOD OF RENDERING IRON CASTINGS MALLEABLE.** John C. Bradley, Buffalo, N. Y. The method consists in packing the castings in pulverized furnace-slag rich in iron oxide, and subjecting them to an annealing heat.

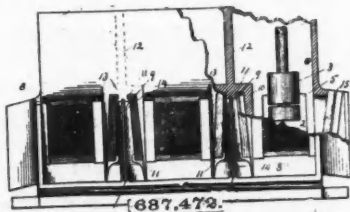
637,410. **PROCESS OF AND APPARATUS FOR DISSOCIATING SUBSTANCES BY ELECTROLYSIS.** Goldsbury H. Pond, Ashburnham, Mass. The process consists in packing a soluble salt between two vertical electrodes, then feeding a saturated solution of the same salt to the inner face of each electrode, and passing an electric current through.

637,417. **PUMP FOR GAS-GENERATING MACHINES.** Valentine J. A. Rey, San Francisco, Cal. The combination with an air-compressor of an expanding fluid-reservoir, a water-motor to operate the compressor, an inlet-valve to said motor, a movable sleeve carried on the movable part of said reservoir and a weighted lever operating to start the valve by cumulative pressure.

637,427. **COKE-LOADER.** Frederick W. Stammier, Johnstown, Pa. The combination of a carriage mounted on suitable tracks, a car mounted on said carriage adapted to operate at a right angle to the movement of the carriage, said car having a bottom composed of a series of hinged doors provided with supporting-rollers.

637,432. **GAS-BLAST FURNACE.** Dimitris Tschernoff, St. Petersburg, Russia. A furnace having a shaft, A, with openings, a, near the base of the shaft, a chamber on the exterior over said openings, a pipe, P, from the upper part of the chamber to the interior of the shaft toward the top thereof, and a perforated pipe, C, in the shaft.

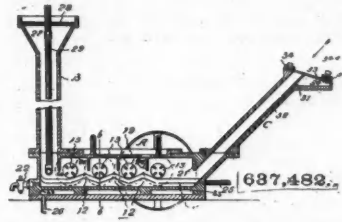
637,471 and 637,472. **MORTAR FOR STAMP-BATTERIES.** William A. Merrialls, San Francisco, Cal. A mortar having a row of chambers, the rear wall of the mortar having a row of feed-holes adapted



for feeding into the respective chambers and independent feed-chutes therefor, and the front wall having a row of screen-openings in front of the respective chambers, said front wall having an

aperture between each pair of screen-openings, said apertures being adapted to receive a pair of lateral discharge-screens, and the mortar-casing being provided with guides for holding said screens in place, a vertical transverse partition in the mortar above each aperture, upper and lower guides below each partition, and removable vertical partitions sliding in said guides and separating the lateral screens so held in place.

637,482. **AMALGAMATOR.** Louis C. Park, Vancouver, Canada, assignor to William W. Slater, Edinburgh, and James Galloway, Jr., Leith, Scotland. An amalgamator having the chamber-sections, A, B and C, arranged so that water will gravitate therethrough, in combination with a longitudinal groove, II, arranged along the center of



bottom of said chamber, A, the bottom of said chamber on the opposite sides of the groove, II, being sloping upwardly from the groove to the side walls of the said chamber, and ribs, 12, placed on the oppositely-sloping sections of the bottom at intervals and at right angles to the groove, with their approaching ends terminating at the opposite edges of such groove.

637,488. **APPARATUS FOR DETERMINING CONSTITUENTS OF GASES.** Alfred Steinbart, Carlstadt, and Edward A. Uehling, Newark, N. J. The combination with a tube system, having two contractions forming two fine apertures through which the gas is conveyed, means for maintaining that part of the tube system provided with the contractions at a constant temperature, an indicator for showing the tension of the gas in that part of the tube system between the two contractions and means for conveying the gas through the tube system at a constant difference between the tension of the gas at the inlet and outlet ends of the tube system, and means for containing a substance which absorbs one or more constituents of the gas.

637,501. **SURVEYOR'S LEVELING-ROD ATTACHMENT.** Walter G. Clason, Fitchburg, Mass., assignor to Edward G. Soltmann, New York, N. Y. The combination with a leveling-rod, of a graduated ruler movable longitudinally relative to said rod and provided with means for automatically determining the measurements from the datum-line.

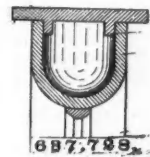
637,516. **PUMP FOR COMPRESSING AIR OR GAS.** Henry E. Ludwig, Erie, Pa. The combination in an air or gas compressor having a passage adapted to connect the ends of the compressing-cylinder, of a valve controlling said passage and adapted to open said passage at or near the commencement of the return stroke of the piston in said cylinder for equalizing the pressure in the ends thereof, and means for admitting liquefied air or gas into the passage.

637,585. **ELECTRO-PLATING APPARATUS.** Edward Hett, New York, N. Y. The combination with the containing vessel of an electro-plating apparatus and suitable electrical connections, of supporting and revolvable shafts mounted in suitable boxes and having at their inner ends interior clamping-heads.

637,659, 637,660 and 637,661. **COMPRESSION OF AIR AND UTILIZATION THEREOF.** Edward E. Petee and John J. McCutchan, New York, N. Y., assignors, by mesne assignments, to the Automatic Air Carriage Company, of New York. The method consists in preheating and moistening the air and compressing it in that condition and maintaining the heat of compression of the dense moist air throughout its passage from the compressor to the motor.

637,716. **BUCKET CONVEYOR.** James M. Dodge, Philadelphia, Pa., assignor to the Link-Belt Engineering Company, same place. Filed Dec. 31, 1897. The combination of an endless chain made up of a series of links, arms projecting from the links, buckets pivoted to said arms, each bucket having a lip adapted to overlap the edge of an adjoining bucket.

637,728. **CAST-METAL PILE.** Maurice Goldberger, Fort Wayne, Ind., assignor to the Fort Wayne Smelting and Refining Works, same place. A cast-metal foundation-pile whose body is formed of three



integral wings or flanges arranged as shown, pointed at their lower end, and whose upper end is formed into an integral hollow receptacle or chamber, and a removable cap having an annular flange upon its lower face adapted to fit within the open top of said chamber.

GREAT BRITAIN.

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

Week Ending October 28th, 1899.

- 21,395 of 1898. **GOLD ORE LIXIVIATION.** J. B. de Alzugaray, London. Treating gold ore, after pulverization, with sufficient concentrated solution of cyanide to moisten it, then treating it in a closed vessel with oxygen and bromine.
- 23,221 of 1898. **ROASTING ZINC-LEAD SULPHIDES.** G. de Bechi, Paris, France. Roasting zinc-lead sulphide and salt in separate vessels and bringing the vapors of both into contact.
- 23,810 of 1898. **MINER'S LAMP.** J. Naylor, J. Roby and W. Abbott, Wigan. Detailed improvements in the miner's safety lamp described in the inventor's patent 2,639 of 1897.
- 24,696 of 1898. **MINER'S ACETYLENE LAMP.** T. G. Macfie, London. A miner's safety lamp adapted for the use of acetylene.
- 25,808 of 1898. **DIAL FOR MINERS.** T. A. O'Donahue, Wigan, and J. Holden, Manchester. A miner's dial, in which the outside arc for reading vertical angles is dispensed with.
- 1,258 of 1899. **STONE-BREAKER.** J. E. and J. Broadbent, Staleybridge. In stone breakers, arrangements for fixing and removing the steel jaws.
- 7,723 of 1899. **GAS GENERATOR.** J. Tereney and B. Uhlyarik, Budapest, Hungary. Improvements in gas generators for smelting steels.

PERSONAL.

Mr. Ellsworth Daggett is in Oregon on a special mission.

Mr. Samuel Newhouse, accompanied by Mr. George Keppel, of London, is in Salt Lake City.

Mr. D. J. McDonald, mining operator, of Rossland, B. C., is in San Francisco.

Mr. R. F. Heywood arrived in Salt Lake City recently from a trip to New York.

Mr. C. A. Molson, after devoting a week to Utah, left Salt Lake City eastward bound on December 2d.

Mr. Victor M. Clement was recently in Southern Utah, looking over some Piute County mining properties.

Mr. C. H. McIntosh, ex-governor of British Columbia and prominent mine owner there, is in San Francisco.

Mr. G. A. Duncan has been in Boston reporting on the condition of several Utah undertakings of which he has the management.

Mr. W. H. Aldrich, after a hasty look at the ore treatment situation in Colorado, Utah and Montana, has returned to British Columbia.

Mr. John A. Turner, gold commissioner at Nelson, B. C., now on leave of absence, sailed for England November 29th on the "Teutonic."

Mr. Max Boehmer, mining engineer of Leadville, is visiting the Cripple Creek district on business connected with the Jack Pot property.

Mr. Walter H. Wiley, a prominent mining engineer of Idaho Springs, is visiting in Cripple Creek in connection with the Doctor-Jack Pot suit.

Mr. Augustus Miller, who for 33 years has been general superintendent of the Pottstown Iron Company's plant at Pottstown, Pa., has resigned.

Mr. Francis T. Freeland, superintendent of the Smuggler Mine at Aspen, is in Cripple Creek, Colo., on business connected with the Doctor-Jack Pot suit.

Capt. Samuel Mitchell of Negaunee, Mich., a well known mining superintendent in the Lake Superior country, has resigned as general manager of the Negaunee Mine.

Mr. H. C. Callaghan, manager and consulting engineer of the Lake View Consols, Kalgurlie, Australia, is in San Francisco. He was formerly located at Virginia City, Nev.

Mr. J. H. James of Chicago has returned from Sonora, Mexico, where he has been examining mines for Chicago and St. Louis people. Mr. James returns to Sonora in a week or two.

Mr. Ernest R. Woakes, mining engineer, who has been recently at Nelson, B. C., leaves that place this week for New York. He expects to leave New York December 16th for England.

Mr. L. R. Pomeroy, who has for some years represented certain departments of the Cambria Steel Company in New York, has resigned to accept a position with the Schenectady Locomotive Works.

Mr. S. P. Sheldon, superintendent of the open hearth department of the Otis Steel Company, Cleveland, O., will soon become assistant general superintendent of the Joliet works of the Illinois Steel Company.

Mr. J. L. Parker, of the firm of J. L. Parker & Company of Rossland, B. C., has been appointed superintendent of the North Star Mine at Cranbrook, B. C., and will have his headquarters at that mine.

Mr. W. A. Jowett, late proprietor of the Nelson, B. C., "Miner," who has been in the Kootenay District 11 years, sailed for England on the "Teutonic," November 29th, taking a property to place in England.

Mr. George H. Robinson is in Butte, Mont., after a flying trip to Arizona via San Francisco and back to Denver and Salt Lake City. He states that he never knew the mining outlook in the West to be brighter.

Mr. Henry A. Fry and Mr. Joseph Wright of Philadelphia are at Globe, Ariz., visiting the property of the Donellan Mining Company, in which they are interested. Mr. Fry is president of the Donellan Mining Company.

Mr. D. C. Jackling, on January 1st, will sever his connection with the De La Mar Mines, Mercur, Utah, to take charge of the metallurgical department of the Republic Mine, Republic, Wash. He is designing a 200-ton treatment plant for the Republic, to be erected with the utmost expedition.

OBITUARY.

Alexander M. Guthrie, a member of the firm of A. M. Guthrie & Company, Limited, crucible manufacturers of Pittsburg, Pa., died in New York City, November 30th, aged 57 years.

George W. Prince, secretary of the Golden Fleece Mining Company of Lake City, Colo., was instantly killed in a collision on the Denver & Rio Grande Railroad near Salida on December 4th.

George M. Kepler, a pioneer in the petroleum industry of Western Pennsylvania, died at the residence of his son, in Pittsburg, Pa., on November 23d. Mr. Kepler was born in Center County, Pa., and went to the oil regions during the famous Pithole excitement. He operated extensively at Petroleum Center and Triumph Hill, and later in Clarion and Butler counties. He was very successful in his projects and became wealthy.

G. E. Stevenson, a prominent English engineer, died at Manchester, Eng., recently from injuries received in a disastrous gas explosion. He was born in Cincinnati, O., served at the London & Brighton Railway Works, and was a gas engineer and a manager of gas undertakings for upwards of 25 years. He resided from 1885 to 1891 in Buenos Ayres, South America, during which period he constructed several gas works. Since 1891 he had been chief consulting engineer of the gas department of the Manchester Corporation. He was a member of the Institution of Civil Engineers and had been president of the Incorporated Institution of Gas Engineers.

John I. Blair, of Blairstown, N. J., reputed one of the wealthiest men in the United States, died on December 2d, in his home at Blairstown, N. J., at the great age of 97 years. He was born August 22d, 1802, near Belvidere, N. J., his ancestors being Scotch Presbyterians. When but 10 years old, it is said, he determined to get rich. He became clerk in his brother's store and at 17 had a store of his own. By 1830 he was proprietor of 5 general stores in the country about Belvidere. He made money and took an interest in the iron industry at Oxford Furnace. Later, about 1839, in company with George W. and Joseph Scranton, Moses Taylor, Robert C. Winthrop and others he organized the Lackawanna Coal and Iron Company.

To market the coal and iron a railroad was necessary and from this has grown the present Delaware, Lackawanna & Western system. In 1860 John I. Blair began railroad building in the West. His first venture was with the Chicago, Iowa & Nebraska, now part of the Chicago & Northwestern. This venture turned out so well that he went into other road building projects, taking land grants in payment. It is said that at one time he owned more land and more railroads than any man in the world. In connection with his many railroad and land and town-site enterprises he was at times interested in mining properties, including iron mines in Sussex and Morris counties, N. J., and silver and gold mines in the West, including the famous Silver Peak Mine in Esmeralda County, Nevada. He was also a large owner of slate quarries in the Bangor region, Pennsylvania. Mr. Blair led a quiet life at Blairstown and it is said of him that he was the only one of this country's very rich men to accumulate a great fortune outside a large city.

SOCIETIES AND TECHNICAL SCHOOLS.

Johns Hopkins University.—A fire in Dalton Hall, the chemical laboratory of the university, on December 4th burnt out the upper story of the building. The loss is estimated at \$12,000.

Montana Society of Engineers.—At the meeting in Butte on November 11th it was decided to hold the regular annual meeting on January 13th at Bozeman. The president appointed the committee of arrangements for the annual meeting, as follows, viz.: Wm. H. Williams and Clayton H. Thorpe, both of Bozeman, and Frank L. Sizer of Helena.

Michigan Engineering Society.—The society will hold its next annual meeting at Kalamazoo, beginning January 2d. Among the papers to be presented are: Placer Mining on Douglass Creek, Wyoming, by H. G. Rothwell; Brick and Asphalt Paving, H. E. Riggs and F. F. Rogers; Modern Power Plants for Manufacturing Purposes, B. E. Parks; The Allegan Dam, J. C. Riley; Hydraulic Formulae, M. E. Sullivan; Economic Geology of Lower Michigan, A. C. Lane; Land Grants in the United States, R. W. Hawley. The officers of the society are: J. J. Hubbell, Manistee, president; H. E. Riggs, Toledo, vice-president; F. Hodgman, Climax, secretary and treasurer.

American Society of Mechanical Engineers.—The 20th annual convention in New York this week was well attended. The following officers were elected: President, Charles H. Morgan; vice-presidents, E. D. Meier, George R. Stetson, B. H. Warren, Jesse M. Smith, Stevenson Taylor, David Townsend; treasurer, William H. Wiley; secretary, F. R. Hutton.

The retiring president, G. W. Melville, gave the presidential address.

The committee having charge of the matter of boiler trials reported that at present some form

of calorimeter in which coal is burned in an atmosphere of oxygen gas is to be preferred. This committee, consisting of Charles E. Emery, William Kent, George H. Barrus, Charles T. Porter, Robert H. Thurston, Robert W. Hunt, F. W. Dean, J. S. Moon, and William B. Potter, recommended "that, as far as possible, the capacity of a boiler be expressed in terms of the number of pounds of water evaporated per hour from and at 212 degrees."

The committee determined to accept the Centennial standard, and to recommend "that in all standard trials the commercial horse-power be taken as an evaporation of 30 lbs. of water per hour from a feed-water temperature of 100 degrees Fahr. into steam at 70 lbs. gauge pressure, which shall be considered to be equal to 34½ units of evaporation; that is, to 34½ lbs. of water evaporated from a feed-water temperature of 212 degrees Fahr. into steam at the same temperature. This standard is equal to 33,305 thermal units per hour."

Prof. R. H. Thurston of Cornell University read a paper on "The Steam Engine at the End of the Nineteenth Century." He said, in closing:

"The twentieth century will very probably see the field of the steam engine greatly restricted by the introduction of other heat motors, as well as by the general employment of electricity for distributing power from hydraulic and pneumatic prime movers."

Other papers read were, "The Berthier Method of Coal Calorimetry," by C. V. Kerr, and "Pressure in Pipe Due to Stoppage of Flowing Liquid," by George M. Peek. M. P. Higgins of Worcester, Mass., read a paper entitled "Education of Machinists, Foremen, and Mechanical Engineers."

Mr. Higgins spoke of the incomplete work of the present technical schools and referred to the over-supply of polytechnic engineers, without preliminary training in the shops.

Another paper was "Compression and Liquefaction of Gases," by Arthur L. Rice of Brooklyn.

A movement has been started by the association to raise a fund to erect a suitable memorial to mark the grave of Robert Fulton in Trinity Churchyard, in New York City.

INDUSTRIAL NOTES

Earl C. Bacon of New York City has shipped a lot of heavy crushing and pulverizing machinery to Corinto, Nicaragua.

The 30-ton furnace at Cranberry, N. C., is being overhauled and will be in blast before January 1st. J. F. Huddle is superintendent.

The extension of the furnace building of the Raritan Copper Works at Perth Amboy, N. J., will be furnished by the Berlin Iron Bridge Company of East Berlin, Conn.

The Metropolitan Railway Carriage & Wagon Company of London has ordered from Westinghouse, Church, Kerr & Company three 225 H.P. Westinghouse gas engines.

The Clyde Steamship Company has placed a contract with the Berlin Iron Bridge Company, of East Berlin, Conn., for a new pier shed and a dock at Providence, R. I. The building will be 40 ft. wide and 600 ft. long.

The Lawrence Machine Company of Lawrence, Mass., is to furnish a centrifugal pumping plant, to be installed at the works of the Ohio Steel Company. The plant will have a capacity of 160,000 gal. per minute.

The Union Smelter Manufacturing Company of St. Louis, H. Tiedeman, manager, is to build a 50-ton custom smelter at Sumpter, Ore. The company recently erected a 20-ton pyritic plant for the Tasmania Copper Company at Winfield, Colo.

The Siemens-Halske Electrical Company of Chicago has secured the contract for the electrical machinery and appliances for the new basic open hearth steel plant for the Sharon Steel Company, at Sharon, Pa. Included in the equipment of 2 generators of 600 H.P. each.

The works of the Continental Wire Company at Granite City, Ill., are about to start up again under the direction of the Merchants Wire and Nail Company. The latter company will put the works in order, pay all expenses of operation and pay the receiver of the Continental Company \$24,000 per year.

The Webster Manufacturing Company of Chicago has secured the contracts for the entire equipment of elevating, conveying and power transmission machinery for the Buckhorn Portland Cement Company of Manheim, W. Va., and the Virginia Portland Cement Company of Craigsville, Va.

The Premier steel plant at Indianapolis has been purchased by Pittsburg and Indianapolis parties, who have organized as the Central Steel Company with the following officers: President, Major Collins, of Brazil; vice-president, W. J. Carlin, of Pittsburg; treasurer, Crawford Fairbanks, of Terre Haute; secretary, Joseph Paull, of Pittsburg.

The Denver office of the Jeanesville Iron Works Company recently received a telegraphic order from Red Bluff, Mont., for a 22 in. by 10 in. by 18 in. mining pump; also a 16 in. by 10 in. by 12 in. pump from Salt Lake City, Utah. The big compound condensing 800 ft. lift pump for the Vindicator Mines at Independence, Colo., was shipped last week.

The Robb Engineering Company of Amherst, N. S., is furnishing the Dominion Iron and Steel Company two 150 H.P. engines to be used for electric lighting, besides a number of smaller engines and boilers for temporary use during the work of erecting the larger engines. The Ymir Gold mines of Nelson, B. C., have placed an order with the Robb people for 3 new Mumford boilers.

Fraser & Chalmers of Chicago have sold an adjustable Comet "G" crusher to the Momenca Stone Company of Momenca, Ill., owned by the Chicago & Eastern Illinois Railroad. This crusher is the largest size built and has the enormous capacity of 200 tons per hour crushed to 2½ in. ring. The selection of the Comet machine was determined by its adjustable features, saving another crusher to re-grind tailings and spalls.

The Edward P. Allis Company was awarded the contract for the large copper smelting and refining plant to be erected by the Rio Tinto Company, Limited, at its mines in Spain. The smelting furnaces of the sectional steel water jacket type will measure 42 in. by 160 in. at the tuyers and will be complete with inclosed charging tops, overhead downtakes and 12 ft. steel settlers. The converters will be of the trough design with hydraulic tipping device and the necessary converter and relining stands, moulds, trucks, etc. The carrying ladders from settlers to converters will be handled by a 30-ton electric traveling crane, having 4 movements driven from a 50 K. W. generator. The crushing, pulverizing and mixing machines for converter lining will be moved by electric power. The blowers and electric generator will be driven by a Reynolds Cross-compound, Corliss engine. The compressor for supplying air to the converters will be of the same type. Hydraulic pumps and elevators, blowers, scales, generators, motors, etc., are included in the contract.

This plant, when erected, will be one of the most modern and complete in existence.

TRADE CATALOGUES.

The Haydenville Company of New York City and Haydenville, Mass., has issued its 1900 special and supplementary catalogue of plumbing and steam brass and iron goods. The firm manufactures bibbs, stops, cocks and valves in great variety. These are illustrated in the 68-page pamphlet, and prices are given.

The Bucyrus Company of South Milwaukee, Wis., builder of steam shovels and dredges, has issued a 14-page pamphlet on "Placer Mining Dredges" as part 8 of its catalogue. The pamphlet states that the Bucyrus placer mining machines are of 2 types, one for river, the other for land mining. The river machine is mounted on a float, the land machine on wheels. The river machines are of the bucket type, the buckets being fitted with Robinson's improved joint, greatly reducing wear. These dredges are made in 2 sizes, but the company is prepared to build to order any size desired, from 200 to 20,000 cu. yds. per day. The company's machine for land mining has a steam shovel and its capacity is about 60 cu. yds. of gravel per hour. Several half-tone cuts show how the company's dredges look in operation.

MACHINERY AND SUPPLIES WANTED.

If any one wanting machinery or supplies of any kind will notify the "Engineering and Mining Journal" 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 and selling goods of any kind.

GENERAL MINING NEWS.

Oil Production in November.—Field operations continue very active. There was a large amount of wildcatting during the month, but nothing out of the ordinary. There were, says the Oil City "Derrick," 1,380 wells completed in the Pennsylvania and Lima fields in November; the dry holes numbered 248 and the new production was 18,944 bbls. This is an increase of 34 wells completed, with a loss of 606 bbls. in new production, compared with October. On November 30th the count in all fields showed 674 rigs and 1,186 drilling wells. This was 52 fewer rigs and

62 more wells drilling than at the close of October.

Whitebreast Fuel Company.—The coal mining properties of this company of Chicago have been sold for \$520,000, the purchase being in the interests of bondholders. The properties were sold at masters' sales under a decree of foreclosure in the Federal courts in the suit of the Atlanta Trust Company of New York against the Whitebreast Fuel Company to foreclose a mortgage of \$600,000, of which amount \$120,000 had been paid before suit was begun. The coal properties are located in Marion, Lucas and Monroe counties, Iowa, and Ladd and Bureau counties, Illinois.

ARIZONA.

Gila County.

Ray Copper Mines.—Two 3-compartment shafts 11½ by 5 ft. are down over 100 ft. They will be equipped with powerful gasoline hoisting engines, also air compressors. A track to the new townsite on the Gila River is under construction. The townsite will be named Kelvin. At the mine about 60 men are employed on development, under General Superintendent Lambert, with J. P. Lawrence, formerly of Globe, as superintendent.

CALIFORNIA.

Calaveras County.

(From Our Special Correspondent.)

Harris.—The double compartment shaft at this mine, 1½ miles from Angels, is down 336 ft. at which depth the ledge is reported to be 50 ft. wide, assaying very high.

Little Hero.—At this mine near El Dorado, the new shaft, down 30 ft., has developed some ore assaying as high as \$75 per ton. This property, which was worked in the early days, shows some very rich croppings.

Rose Hill.—Lewis Emery, who is operating this property, 1 mile southwest from El Dorado, is to increase the water supply. The dam 2½ miles above El Dorado is to be raised 14 ft., and a ditch 6 ft. wide will convey the water from the reservoir to the penstock, from which point it will be carried 6,000 ft. by a 30-in. pipe, and then conveyed by two 18 in. pipes to the Cave City and the Rose Hill mines, where hydraulicking will begin. A tunnel for a tail-race is also being dug from Murray Creek toward La Chapelle Flat, a distance of 1,400 ft. Through this tunnel a large part of La Chapelle Flat is to be hydraulicked.

Kern County.

(From Our Special Correspondent.)

Pacific Coast Borax Company.—The works at Borax Lake are being cleaned out and put in order preparatory to getting out borax on a large scale. A force of men have been engaged and 100 tons per month will be shipped.

Randsburg District.—Most of the mines in this district are being worked, and are said to pay well. The Blackhawk and Red Dog mills are running on ore from the Butte and other mines. The Wedge mills about 40 tons per day, the Irene, Napoleon, Hector and Jenny Lind mines have all made small runs of rich ore, and the Ruby has just cleaned up 120 tons.

Madera County.

(From an Occasional Correspondent.)

Macdonald Mines.—The 10-stamp mill which began work November 1st handles about 25 tons daily. Munro Archibald, late of the Dufferin Mine, Nova Scotia, has been appointed assistant superintendent to Mr. McDonald. The new Goré pumping plant is working satisfactorily. About 16 men are employed. Arrangements have been made with Connor & Grant of San Francisco for 10 additional stamps, which will be installed in the spring.

Nevada County.

(From Our Special Correspondent.)

California.—The impounding dam at this mine, 4 miles west from Grass Valley, has been completed. It is 337 ft. long and 14 ft. high. The tailings saved will be treated in the future.

Mayflower.—The new canvas plant at this mine on Little Deer Creek, 2 miles southeast from Nevada City, is working satisfactorily, saving many ounces of gold which formerly went down the creek.

Placer County.

(From Our Special Correspondent.)

Hidden Treasure.—At this drift mine at Sunny South, a new channel known as the Dam was located about 5,000 ft. in from the main channel. It is 32 ft. lower than the tunnel level in the upper channel. The gravel is blue and 6 ft. wide and is reported very rich, going as high as \$5 per car. An incline is to be run up the channel some 800 ft. The gravel cars are to be hauled by electric locomotives. H. T. Power is superintendent.

La Trinidad.—This mine on Sailor Canyon, 16 miles southeast from Cisco, is being developed under the superintendency of J. R. Brokenshire. A crosscut is being run from the hanging wall, at a point 700 ft. in, on the tunnel. The mine is

equipped with a 10-stamp mill and 4 concentrators.

San Diego County.

(From Our Special Correspondent.)

Kentuck S.—At this mine, ½ mile northwest from Banner, the main ledge has been found to be 2 ft. wide, carrying ore which is said to assay from \$200 to \$300 per ton. This property is being developed by the Bailey Brothers of San Diego, who also run a custom mill.

Roberts.—This gold property at Escondido is being prospected under bond by John Reid for Eastern parties. The shaft is now down 35 ft. and is to be continued to 150 ft.

Shasta County.

(From Our Special Correspondent.)

D. McCarthy has begun work on the old Murray & Conroy property in Flat Creek District. There is a tunnel on the vein 300 ft. long, and a crosscut tunnel 408 ft., which will be continued 250 ft. further. The ore averages \$6 a ton. Work had been suspended for many years.

In the Old Diggings District, Panter & Litsch are making ore shipments to Keswick that average \$50 a ton from the Evening Star Mine. They have also begun work on the Mammoth Extension, which had long been idle.

The owners of the Mammoth copper mine, near Kennett, upon which a payment of \$100,000 is due January 1st, have granted an extension of 21 days.

The development of copper properties in the Copper City and Stillwater sections continues by both the German syndicate and the De La Mar interests. Near Copley and also near the Iron Mountain Mine, a Boston company represented by John Fillins and C. D. Galvin & Company has a large force at work.

At the Capitol Mine near Shasta the tunnel at 360 ft. has cut sulphuret ore that yields good assays.

F. G. King, for an Eastern company, has obtained a 19 months' bond on the Onn copper group of 20 claims for \$45,000.

Near French Gulch the Washington Mine, worked by 20 leasers, is said to be producing \$30,000 a month. The ores are shipped to the smelters at Keswick and Vallejo.

The new Hope Mine near French Gulch was sold recently for \$7,500 to an English company.

Siskiyou County.

(From Our Special Correspondent.)

Cape.—The final payment on this quartz mine on the Greenhorn has been paid by Banz & Adams, managers for the new company. The 30 in. ledge can be traced over a mile.

McGrath Brothers.—This river claim on the Klamath River below Hornbrook has been sold for \$3,000 to San Francisco parties. The property, which runs for 4,500 ft. along the river, is to be worked on an extensive scale by the new owners. It can be worked the year round.

Tuolumne County.

(From Our Special Correspondent.)

Eagle-Shawmut.—The storage reservoir at these mines on Blue Gulch, 2 miles northwest from Jacksonville, is almost completed, and the ditch to the hoist is ready. The reservoir is 100 ft. long, 40 ft. wide and 8 ft. deep. The 40-stamp mill is crushing day and night good ore from the mines, also earth and clay removed from the surface of the bedrock east of the vein. This earth, it is said, contains some \$7 per ton in free gold, beside the sulphurets which are saved. One hundred and fifty men are employed.

Gerrymander.—At this mine near Sonora, crosscutting has begun from the 200 ft. level for the vein running east and west. It expected to strike the vein within 25 ft. The vein on the 100 ft. showed high grade ore.

Mary.—The mill at this mine, 1 mile northeast from Arrastraville, has been destroyed by fire supposed to be on incendiary origin.

Mississippi.—It is reported that this mine at the lower end of Big Oak Flat is to be reopened by a Boston company. A small force of men is repairing the old works, and wood and supplies are being taken in.

COLORADO.

Clear Creek County.

(From Our Special Correspondent.)

Annette Mining Company.—Manager W. A. Hoover, superintendent of the Griffith mine at Georgetown, says that plans are on foot for an air compressor. He expects to secure electricity to drive it. Another ore shoot is cut in the upper and lower levels. These are 1,000 ft. apart, yet the shoot is continuous. The distance from the shoot worked and the new strike is 800 ft.

Argo Mineral Development Townsite and Tunnel Company.—In the Newhouse Tunnel a vein of good ore has been cut at 7,500 ft. from the mouth of the tunnel and at a depth of about 1,700 ft. A 3-in. streak of lead ore was cut, then a horse or granite intrusion 10 ft. thick, and then a vein 5 ft. wide, of which 18 in. was lead and iron with gold and silver values, although

some zinc was also found. The ore is suitable for concentration, and Manager A. Hanchett says that mining will begin within 60 days. The vein is either the Tropic or Seaton. From surface indications it is believed that they form a junction before reaching this depth. The Seaton, being the older location, will claim all of the vein on the west side of the tunnel, and the Tropic will have that on the east side.

Quaker Mining Company.—Manager Jesse Ward has been developing this property at Idaho Springs. In one of the north levels 400 ft. from the shaft a porphyry dike has been cut that crosses the Monte Cristo vein and seems to make an ore body showing 4 ft. of pay ore. The shaft was sunk off the vein and crosscutting is going on in the lower workings. The drift will be run north along the vein to reach the shoot. The mine is owned by Pittsburg people.

Fremont County.

American Zinc-Lead Smelting Company.—According to a Denver paper, the smelting plant at Canyon City, of which Dr. F. L. Bartlett has been manager, together with patents and mining property controlled by the concern, will be transferred to a new company of the above name. It is said that the chief parties interested in the new company are H. L. Hollister of Boston and Dr. Bartlett of Canyon City. The capital stock has been increased from \$500,000 to \$1,000,000, and extensive improvements are planned at the smelter to increase its capacity to 300 tons daily.

Lake County—Leadville.

(From Our Special Correspondent.)

Daily Output.—The production is somewhat hampered through a car shortage, but at present is about 2,300 tons per day.

Production for 1899.—Despite the fact that for over 3 months last spring no ore was shipped owing to the storm and that during the summer work was suspended for some weeks owing to the smelter hands' strike, the output of the year is estimated at over \$9,000,000.

Adams-Maid-Wolftone.—The output for November was over 5,000 tons of clean lead and iron sulphides.

Belle of Granite.—Leadville people, headed by Sheriff E. L. Daniels, have taken a 2 years' lease on this property in Granite Section. The property has already produced over \$50,000, although the shaft is only 185 ft. deep. The new lessees will sink the shaft 45 ft.

Fanny Rawlings Mining Company.—The magnificent new plant of machinery is almost in place and it is announced that December 15th will see a resumption of work and shipments. During the year ending September 1st the gross production by lessees was \$200,000. There are 10 acres of ground and much of it has not been explored.

Hap Hazard.—Hahnwald Brothers continue to work their territory in Lake Park Section and have just opened up another streak of honey-combed quartz which assays 26 to 38 oz. gold. The vein is about 18 in. wide and the shaft is being sunk on it.

Mahala Mining Company.—This company's large property closed down December 1st indefinitely. The mine has been worked many years and has paid nice dividends. For some time past the ore mined at 1,180 ft. has been very low grade and it was finally decided to shut down. The Mahala is in Graham Park Section near the Mab, Greenback and several other big properties.

New City Mining Company.—While this company has been formed there are some serious difficulties to be surmounted, including a satisfactory understanding with the lot owners. Some 20 blocks of residences are embraced in the territory to be worked. The officers selected are: J. M. Maxwell, president; R. H. Blose, vice-president; R. R. Moore, secretary; A. Baer, treasurer; Andrew Dyatt, manager.

Rubie Leasing Company.—This company, capitalized at \$50,000, is working the old Rubie Mine on Iron Hill and has just opened up another shoot from the drift at the 575 ft. level, supposed to be the extension of the Colorado No. 2 shoot. Arrangements are being made to ship heavily. The property laid idle for years.

Mineral County.

Alpha.—The Co-operative Mining Company has started this mine, which has been idle for 4 years.

Bachelor.—This mine at Creede is shipping 1,000 tons per month.

Nelson Tunnel.—The water in the Amethyst is being lowered at the rate of 15 in. daily and in the United States at the rate of 10 in. daily. The water in the Last Chance is now below the 11th level and pumping has stopped.

Routt County.

(From Our Special Correspondent.)

Bromide.—A successful trial run has been made with the smelter and a carload of copper matte is ready to be hauled to the railroad. It is proven that coke is the fuel required, charcoal

being too light. Mr. R. S. Collett says that 50 miners and 20 teams will be put to work at once.

San Miguel County.

(From Our Special Correspondent.)

New Klondike Gold Mines Company.—This company, composed largely of New York and Ohio men, has bought the Klondike group of nine claims near the mouth of Waterfall Gulch at Ophir. The group is traversed by innumerable veins carrying gold and a large percentage in iron pyrites. The veins run \$14 to \$19 per ton in gold and the rock between is said to mill from \$5 to \$9, so the ore can be quarried. Plans have been submitted for a large milling plant. Frank B. Roberts of Telluride was one of the owners, and appears to be connected with the new company.

San Juan Gold and Silver Recovery Company.—This company, composed largely of St. Louis men, recently bought the Gold Run placer on San Miguel River, 1 mile above Telluride, for \$50,000, a cash payment of \$7,000 being made. Carl Anderson of Telluride, resident manager, is building a 100-ton cyanide plant to treat the tailings on the placer which have come from the Smuggler-Union and other mills in Marshall and Savage Basins and in places are over 10 ft. deep. The manager estimates that there are about 100,000 tons of tailings on the placer, which tests have shown to run from \$5 to \$6 per ton in gold and silver. He expects to recover 75% of the values, and if successful will enlarge the plant to treat 600 tons in 24 hours.

Teller County—Cripple Creek.

(From Our Special Correspondent.)

Alert Gold Mining Company.—This company has bought the Little Joe and Kalamazoo claims on Bull Hill near Altman. The price given is \$72,500. This company has been operating a lease on some of the Damon property close to the north end of the claims purchased, and took out considerable ore. The new property lies parallel to the Wild Horse claim of the Consolidated Gold Mines Company, which is shipping largely. The Little Joe and Kalamazoo were bought from W. H. Reynolds of New York, who has done a large amount of work on them. Mr. Reynolds still retains an interest in the property and was elected president of this company. The other officers are Mr. Stovel and O. W. Pitcher. Mr. Pitcher is general manager.

Economic Extraction Company.—The large mill will begin treating ore in a few days. It has been crushing for some time, but has not yet chlorinated any. The present capacity is 300 tons per day, but the capacity can be doubled when required.

Jack Pot.—The injunction suit brought by the Doctor is to be tried in the District Court. A large amount of surveying, etc., has been done and mining engineers of large reputation will be much in evidence. The point at issue is the position of the apex of the famous Jack Pot vein.

Kimberly Gold Mining Company.—At the annual meeting of the stockholders the following directors were elected: W. F. Whalen, Jacob Seligman, T. C. Delaney, P. S. Delaney and W. A. Delaney. The number of the directors was increased from 3 to 5. The report of the manager shows that the property is worked under lease. Some of these leases have good ore. Considerable ore was shipped during the year. The properties are on the west slope of Beacon Hill near the El Paso Company's property.

Los Angeles.—It is reported that the Butte and Cripple Creek people that have a lease are soon to begin work again, and will sink the shaft to 1,000 ft.

Mt. Rosa Mining, Milling and Leasing Company.—This company has parted with 4.5 acres of its property adjoining the Little Montana claim known as the Sweeney lease, which has been worked for some time under bond by the Mary Casheen Company. The bond was for \$100,000, and has been taken up. Some good ore is said to be opened. The formation is granite, not far from the contact with the breccia.

FLORIDA.

Polk County.

Palmetto Phosphate Company.—This company is erecting a new plant on property recently acquired 9 miles from Fort Meade. This plant will, when completed January 1st, be the largest single plant in the State, with a capacity of 15,000 tons of rock. The principal dry shed is over 700 ft. long. The company will employ about 300 men. It is now operating another plant near Mulberry, several miles distant, and has its own railroad connecting the two. The pebble at both mines will be dug by hydraulic dredges.

Prairie Pebble Phosphate Company.—W. W. Clark is erecting a pebble plant at Bartow for this company.

St. Clair.—Buttgenbach & Company have about completed their new plant on the St. Clair property, near Newberry. It will be in working order by December 15th. A. S. Anderson is manager.

IDAHO.

Blaine County.

Camas No. 2.—The cyanide plant at this mine near Halley, of which J. B. Frank is manager, is to close down for the winter.

Croesus.—This mine at Halley is under bond and lease to an English syndicate, according to report. It is said 30 stamps will be added to the mill next spring.

Idaho County.

Blue Bird.—E. F. Fitzhugh of Idaho City has it is said, struck rich ore in this old claim, a short distance north of the Elkhorn. The claim was worked many years ago by Alex. Kyle. Mr. Fitzhugh struck a new shoot about 200 ft. from the old shoot.

Wolverine.—The air compressor, dynamo, Ingersoll drills and hoisting works at Banner have been purchased by the Twin Springs Company, and will be hauled to the Copper Queen telluride mine on Badger Creek, 15 miles southeast of Idaho City. The company is constructing a telephone line to the mine.

Shoshone County.

Mining Conditions.—The few miners held in confinement at Wardner for their participation in the riot of April 28th, when the Bunker Hill & Sullivan Mill was destroyed, will be discharged on their own recognizance. Of the 500 or more arrested and confined but 14 were tried, and of these 11 were sentenced. General conditions in the Coeur d'Alene region are reported very satisfactory. Miners and business men feel they can rely on the protection of the law, new capital is coming in, and 200 more men are employed about Wardner than ever before. It is thought that the old element can not get control again except through the indifference of the mine owners. The United States troops are still stationed in Wardner.

MICHIGAN.

Copper.

Calumet & Hecla Mining Company.—The company has declared a dividend of \$20 per share, payable December 29th. This is the fifth dividend of \$20 during the current year, making the year's distribution \$10,000,000. The company has paid out in dividends since its organization \$64,850,000, not including the dividend just declared.

Quincy.—The output for November was 749½ tons of copper, and for the 11 months, 8,393¾ tons, compared with 782 1-3 tons and 9,217 1-3 tons respectively for last year.

Iron—Marquette Range.

Webster.—This old mine near Michigamme has been leased by the Cleveland Cliffs Company.

Iron—Menominee Range.

(From Our Special Correspondent.)

A 20-year lease has been applied for by Chas. F. Leland and others of Duluth, Minn., on 5 forties close to Crystal Falls. Some exploration has been done on the property and arrangements are under way to put in drills. The land belongs to the Menominee River Lumber Company, and the lease is at a favorable rate.

MINNESOTA.

(From Our Special Correspondent.)

The Duluth & Iron Range road is still shipping ore, but business at other ore docks has ceased. Up to December 1st, Minnesota shipments were as follows: Duluth & Iron Range, Two Harbors, 3,871,598 tons; Duluth, Missabe & Northern, Duluth, 3,494,161; Eastern Minnesota, Duluth, 871,388; total, 8,237,147. This is from the Vermilion range 1,740,000 tons, Mesabi range, 6,500,000. For all the year 1898 the Mesabi shipments were 4,613,766, Vermilion 1,265,142, giving an increase up to date of about 2,500,000 tons. Up to the present week there has been no weather to stop easy handling of ore, though the range country was frozen up, but from now on unloading cars will be hard work.

Iron—Mesabi Range.

(From Our Special Correspondent.)

Ore has been found along the south line of T. 59, R. 17, north of the Sauntry and Alpena mines, in locations that were not regarded as within the line of the iron formations. Part is in the possession of the Minnesota Iron Company by its deal with the C. N. Nelson Lumber Company. The limits of the ore body lying north of the Sauntry, near Virginia, have not yet been determined.

Biwabik.—This property, of the Biwabik Mining Company, has sold for next season's delivery 850,000 tons already, mostly to those holding interests in the mine, and at a probably lower figure than other Mesabi ores of as good quality. Two steam shovels are working at the ends of the two cuts, and will connect them. What ore is taken out in this work will be stocked on the floors of the pits for early spring shipment. The dirt removed will be carried to the great dumps south of the mine. It is probable this mine will ship 1,000,000 tons next year. In 6 days this summer the mine shipped 45,000 tons.

Chandler Iron Company interests have secured

valuable lands on the east side of T. 58, R. 20. Camps will be built at once. Work is also under way in section 22, 2 miles east.

Colonial Mining Company.—The Hale and Kanawha mines at Biwabik have closed for the season with shipments of 50,000 tons. Development work will continue all winter. Both mines are open pits, the Hale is down 90 ft. and is hoisting by skips. The Kanawha is to be worked as a milling proposition.

Duluth.—This mine at Biwabik has produced the past season 165,000 tons, all from its open pit by milling. Shaft No. 2 has been idle, but a large stock-pile will be made there this winter. The mine is the property of the Consolidated Company.

Roberts Mining Company.—This company has closed with about 60,000 tons for the season. Operations will be pushed during the winter.

Yawkey explorations of the Enterprise property, near Virginia, have ceased, and M. L. Fay has put a drill on lands held by him close to Alpena mine. On Enterprise 6 drill holes have proved a body of ore about 95 ft. deep, covering more or less fully 25 acres of ground. The ore is of fair grade and not heavily covered with surface.

Iron—Vermillion Range.

(From Our Special Correspondent.)

Chandler Iron Company.—This company is exploring several localities. It was begun on the Camp lands on section 32, and on the Lockhart and the Conan lands close to Ely. Chandler itself is limited to a few more years of life at the present rate of shipments and new supplies are imperative. Stock-piling indicates larger shipments next year than this.

Oliver Mining Company.—This company's Savoy mine is working with nearly 200 men, and the Zenith has recommenced with a smaller force. Both mines will make a big record this winter.

MISSOURI.

Jasper County.

(From Our Special Correspondent.)

Joplin Ore Market.—The market has steadied down. Buyers are paying within 50c. per ton of the schedule price, and last week bought more ore than at any time since the first week in April. Producers have accepted the situation, and a great quantity of high-grade ore was sold at \$30 and \$31 per ton, while the fancy ore from the Eagle Mine at Belleville and a part of the product from the Boston-Aurora ground at Aurora brought \$32.50 per ton. Most of the Oronogo ore sold at \$31 per ton, and 400 tons from the Granby land was sold for this week's delivery at \$31 per ton. All the mills in the district are running except those short of coal, and the few that have too thin dirt to work at a profit.

During the corresponding week last year, top grade zinc ore sold at \$40.50 per ton and lead for \$20.50 per 1,000 lbs. The turn-in was less than for last week by 2,691,480 lbs. of zinc and 195,760 lbs. of lead, and the value was less by \$18,348. For the corresponding 48 weeks of last year, the lead turn-in was greater than this year by 4,388,452 lbs., but the zinc sales were less by 55,626,870 lbs. and the value was less by \$3,723,832.

As compared with the preceding week, the sales were greater by 2,673,320 lbs. of zinc and 180,080 lbs. of lead, and the value was greater by \$43,224. Following is the turn-in by camps:

	Zinc, lbs.	Lead, lbs.	Values
Joplin.....	2,157,950	333,310	\$43,487
Cartersville.....	1,228,930	303,840	26,022
Webb City.....	694,000	46,200	10,963
Belleville.....	260,490	1,060	3,977
Oronogo.....	1,959,230	.....	29,822
Stotts City.....	312,260	24,830	5,354
Central City.....	1260,710	1,410	3,427
South Jackson.....	57,090	16,060	1,556
Cave Springs.....	168,000	2,580	2,253
Duenweg.....	277,000	50,290	4,359
Aurora.....	1,394,000	45,000	17,838
Granby.....	362,000	16,000	5,954
Galena—Empire.....	2,961,100	348,040	48,930
Lehigh.....	73,750	.....	1,106
Hells Neck.....	52,640	6,180	983
District total.....	12,222,190	1,194,790	\$306,625
Total for 48 weeks.....	471,784,180	44,534,858	\$10,113,935

Mining Land Sales.—The Colonial Zinc Company, Limited, of New York, has purchased several large and valuable tracts of mineral lands, also some well-known mines. Among others, the Free Coinage first lease at Midway near Joplin, including 2 big mills and the fee of the 110 acres on which the lease is located; the Blue Wing lease of 25 acres at Cartersville, with the mill; the Mayne 150-ton gravity mill and lease of 20 acres in South Galena, Kan., and a first lease on 40 acres of promising land southwest of Galena. The deals were closed by J. B. Carmichael and H. A. Foster of Joplin, representing the Eastern purchasers, and the amount paid is said to have been about \$300,000. Contracts have been let for 4 new mills.

The Snyder tract of 20 acres at Blendeville has been purchased by E. W. Kelley of Philadelphia, Joe Aldrich of Joplin, and J. E. Haffner

of Indiana. The Butte-Missouri tailing mill on the Missouri Zinc Fields ground at Cartersville has been sold to Dr. Miller of Chillicothe, Mo., and his brother at Palmyra, Mo., and the Oswald tailing mill on the Granby land in Leadville Hollow, northwest of Joplin, has also been purchased by Chillicothe parties, Harry Ruby and State Railroad Commissioner McCully being among the new owners. E. Hedburg & Company of Joplin sold the 80-acre lease of the old Blue Goose Mining Company at Tuckahoe to Eastern parties for \$6,000 and the lease and mine of Col. H. H. Gregg in Jackson Hollow, southwest of Joplin, to the Judson syndicate of Chicago for \$20,000.

J. W. Baker & Company have sold the Nine Spot on the Little Frances lease to Boston parties for \$14,000. The property consists of 2 lots and a fine developed mine. Ore was struck late in October and only 3 turnins have been made. A mill will be erected at once.

The Dakota plant on the Mahaska ground, south of Blendeville, which was completed 30 days ago by T. C. Molloy, J. R. Holmes and George Meese, was burned last week. The mill was partly insured and the loss was about \$2,000. The plant will be rebuilt at once.

MONTANA.

Cascade County.

Broadwater.—At this mine, near Neihart, a large amount of work has been done since C. S. Gibson became manager. The workings have been cleared out and 60 leasers put at work.

Deer Lodge County.

(From Our Special Correspondent.)

Marble.—Beaudette Brothers of Anaconda are working a marble quarry about 20 miles from Missoula. The quarry is developed and a plant with engine and saws for cutting and polishing has been put in. The output consists of 3 in. slabs for counters, interior work and headstones and of larger shafts for monumental purposes. This is the only marble quarry of good quality in Montana that is in operation.

Flathead County.

Brick & Brannigan.—The 10-stamp mill on West Fisher Creek near Libby is running. It is connected with the mine by a 1,100 ft. wire rope tramway. About 20 men are employed. The mill is equipped with 2 Reliance vanners.

American Kootenai Mining Company.—A 10-stamp mill with 2 Frue vanners furnished by Fraser & Chalmers of Chicago has arrived at Libby. It will be hauled to the mine when snow falls. Mr. Beager is manager.

Buzz Saw.—The new concentrating plant at the mine on Shaughnessy Hill near Libby is shipping concentrates. It is handling about 70 tons daily, though its capacity is 150 tons. J. M. Dikeman is manager.

Sullivan Gold and Copper Mining Company.—This company has been organized at Kalispell with 1,000,000 shares of 10c. par value, to work a group of 9 claims on the Stillwater River, about 27 miles from Kalispell and 15 miles from Lakeview station on the Great Northern. On the property is an adit tunnel 50 ft. deep. The ledge is 3 ft. wide and the formation is granite and porphyry. A shipment is said to have returned gold, \$18; copper, 18.8%; silver, 24 oz. A force of 3 men has been working. The directors are: D. R. Peeler, M. J. Sullivan, J. J. Sullivan, Fred Langerman, Harry C. Keith, James Conion, John McIntosh, of Kalispell.

Missoula County.

Lo Lo.—This group of gold claims formerly owned by T. S. Letterman of Missoula, is now the property of the Western Montana Placer Mining Company. The consideration is said to have been \$45,250 in cash and stock. Considerable prospecting and development work has been done on the group and a milling plant is contemplated. C. S. Crystler of Milwaukee, Wis., is managing director of the Western Montana Placer Mining Company. It recently secured 100 acres of placer ground on Nine Mile Creek.

(From Our Special Correspondent.)

Cedar Creek Placer Mining Company.—The final clean-up for this season has been finished. The gold taken out this season amounted to about 1,300 ounces and was valued at about \$25,000. The backward spring delayed work for a month, or the returns would have been much larger. Only the gravel of the old placer workings was worked this year. This ground is said to have yielded over \$200,000 when worked years ago.

Golden Scepter Mining Company.—The machinery of the stamp-mill and hoist, as well as the electrical equipment of the railway at Quigley, is being prepared for removal to the Northern Pacific Railroad for shipment. The machinery is all new and has never been in operation, the plant being unfinished when work was suspended in 1895. The destination of the machinery is unknown, but the camp will probably be deserted by the present owner, A. Colburn of Philadelphia, who lately bought it.

Park County.

Montana Coal and Coke Company.—At Horr

the new bunkers with 1,000 tons capacity are completed, as is the new hoisting plant. The electric machinery for lighting the buildings and supplying power for the electric locomotive has been ordered. The aerial tramway between Jorr and Aldredge is finished. Arrangements are being made to keep the refuse from the washer from flowing into the Yellowstone River, as there has been some complaint from this source. W. B. Gay is manager.

Teton County.

Michigan & Montana Copper Mining and Smelting Company.—The company is prospecting a group of claims in the ceded strip. A wagon road has built to the mine from Swift Current, a distance of 6 miles. About 300 ft. of drifting are to be done before April 1st next. The officers of the company are F. B. Goetter, president, and O. Petersen, vice-president. A. D. McDonald of Libby is secretary and treasurer.

NEVADA.

Lincoln County.

(From Our Special Correspondent.)

De La Mar.—About 9,000 tons are mined monthly and milled. Exploration on the lower levels continues favorable, and the property is in finer form than a year ago. Sampling of the high tails dumps thus far shows values under \$1 per ton. Possibly the tails from the original chlorination plant may pay to work over. F. P. Swindler is superintendent.

Horseshoe and Homestake.—There has been much speculation over the amount paid Allan G. Campbell by A. W. McCune and R. C. Lund for his interest in the Deer Lodge properties. The deeds now filed at Pioche show the consideration to have been \$50,000, which includes all Mr. Campbell's holdings at Deer Lodge. About 60 men are employed.

Washoe County.

Nevada Mining Company.—This company has been formed in Reno, to work a group of mines in Peavine District, with the following incorporators: J. Brown, T. P. Bradshaw, F. H. Norcross, F. McRae, D. W. Cutts, D. E. Morton, J. A. Pothoff, N. B. Christensen, Andrew Fife, Mrs. A. E. Brown, C. A. Norcross, Lena M. Moore, F. H. Bradshaw, A. G. Fletcher, O. H. Perry and Donald McKay.

White Pine County.

Chainman.—The mill at Ely will, it is reported, run all winter. Improvements have been made to the cyaniding plant and the extraction is higher. J. P. McOmie, one of the owners, is superintendent.

NORTH CAROLINA.

Ashe County.

(From Our Special Correspondent.)

Elk Knob.—This copper mine has been purchased by Messrs. Zime & Bach of Milwaukee, Wis. The reported price is \$40,000; in addition were purchased some 20,000 acres of land.

Gambill.—This copper mine near Jefferson is being opened by Pennsylvania men, who will haul the ore to smelters pending a railroad.

Iron Lands Purchased.—Representatives of the Pennsylvania Steel Company and the Cambria Steel Company have purchased the Ballou Home Place Iron Bank. Some money was paid down and an agreement of 25c. per ton royalty. This is a good ore and is reported to run 60% iron.

Ore Knob.—This copper mine has resumed work, after 18 years' idleness. It has paid over \$200,000 in dividends. The main shaft is 400 ft. down and the vein is said to average 8 to 10 ft. of 6 to 8% ore. There is a smelting plant for making ingot copper at the mine.

Cabarrus County.

(From Our Special Correspondent.)

McMackin.—The development at this gold mine here by the 280-ft. shaft has been so encouraging that the manager, Col. E. B. C. Hambley, says the company is going to sink 2,000 ft. on the vein.

Union Copper Mining Company.—Two to 4 cars of copper ore are shipped weekly to the smelters in New York. Work is being pushed on the concentration plant and in the lower levels of the mine.

OREGON.

Baker County.

Cougar.—The 250-ton cyanide plant, the largest in Oregon, at this mine, 15 miles southwest of Sumpter, is about ready. J. W. Larkin is principal owner and manager.

Eldorado.—This group of 5 claims on Chicken Creek east of Cracker Creek has been bonded by M. H. Knapp to J. B. Dabney of Spokane for \$45,000. The option expires January 1 1901.

Empire Mining Company.—This company is installing a 10-stamp mill on its claim adjoining the Bonanza Mine near Sumpter.

Golconda.—The big chlorine bromine plant erected at a reputed cost of \$130,000 at this mine on Cracker Creek, near Sumpter, has given unsatisfactory results and has closed down. A 10-stamp mill is to be added to the roller mill recently installed.

May Queen.—Ten more stamps for this mine in Red Bay District have arrived at Sumpter.

Union County.

Robert Emmett.—At this mine at Cornucopia, recently bonded by the Messrs. Davey, a large amount of machinery is being installed. About 30 men are busy. A Huntington mill will reduce the ores.

Union-Cornucopia.—This group of 30 claims at Cornucopia is now under bond to a Montreal syndicate for a large sum. The development work done is reported to exceed 10,000 ft. The 20-stamp mill has 12 concentrators. The mill and a 7-drill compressor get power from a 110 H.P. dynamo. A 1,500 ft. tunnel is being driven.

PENNSYLVANIA.

Anthracite Coal.

The Lehigh Valley Coal Company has decided to do away with its company stores. The same action has been taken by the Lytle Coal Company regarding its store at Minersville.

Kehly Run.—The fire at this colliery near Shenandoah is under control.

Susquehanna Coal Company.—The miners at Glen Lyon and Nanticoke have not returned to work. The wage scale seems satisfactory, but the miners' union demanded that the company discharge the pump-men who had stood by it during the strike. This the company declined to do.

Wadesville.—This mine has been reopened by the Philadelphia & Reading Coal and Iron Company. It was opened 30 years ago, but was flooded to put out a mine fire and has been idle 10 years. Work began on a new shaft 700 ft. deep and surface improvements 2 years ago. These are nearly completed. The breaker will be large. All power transmission will be by wire rope instead of belts. A very complete system of jigs is in place. The coal hoisted is dumped from the cage into a steel chute, from which it runs into the breaker. The engines used in hoisting water have cylinders 40 by 60 in. The colliery will resume with about 100 hands. All the important coal measures will be cut from the Mammoth vein to the Buck Mountain vein. The breaker building is of wood with some iron supports and bracing.

Bituminous Coal.

Pittsburg Coal Company.—This company has bought a 3,000 acre track of coal land not far from Washington in Nottingham and North Strathbane Township, optioned by J. M. Thomas at from \$35 to \$40 per acre.

Slate.

(From Our Special Correspondent.)

Bangor Royal.—This quarry is open for lease.

Diamond Slate Company.—Joseph B. Kellow, Samuel Cann and Quintus Sandt, of Pen Argyl, compose this concern, which operates the new Diamond quarry adjoining the abandoned Diamond quarry. They are working 3 blocks, and during November the output was from 7 to 9 squares per block per day.

Imperial.—Resumption of work at this Wind Gap quarry is assured next spring. Preliminary work will be begun at once enlarging the factory, putting in more machinery and also pumps to keep down the water. The Pelican and Old Wind Gap, Park Slate Company's, are the only quarries now working at Wind Gap.

Jackson Brothers.—This Pen Argyl firm has erected a new derrick, the fourth at the quarry. A new double drum hoist and 100 H.P. boiler are to be added.

Klondike.—Henry Parsons, of the Golden Rule quarry, Pen Argyl, has been prospecting for slate just north of the Grand Central, and has named the new quarry the Klondike.

SOUTH DAKOTA.

Lawrence County.

(From Our Special Correspondent.)

Boston-South Dakota Mining Company.—This company is working the old stamp mill at the Minerva. Joseph Underwood of Chicago, who has charge; J. B. Martin, secretary, and F. D. Underwood, the last 2 men being from Boston, are the principal stockholders. The mine has been cleared out and several thousand feet of old drifts and tunnels retimbered. The mill has 40 stamps. A water tunnel is being run on bedrock.

British-American Gold and Copper Mining Company.—At the 70 ft. level of the shaft in Butcher Gulch, a drift has started west through talc. That is expected to reach a porphyry dike and ore. L. G. Hoyt, resident manager and assayer, has charge.

Cascade Water Power and Electrical Transmission Company.—This company, organized under Wyoming laws, has purchased of William Lardner of Deadwood between 12 and 15 miles of water rights along Spearfish Creek.

Detroit & Deadwood.—The tunnel of the City Creek property is in 460 ft. But one shift is working at present, owing to the poor ventilation. A compressor has been ordered. The tunnel will have to run 400 ft. to cut the main ledge.

Hardin.—The original Hardin Mine has started up again. As soon as the workings are dry prospecting will be begun.

Homestake Company.—This company is securing individual water rights along Spearfish and Red Water creeks. The Thomas Russell interest in the Carbonate Flume Company, near Maurice Station, has been purchased. Dr. D. K. Dickinson of Lead is believed to have acted in the interest of the Homestake when he bought the electric light plant at Spearfish. The company is purchasing rights along the creek, to prevent litigation by other owners of water rights.

Northwestern Gold and Silver Extraction Company.—M. H. Pennington and A. H. Lloyd, of Chicago, have been in Deadwood superintending work for this company, in which they are heavy owners. The first ore will be taken from the Kicking Horse Mine, at the head of Blacktail Gulch. The Golden Gate Mining Company, which is composed of many of the stockholders of the Northwestern Company, has started mining ore from the Maggie shaft, on the old Manchester property.

Pennington County.

Harney Peay Tin Mining, Milling and Manufacturing Company.—A. R. Ledoux of New York, receiver, has advertised for proposals for the sale of spodumene rock. Bidders are to take not less than 500 tons yearly.

TENNESSEE.

Morgan County.

Michigan capitalists, it is stated, closed a deal with John M. Davis and others of this county, for several thousand acres of coal and mineral lands. The railroad from Harriman to Waterbury will be extended into the property. A bond issue will be floated for the railroad enterprise.

UTAH.

(From Our Special Correspondent.)

Bullion and Ore Shipments.—During the week ending December 2d the several smelteries sent forward 24 cars, or 1,018,968 lbs. lead-silver bullion; 3 cars, or 162,042 lbs. copper bullion. In the same week there were shipped from the different camps 55 cars, or 1,978,575 lbs., ore to smelters outside of the State for treatment.

November Cyanide Products.—The Consolidated Kansas City Smelting and Refining Company, at its Salt Lake City sampler, handled 6,200 lbs. of cyanide products in November, the value of which was \$97,000. This represents the yield of all the cyaniding mills in the intermountain region except the De La Mar plants in Nevada and Mercur.

Juab County.

(From Our Special Correspondent.)

Tintic Shipments.—In the week of December 2d there were sent out from the 3 rail points of the district 123 cars of ore and 3 cars of concentrates, credited as follows: Mammoth, 28 cars ore, 1 car concentrates; Centennial Eureka, 16 cars ore; Bullion Beck, 10 cars ore, 2 cars concentrates; Gemini, 11 cars; Grand Central, 10 cars; Swansea, 6 cars; Humbug and Uncle Sam, 5 cars; South Swansea, 6 cars; Ajax, 3 cars; Eureka Hill, 2 cars; Alaska, 2 cars; Godiva, 2 cars; Sunbeam, 2 cars; Showers Consolidated, 1 car; Tintic Iron, 21 cars hematite for flux.

Eureka Hill.—A 10-car lot of copper rock is being loaded for Leadville—the first shipment in several months. Superintendent Watson has 45 men on pay-roll, mostly on exploration. Shaft is being sunk below 1,500 station. Speculation is rife as to what will be done with the 100-stamp combination mill.

Four Aces.—A rumor is current that lawyers are preparing papers for the suit against the South Swansea.

Godiva.—At 540 ft. in shaft a high-grade ore seam is cut, from which Superintendent McChrystal reports assays of 600 to 1,100 oz. silver.

Joe Bowers.—Messrs. C. T. Burnheim and A. K. Hamilton, of Milwaukee, and Henry W. Leman, of Chicago, representing the Burnham interest, have been here. At a meeting with the officers of the company it was decided to increase the capital stock by 300,000 shares, making a total of 700,000 shares, the entire increase to go to the Burnham interests. This action will have to be approved by the shareowners, but it is believed no hitch will be experienced, and litigation will be out of the way.

Mammoth.—Some little friction between President McIntyre and J. A. Cunningham prevented the renewal of ore shipments via the new East Tintic Railway. Mr. Cunningham offers to sell the railroad and a proposition will be considered. Ore bins are full and the night shift is temporarily laid off.

Star Consolidated.—Conflicting rumors are heard as to the company's indebtedness, one placing it above \$40,000. The management states that the total indebtedness, including November pay-roll, will not exceed \$15,000. Options are held for adjoining ground for \$20,000, none of which is due for 6 months. It is said physical conditions of the mines are better to-day than a year ago. It is possible that a 5c. assessment will be levied.

Tesore.—Vein is cut on 300-level, 7 ft. wide, of which 2 ft. are choice copper rock.

Yankee.—A contract is let to continue tunnel 100 ft. and work will immediately start.

Salt Lake County.

(From Our Special Correspondent.)

Bingham Copper-Gold.—On December 1st the crosscut tunnel was in 860 ft.; face in very hard ground. This tunnel will cut the ledge 500 ft. down on the dip, or 250 ft. below present lowest workings.

New Mammoth.—On November 22d mine and mill closed. The company is \$30,000 in debt and the pay-roll for October and November is unpaid. Several unpleasant stories are in circulation of ore salting and other crookedness. As the shares are non-assessable, a receiver may be appointed and work resumed.

Petro.—Dividends are suspended for the winter. The assigned reason is that deep snow will soon prevent getting the ore to market; yet it will be several weeks before there is serious difficulty on that score.

Red Wing.—The enlarged mill—100 tons daily—is in commission, reducing 4½ tons of crude ore to 1 ton of concentrates. President Tibbals says the mine can readily supply this tonnage.

Summit County.

(From Our Special Correspondent.)

Park City Shipments.—In the week ending December 2d the smelter products marketed through the Mackintosh sampler aggregated 2,444,795 lbs., made up as follows: Silver King, crude, 1,067,640 lbs.; concentrates, 426,645; Daly-West, concentrates, 747,260 lbs.; Anchor, concentrates, 203,250 lbs. For November the outgoing ore consignments were: Silver King, crude, 4,838, 885 lbs.; concentrates, 1,065,620 lbs.; Daly-West, 3,217,640; Ontario, crude, 1,691,940 lbs.; Anchor, concentrates, 732,120 lbs.; Apex, 270,520 lbs.; Valero, 176,310 lbs.; Loring Bros., concentrates, 72,670 lbs.; Cooney, concentrates, 37,250 lbs.; Bird, concentrates, 14,130 lbs.; or total for the month, 12,117,085 lbs. Total shipments for November, 1898, were 6,700,830 lbs.

Anchor.—The new concentrating mill in commission is a vast improvement over the old plant.

Daly-West.—For several weeks no crude products were marketed, owing to friction with the smelters. It is alleged that the Mackintosh sampler affords too high silver values—2 to 3 oz. per ton—and the smelters no longer put trust in Park City sampling. No change other than for the better has occurred recently underground. Four Wilfleys are to be added to the mill. No crude ore is shipped pending the adjustment of the friction over the sampling.

Loring Brothers Mill.—Before December 10th the season's campaign on the old Mayflower and Silver King dumps will be closed, owing to cold weather. The plant has 50 tons capacity and has had quite a successful 7 months' run.

Ontario.—Ore consignments are being resampled at the Taylor & Brunton sampler. This friction serves to curtail production.

Silver King.—No complaint of erratic sampling, to the detriment of the smelter, is made by the Guggenheims, who buy this ore through the Mackintosh plant.

Tooele County.

(From Our Special Correspondent.)

Daisy.—Mr. Theodore Bruback was appointed receiver. It will be no easy task to untangle the company's affairs. Added to the outstanding debts, the mine is turned over in bad shape and considerable dead work is needed to put it in shape, so that 200 tons or more can be mined daily, as is proposed.

De La Mar.—At present 21,000 tons per month are mined and milled, and the gold bullion turned out exceeds \$100,000. The mill will not be in commission to its full capacity till about New Years. Contracts are let for a complete steam power plant, in lieu of the uncertain electric power transmission from Provo canyon, to be in commission May, 1900. This is not an auxiliary to the electric power, as the intent is to abandon the latter.

Mercur.—The claim is made that the November gross yield will establish a new record and will top \$60,000. A consignment of nearly 1,000 lbs. of cyanides was shipped to Salt Lake, December 1st. The gross yield for November is under \$40,000, rather than over \$60,000, as reported.

Northern Light.—Word that high-grade is being sacked fails to arouse interest. Nothing short of carload shipments will restore confidence.

Overland.—A 250-lb. lot of cyanides was sent to Salt Lake on November 25th, the final clean-up until the mill's capacity is doubled. The necessary contracts, probably, will soon be let.

WASHINGTON.

Ferry County—Republic.

(From Our Special Correspondent.)

An American customs officer is now stationed at Columbia and Grand Forks, B. C., to break

the seals of all freight coming through in bond for Republic, Wash. Columbia is but 2 miles from the international boundary and 33 miles from Republic. Eastern firms can save a great deal in freight rates by sending machinery, supplies, etc., by way of Columbia. All manifests must be made out in triplicate for the American customs, and also in triplicate for the Canadian customs. Freight from the East should be billed via Crow's Nest, and freight from the South via Nelson, B. C. A consignment of machinery, 266 pieces in all, weighing 38,000 lbs., from Fraser & Chalmers of Chicago, has arrived at Columbia for the Mountain Lion Mine at Republic. It will be freighted in as soon as snow falls.

Golden Lion.—Cross cutting continues for the ledge, from the bottom of the winze, 95 ft. below the tunnel level.

Liberty.—The company has bought the Liberty Fraction. The property had been closed down for 2 or 3 months.

Merrimac.—The vein has been struck at the north end of the claim, and a contract has been let to sink a small double compartment shaft. The discovery is close to the south end line of the Mountain Lion.

Nob Hill.—Fourteen men are running a tunnel on the vein. A shaft is being sunk and a raise carried up to meet it. When completed, 125 ft. of backs will be ready for stopping. The average value is said to be \$30 per ton and 30 oz. silver to 1 oz. gold.

WYOMING.

Wyoming Smelting, Refining, Mining and Investment Company.—According to press statements, the Rev. W. C. Henderson and William Edmonds, 2 executive officers of this company, which is capitalized at \$2,000,000, were arrested at their place of business in St. Louis, Mo., December 5th, by Government officers on a warrant charging them with using the mails for fraudulent purposes. Deputy United States Marshals are now searching for Joshua C. Watson, who is president of the company. Their operations are said to have been extensive. The prisoners admit having representatives in nearly every State throughout the West, while they declare they have gold, silver, and lead mines in Kansas and Wyoming.

Carbon County.

Diamond Coal and Coke Company.—The 600 men at this company's mine recently struck for a 10c. per ton increase in the price of mining coal and a 10% advance in wages.

The company sought to compromise matters and offered the men 3c. per ton advance in place of 10c. demanded. The miners returned to work, but some union agitators demanded that 2 discharged men be reinstated, and as the company naturally refused, another strike was declared. Some of the men returned to work, but on December 4th a mob of union sympathizers drove them from the property.

FOREIGN MINING NEWS.

AFRICA.

Rhodesia.

The gold production reported for October is 4,276 oz., or 1,377 oz less than in October of last year. The total for the 10 months ending October 31st was 55,343 crude oz., which compares with 12,757 oz. last year.

CANADA.

British Columbia—West Kootenay District.

(From Our Special Correspondent.)

Rossland Ore Shipments.—The ore shipments from Rossland mines for the 11 months ending November 30th amount to 164,000 tons, valued at \$2,750,000 gross. The shipment for the corresponding period of 1898 amounted to 102,000 tons.

Homestake.—This Rossland company has gone into liquidation. A general meeting of the shareholders has been called for on December 20th to consider a resolution to wind up the affairs of the company with a view to the sale of the assets or a reconstruction. G. H. Boyne and T. S. Gilmour have been appointed liquidators pro tem.

Nova Scotia—Cape Breton.

Dominion Coal Company.—This company reports shipments from its mines in November at 135,000 tons. For the nine months of the fiscal year from March 1st to November 30th the shipments were 1,351,200 tons, against 1,043,063 tons last year; showing an increase of 308,137 tons, or 29.5%, this year.

Ontario—Rainy Lake District.

(From Our Special Correspondent.)

Mikado Gold Mining Company.—The October output was about \$12,000, and the rock crushed returned an average of \$10.60 per ton. A complete system of incandescent lights has been installed at the mine.

Northland Gold Company.—This company has been organized at Duluth, to work a claim that

has been opened adjoining the Golden Star. Its incorporators are Daniel Waite, president; C. L. Lewis, vice president; G. W. Buck, treasurer.

COAL TRADE REVIEW.

New York.

Dec. 8.

Anthracite.

Shipments of anthracite to Western points by lake have practically stopped. A few scattering cargoes may go up yet, but that is all. The open fall has proved a blessing to dealers and consumers in lake territory, but, in spite of the heavy movement through the Sault, it looks as though coal might be in short supply at Duluth before spring unless the winter proves exceptionally mild. In Chicago territory everybody expects some coal to come in by rail.

Cooler weather has started up retail buying again. In the East it has brought out the statements in the daily press that the steam sizes have been advanced during the week 25c. per ton at New York. As a matter of fact, there has been no advance within the past few days. The steam sizes have been hard to get for over a month. Consumers who have needed coal had to hunt for it, and the companies, of course, asked more. Pea and buckwheat sizes have advanced nearer 50c. than 25c. since October. This demand for steam coal is helping the market for broken size, which was a drug on the market most of last year.

The production for November was not as heavy as was anticipated. It probably will not much exceed 4,600,000 tons. This is below October's output. Car supply has been the determining factor in this falling off. Anthracite men complain that bituminous shippers have gathered in all the cars in sight. Certainly the pressure to get cars must keep superintendents of rolling stock busy.

The prices of coal at tide water points show signs of advancing farther. Chestnut coal commands a slight premium over broken. We quote for free burning anthracite, f. o. b. New York, as follows: Stove, \$4.15@4.25; nut, \$4.25; egg, \$3.90; broken, \$3.50. The regular price for pea coal is about \$2.75. Anybody wanting it in a hurry might pay \$3 for good coal.

Notes of the Week.

The Schuylkill Coal Exchange states that its drawn to return price for coal sold in November was \$2.63 and the rate of wages for the last half of November and first half of December is consequently 4% above the \$2.50 basis.

Bituminous.

Cooler weather has brought more calls for coal from the shoal water ports, where ice is forming; otherwise there is little change in the seaboard bituminous trade. Selling agents at New York are getting rather tired of trying to pacify everybody at once, for coal seems to be in as urgent demand as ever. There is no talk of next season's business yet and no desire to hear about it; signs which bode ill for consumers by and by.

Offers are freely made by concerns which need coal of 75c. over the regular price or even more. Such offers are often refused, as producers are still encumbered with contracts calling for unspecified amounts, and consumers are making the most of such contracts. It is openly asserted by some producers that the middlemen alone are benefiting by the high prices and that as compared with last year this year's business will show little if any increase in profits. Next year, however, the producer is going to pick and choose a bit, and some consumers who have made the most of the present situation will not receive much consideration.

Taking into account a higher rate for mining, higher freight to tidewater and higher ocean freights, it is altogether possible that consumers at points beyond Cape Cod will have to pay \$1 per ton for coal more than this year. Today soft coal is selling for more than the better steam sizes of anthracite, something that has not happened before in something like 20 years. The all-rail trade continues to have first call. It has had the advantage over that of other consuming territories all the summer and fall, and this advantage is, if possible, more marked than it has been.

Car supply at the collieries is deficient still. It is perhaps $\frac{3}{4}$ of what is called for. Transportation from mines to tide is all right in spots, but in general is sluggish. In the seaboard vessel market vessels are scarce and in demand. Rates are firm at \$1.35@1.45 from Philadelphia to Fall River, New Bedford and the Sound and \$1.90 to Boston.

Birmingham, Ala.

Dec. 4.

(From Our Special Correspondent.)

There is no change in the coal market in this State. There is nothing to be stated, except to announce the continued and increasing activity of the demand. The advance in railroad rates on coal to Alabama and Georgia common points will go into effect December 15th, and the consumer

will pay the difference. The advance is 10c. on the ton. The local demand for coal is extraordinarily large. The furnaces and coke ovens are using great quantities, and there is a scarcity of coke reported. Hence all the ovens now in the course of construction are being pushed to completion. The mines are working at full blast, and no coal is being laid aside for winter use by the larger consumers, as far as can be learned.

There is much buying of coal lands in this State. In a short time now there will be but little coal land on the market. The Sloss-Sheffield Steel and Iron Company is buying in large bodies of coal properties in Walker and Jefferson counties, while Morris Adler and associates have also been purchasing much property. The Tennessee Coal, Iron and Railroad Company is making preparations to supply the extra demand that will be made by the starting of the steel plant and other works in and around Ensley. Two new openings have been made in the vicinity of Ensley in the last four months, and in a few days regular outputs of coal will follow.

Chicago.

Dec. 5.

(From Our Special Correspondent.)

Anthracite Coal.—Colder weather has stimulated buying to some extent, inquiry from in and out of city being larger. The last few days have brought a temperature of 20° or lower, and in consequence orders depending entirely on weather were filled. Freight rates are going up on the railroads, and now that lake traffic is almost closed the shortage of coal here will doubtless work with the increased freight rates to send anthracite coal up 25 or 50c. per ton over present prices. Good authority places the shortage of hard coal in this market at upward of 250,000 tons. Prices are \$5.75 for egg and stove; \$6 for chestnut.

Bituminous Coal.—Shipments of soft coal to town have been much larger than for some time, the mines having had more cars put in their service. The demand continues large, railroads, etc., buying freely, and talking of further large purchases. Prices are quite firm. Coke is in much better demand than supply. Prices are extraordinarily firm, with premiums paid for certain brands.

Pittsburg.

Nov. 6.

(From Our Special Correspondent.)

The two coal combinations are preparing to issue notices of a further advance in prices. The new rate will be 15c. a ton higher, and will go into effect on December 15th. This will make the price of 1 $\frac{1}{4}$ -in. coal, the standard grade, \$1.30 a ton at the mines. This will be the fourth advance made by the Pittsburg Coal Company, the combination of railroad coal operators, since it took charge of the mines in the Pittsburg District. The lowest rate for 1 $\frac{1}{4}$ -in. coal before the consolidation was 85c. a ton. All the coal shipped down the river last week arrived safely at its destination notwithstanding the low water. There is a shortage of coal in the lower markets, and the price at Cincinnati is 8c. a bu. and 1c. higher at Louisville. This is an advance of 3c. since the last shipment was sent out from Pittsburg. There are fully 25,000,000 bus. of coal loaded in the pools and harbor ready to go south as soon as there is enough water in the rivers.

The lake season closed yesterday, and there will be no more coal shipped this year. The Pittsburg Coal Company was unable to fill about 300,000 tons of its contracts for the Northwest. Last year contracts for Pittsburg coal called for 4,500,000 tons, and this year contracts were made for 6,000,000 tons. The company holds the railroads responsible for its inability to fill all its Northwestern contracts.

Connellsville Coke.—The production of coke continued to gain. The car supply was better and the shipments were larger. The supply for next year has been almost fully contracted for. The estimated production for last week was 194,914 tons, as compared with 194,664 tons the week previous. The shipments aggregated 11,133 cars, distributed as follows: To Pittsburg and river tipples, 3,313 cars to points west of Pittsburg, 5,902 cars; to points east of Connellsville, 1,918 cars. This is an increase of 177 cars as compared with the previous week.

SLATE TRADE REVIEW.

New York.

Dec. 8.

Business has fallen off and prices are said to be cut by quarrymen. It is also claimed that Pen Argyl roofing slate is being sold in the Middle West at less than sea-green. This is unusual as Pen Argyl slate has cost from 50 to 75c. more per square than sea-green. Some competition is also manifest in Lehigh. In fact, the price-list established a few months ago is being deviated from pretty generally. Notwithstanding this rate-cutting, quarrymen talk of higher prices for 1900.

In export circles we hear that American roofing slate is selling in Dublin, Ireland, at very low prices. As regards the Welsh industry, we learn that the shipments from Portmadoc in the quarter ending September 30th amounted to 30,445 long tons, and from Carnarvon, 20,992 tons.

The list of prices per square for No. 1 slate, standard brand f. o. b. at quarries in carload lots, is given below:

Prices of Roofing Slate.

Size, inches	Monson or Br'n ville.	Bancor	Bancor Ribbon.	Alb'n. or Jackson Bancor.	Lehigh.	Peach Bottom.	Sea Gr'n.	Unfad'g Green.	Red.
24 x 14	6.10	3.50	3.00	3.35	3.25	5.10	3.00	.....	.....
24 x 12	6.60	3.50	4.00	3.35	3.25	5.25	3.00	3.75	.....
22 x 12	6.60	3.50	3.25	3.50	3.00	5.25	3.00	3.75	.....
22 x 11	6.50	3.75	3.25	3.50	3.00	5.25	3.00	4.00	.....
20 x 12	6.90	3.75	.....	3.50	3.00	5.25	3.00	3.75	.....
20 x 11	6.80	4.50	3.50	4.00	3.60	5.35	3.00	4.25	9@10
20 x 10	6.80	3.75	.....	3.50	3.00	5.25	3.00	3.75	.....
18 x 12	6.80	3.75	.....	3.50	3.00	5.25	3.00	3.75	.....
18 x 11	7.00	4.50	3.50	4.00	3.60	5.35	3.00	4.25	9@10
18 x 10	7.20	4.50	3.50	4.00	3.60	5.35	3.00	4.25	9@10
18 x 9	7.10	4.50	3.50	4.00	3.60	5.35	3.00	4.25	9@10
16 x 12	6.80	3.75	.....	3.50	3.00	5.25	3.00	3.75	.....
16 x 10	7.10	4.25	3.50	4.00	3.60	5.35	3.00	4.25	9@10
16 x 9	7.00	4.25	3.50	4.00	3.60	5.35	3.00	4.25	9@10
16 x 8	7.20	4.50	3.50	4.00	3.60	5.35	3.00	4.25	9@10
14 x 10	6.60	3.75	3.25	3.35	3.25	5.10	2.75	3.75	9@10
14 x 9	6.50	3.75	3.25	3.35	3.25	5.10	2.75	3.75	9@10
14 x 8	6.60	3.75	3.25	3.35	3.25	5.10	2.75	4.25	9@10
14 x 7	6.40	3.75	3.25	3.35	3.25	5.10	2.50	4.25	9@10
12 x 10	5.80	.....	.....	.....	.....	.....	2.50	3.25	.....
12 x 9	5.80	.....	.....	.....	.....	.....	2.50	3.25	.....
12 x 8	5.50	3.50	.....	3.35	3.25	4.85	2.50	3.50	8 1/2 @ 8 3/4
12 x 7	5.00	3.25	.....	3.35	3.25	4.85	2.50	3.50	8 1/2 @ 8 3/4
12 x 6	4.80	3.25	.....	3.35	3.25	4.75	2.50	3.50	8 1/2 @ 8 3/4

A square of slate is 100 sq ft as laid on the roof.

In Brownville and Monson delivery quotations can be had somewhat lower than above, which is also true of other brands. No. 1 Bancor are 50c. extra when full 3/16 in. Intermediate sea green, \$225@245 per square, according to size.

IRON MARKET REVIEW.

NEW YORK, Dec. 8, 1899.

Pig Iron Production and Furnaces in Blast.

Fuel used	Week ending				From Jan., '98.		From Jan., '99.	
	Dec. 9, 1898.	Tons.	Dec. 8, 1899.	Tons.	Tons.	Tons.	Tons.	
An' racite	28	21,150	48	41,250	1,072,473	1,632,347		
Coke.....	148	203,350	210	241,525	4,595,799	10,785,695		
Charcoal..	20	6,125	29	7,375	290,471	282,190		
Totals..	196	230,625	287	290,150	10,968,743	12,699,632		

The iron market is quieter than for a long time past, so far as new business is concerned. In pig iron and steel billets very little has been done, and it is assumed that requirements have generally been arranged for over a considerable time. The present quiet is not unwelcome, for it gives the furnaces and mills a chance to count up their orders and figure on the prospects for spring trade. While no concessions of importance have been noted, it is a fact that sellers are hesitating about giving quotations beyond June delivery, while buyers are asking for lower figures. From present appearances it is likely that matters will be quiet until the end of the year at least.

In finished material the only incident is a considerable demand for structural steel from bridge builders, who have lately taken many contracts. The car builders seem generally to have filled their requirements and are no longer prominent in the market.

There are reports of some changes in the Carnegie Steel Company. It is understood that Mr. H. C. Frick has resigned his position as chairman and that he will leave the company altogether and take the position of president of the new Union Iron and Steel Company. The reasons which lead to Mr. Frick's retirement from the Carnegie Company are not known, though there are plenty of rumors about them.

Birmingham, Ala. Dec. 4.
(From Our Special Correspondent.)

The pig iron market in this section of the country continues to be active, and, if anything, there is an increase in the demand. Inquiries are being received right along, and many orders are being booked, delivery on which will not be made until late into 1900. The orders taken in months ago are now being rushed out, and railroads still report a deficiency in cars with which to handle the product promptly.

Every effort is being made to meet demand, and the work on repairing furnaces is being rushed. There is a delay in getting machinery, there is a scarcity in fire-brick, there is trouble in getting all the labor—in fact, there is something found out weekly to prevent the early completion of the repairs on furnaces. There are two furnaces booked to go into blast this week. The Sloss-Sheffield Steel and Iron Company is to blow in the Hattie Ensley furnace at Sheffield. Then the Trussville furnace will go into blast this week. There has been delay at this point on account of a scarcity of coke and

other raw material. The Louisville & Nashville Railroad Company has reconstructed a line to Bradford, a few miles from Trussville, where are located coke ovens belonging to the company which owns the Trussville furnace, and 50 carloads of Pocohontas, Va., coke have been brought into the plant.

The blowing of the steel plant at Ensley, near here, on Thursday afternoon last, meant much for the Birmingham district, and for the pig iron market. Only one furnace of the 10 open-hearth furnaces was blown in, but just as soon as they can be completed the others will go in too. Between 30 and 40 tons of steel were made on the first run. The blooming train will go into blast this week. The steel plant is owned by the Alabama Steel and Shipbuilding Company, an offspring of the Tennessee Coal, Iron and Railroad Company. The plant costs over \$1,000,000, and it could not be duplicated for almost double that money. The mill will have an output of about 1,000 tons of steel per day, the greater part of which for a long period has already been disposed of. The Alabama Steel Wire and Rod mills, located within a stone's throw of the steel plant, will soon be ready for operation. The Tennessee Coal, Iron and Railroad Company will most likely furnish the iron for the plant from the Ensley furnaces, four being in blast now and a fifth one under way of construction. The fifth furnace will, however, not be ready for operation for three or four months yet.

Then the Bessemer rolling mills, which have been out of blast for several years, will shortly be ready for operation. The Republic Iron and Steel Company, which already has two furnaces at Thomas, and owns and operates the Birmingham and Gate City rolling mills, now announces that it is delayed in constructing two new furnaces at Thomas by the machinery manufacturers, who are not able to deliver blowing engines as quickly as desired.

The following quotations still prevail: No. 1 foundry, \$18.50@19; No. 2 \$17.75@18.50; No. 3, \$16.75@17.50; No. 4, \$16@16.50; gray forge, \$16@16.25; No. 1 soft, \$18.50@19; No. 2, \$17.75@18.50.

Buffalo. Dec. 5.
(Special Report of Rogers, Brown & Co.)

The buying and selling of pig iron, the entering of new orders and the shipping of those already booked, goes forward at a normal business rate, apparently oblivious of the fact that this is the time of year usually recognized as the quiet period. The shortage of cars is still hampering shipments, and will continue to do so for a couple of weeks. This shortage develops that many consumers are running on a narrower margin of stock on hand than is wise in times of irregular shipments. The outlook is favorable from every point of view. Prices firm, while a strong undertone prevails throughout the whole range of the pig iron market. We quote below on the cash basis f. o. b. cars Buffalo: No. 1 strong foundry coke iron, Lake Superior ore, \$24@24.50; No. 2, \$23.50@24; Ohio strong softener No. 1, \$24.25@24.75; No. 2, \$23.25@23.75; Jackson county silvery No. 1, \$31; Southern soft, No. 1, \$23.50; No. 2, \$22.50; Lake Superior charcoal, \$25@26; coke malleable, \$24@24.50.

Chicago. Dec. 5.
(From Our Special Correspondent.)

Pig Iron.—The demand for iron having been pretty well satisfied, the market conditions for the past week are not so favorable as might be expected. Sales call for some iron, mostly in small lots. The furnaces continue to ship iron in every direction as fast as made, and foundries report business held up considerably, through inadequate supply of pig iron. Northern and Southern irons are about equally in demand. Southern irons are likely to make a small advance in price, while Northern remain firm at quoted prices: Lake Superior charcoal, \$25@26; local coke foundry No. 1, \$24@25; No. 2, \$23.50@24; No. 3, \$23@23.50; Local Scotch foundry No. 1, \$24@25.50; No. 2, \$23.50@24; No. 3, \$23@23.50; Southern Coke No. 1, \$22.85@23.85; No. 2, \$21.85@22.85; No. 3, \$20.85@21.85; Southern No. 1 soft, \$22.85@23.85; No. 2 soft \$21.85@22.85; Southern silveries, \$26.50@27; Ohio strong softeners, \$24.50@25; Alabama car wheel, \$24@26; coke Bessemer, \$25@26; malleable Bessemer, \$25@26.

Cleveland, O. Nov. 5.
(From Our Special Correspondent.)

Iron Ore.—Another advance in the carrying rates on the Lakes was the principal feature of the ore situation here during the past week. The rates now paid are \$1.90 from the head of Lake Superior, \$1.50 from Marquette and \$1 from Escanaba. Most of the vessels now go out of service on account of the insurance running out. Quite a number of them, however, will be kept in operation as long as the mild weather continues, and a large number of cargoes are expected to arrive here during the week. For this reason also it is thought the rates will be advanced still more, or companies being anxious to bring down as many cargoes as possible before navigation will stop entirely. The question of shipments has kept the representatives of our companies very busy, but

they have nevertheless made some progress toward selling ores to be mined and delivered next year. No actual sales have been made, but in very many respects an understanding has been reached as to next season's prices. The following are the reported figures being obtained on any sales made for this season: specular and magnetic ores, Bessemer quality, \$6@6.25; specular and magnetic ores, non-Bessemer, \$5@5.15; hematite ores, Bessemer quality, \$5@5.25; red hematite ores, non-Bessemer quality, \$4@4.50.

Pig Iron.—The pig iron trade has varied little in volume and very little in prices from what was reported at the end of last week. Some sales have been made, chiefly of foundry irons, but at unchanged quotations. The market remains firm at the high figures quoted for the past few weeks. As the production of this year and very largely for the first half of next year are sold, a firm market for all grades of iron is quite sure to continue, and prices may even go higher. The following are present quotations for iron f. o. b. Cleveland: Lake Superior charcoal, \$25.50; Bessemer, \$24; No. 1 foundry, \$23.50; No. 2, \$23; No. 1, Ohio Scotch, \$22.50; No. 2, \$22; gray forge, \$21.

Philadelphia, Dec. 7.
(From Our Special Correspondent.)

Pig Iron.—The conditions prevailing last week continue this week without apparent change in any respect. At the same time there is a different feeling expressed, particularly by foundrymen, who are looking for supplies for the latter part of the winter. There are quite a number of those who would like to place contracts, but they want first-class iron, and there is none being offered. Several of the new makes of iron are to be had at what appears to be a concession, and this is ground for the rumor that pig iron is cheaper. There is nothing doing in forge, although there are quite a number of mill owners who would promptly agree to pay \$20 for the kind of iron they want. There is nothing doing in Bessemer or basic, although there are plenty of parties who are prepared to extend their engagements as soon as prices suit them. While the pig iron market is called quiet, because of the very few sales, there is a great deal of anxiety felt in regard to spring supplies.

Billets.—There are a number of parties in the East desirous of buying billets and some of them have made quite good offers, but \$3 at present separates sellers and buyers. The sellers will not yield to that extent, and the buyers have billets to carry them over into January.

Merchant Bar.—Merchant bar iron rules high and mill owners could get more contracts if they were willing to accept them, especially for common iron, but the general feeling here is that no one will buy but those who are compelled to in the hope that later on an advantage of \$1 or possibly \$2 per ton can be had. In this connection it is proper to mention that there is a renewal of rumors of weakness in bars.

Sklp Iron.—Sklp iron has weakened somewhat, but no quotations are given.

Sheet Iron.—The sheet iron market is very quiet in all excepting heavy sheets for special purposes, and the demand in this line is only for small lots, but good prices are paid.

Merchant Steel.—The statements given out to-day are that implement people in the West are once more asking for prices for large quantities of material for summer delivery. Eastern consumers are doing nothing, and do not feel like doing much, as long as prices are as high as they are.

Plate.—The situation remains apparently the same. Two months ago there were a good many urgent buyers. These requirements have not yet been covered, and at the present time there are very few inquiries on the market. Prices have not weakened, and probably will not for an indefinite period. The understanding is that just as fast as mill owners find themselves able to let in new business, half-promised, it will be quietly taken.

Structural Material.—The only point of interest this week is that the bridge builders, who have recently closed arrangements with railroad companies for bridge work, are pouncing down on mill people, but find prices too high to suit them. They make a strong argument for lower quotations. The mill owners have a strong argument for continued high prices, and they will not recede from their position. Shapes range from 2.40 to 2.80c.

Old Rails.—Heavy transactions are reported as having been closed within a few days between sellers and buyers direct. They have not acted through any houses in this city.

Scrap.—Anything in scrap would sell promptly at extremely high prices.

Pittsburg. Dec. 6.
(From Our Special Correspondent.)

But little new business was offered in iron and steel during the week, but consumption is

still keeping ahead of production. A number of manufacturers have not yet caught up with old orders. Prices in all lines, with the exception of sheets, are firm. Sheets are so low that some large producers refuse to sell, holding No. 28 at 3.20c., while the price quoted is 2.95@3c. Galvanized sheets have also dropped and are quoted this week at 75 and 5% off, with no freight allowance. One concern declines to sell at less than 70 and 10% off at Pittsburgh. Spelter has dropped about 30% within the past few weeks, and can be had now at 4.30c. Pittsburgh. Spelter being largely used in making galvanized iron, this, with the low prices of sheets, has been responsible for the decline in prices of galvanized sheets. There has been no material change in the price of Bessemer pig iron, but the market is as firm as last week. Some sales of small lots for immediate delivery were made at \$25. Sales have been made into the third quarter of 1900 at \$24.50@25. Foundry irons are firm, and No. 2 is quoted at \$28, Pittsburgh. The strike of the molders did not affect the market, as the demands of the workers were conceded and all the foundries are in operation as usual. The steel market is quiet, buyers evidently waiting for lower prices. Practically nothing was done during the week. Steel billets are quoted as low as \$35 for next year. The steel bar market is not as strong as last week, but a number of orders was placed. Prices remain about the same as last week. It is not expected that much new business will appear until about February. The demand for wire and nails is lighter, but there has been no change in prices.

Pig Iron.—But few sales of Bessemer were made during the week, the ruling price being \$25@25.25 Pittsburgh. For next year's delivery, \$24.50@25 is quoted, and sales at those figures have been made into the third quarter. The freight rate from the Valley furnaces to Pittsburgh after January 1st will be 90c. There was no change in the price of foundry iron. The minimum price for No. 2 is \$23 Pittsburgh.

Steel.—The market is unusually quiet, and no sales of any consequence were made during the week. Billets for immediate delivery can be had at \$37, and for next year as low as \$35 is quoted. Steel bars are lower and 2.40c. is named as the price for shipment this month, and 2.25c. is asked for next year.

Sheets.—The market continues to decline, and but few sales have been made, producers preferring to hold off for better rates. No. 28 gauge is quoted at 2.95@3c. Galvanized sheets have also dropped and are quoted at 75 and 5% off.

Ferro-manganese.—There is no change in prices, and the demand continues good. The rate for small lots is \$125, and for large lots \$100.

New York. Dec. 8.

The iron market shows signs of weakness in spots. Prices of finished material are still higher here than abroad and no great amount of export business can be expected till there has been a decided fall.

Pig Iron.—The market shows no weakening. Consumers who were not expected to be in the market for some time are buying again. Most furnaces are so sold ahead that immediate deliveries are almost impossible. We quote for delivery to July, 1900: Northern brands, tidewater delivery: No. 1 X foundry, \$25.50@25.75; No. 2, \$24.25@24.75; No. 2 plain, \$23.25@23.75. Southern brands, New York delivery: No. 1 foundry, \$23.25@23.75; No. 2 foundry, \$22.25@22.50; No. 1 soft, \$22.25@22.50; No. 2 soft, \$21.25@21.50; No. 3 foundry, \$21.50.

Warrant irons have changed but little during the week. Alabama No. 2 foundry has been \$16.75; No. 3, \$15.50; No. 4, \$15@14.50; gray forge, \$15.50@15.

Bar Iron and Steel.—There is little change in conditions. Prices are pretty firm. We quote refined iron as high as 2.35c. on dock, and common at 2.15c. Soft steel bars, 2.55c.

Plates.—Mills have begun to look about for new work and prices have fallen. There is a general feeling that they were pushed up too high and a good many consumers decided to wait for a fall. We quote for large lots at tidewater: Tank, 1/4-in. and heavier, 2.75c.; tank, 3/16-in., 2.85c.; shell, 2.95c.; flange, 3.05c.; marine, 3.15c.; firebox, 3.20c.; universals, 2.75c.

Steel Rails and Rail Fastenings.—Business, so far as new orders are concerned, remains slack. We quote for standard sections \$35@36 f. o. b. Eastern mills. Smaller rails are quoted: 12-lb., \$40; 16-lb., \$40; 20-lb., \$40; 30-lb. to 40-lb., \$38; 40-lb. to standard, \$37, with the usual advance for small orders. We quote angle bars, 2.45c.; fish plates, 2.40c.; spikes, 2.75c.

Structural Material.—Prices held up pretty well but terms are easier.—We quote for large lots of steel at tidewater: Beams, 15-in., 2.50c.; tees, 2.55c.; channels, 2.55c.; angles, 2.45c., with higher figures for prompt delivery and small lots.

METAL MARKET.

NEW YORK, Dec. 8, 1899.

Gold and Silver.

Gold and Silver Exports and Imports
At all United States ports in October and year.

	October.		Year.	
	1898.	1899.	1898.	1899.
GOLD.				
Exports	\$1,279,926	\$772,867	\$14,061,849	\$33,650,705
Imports	16,738,353	7,562,876	144,082,169	41,831,297
SILVER.				
Exports	I. \$15,458,427	I. \$6,791,009	I. \$130,020,320	I. \$8,180,592
Imports	4,512,827	4,985,519	43,946,327	43,723,941
Exports	2,553,444	2,193,125	23,652,668	24,917,220
Exports	E. \$1,959,393	E. \$2,792,385	E. \$20,293,659	E. \$18,806,721

This statement includes the exports and imports at all United States ports, the figures being furnished by the Treasury Department.

Gold and Silver Exports and Imports, New York
For the week ending December 7th, 1899, and for years from January 1st, 1899, 1898, 1897, 1896.

Period	Gold.		Silver.		Total Excess, Exp. or Imp.
	Exports.	Imports.	Exports.	Imports.	
Week	\$46,629	\$59,512	\$746,320	\$132,552	E. \$600,685
1899.	11,732,386	13,794,623	27,699,502	3,554,837	E. 22,052,423
1898.	8,433,594	96,853,233	32,172,703	3,008,125	I. 59,255,061
1897.	29,761,631	43,170,454	34,214,685	2,961,722	E. 7,844,160
1896.	40,763,863	76,616,228	35,424,439	3,589,820	I. 4,017,696

Exports and imports of gold were in small parcels, to and from various ports. Exports of silver went chiefly to London; imports were from Mexico and the West Indies.

The United States Assay Office in New York reports the total receipts of silver at \$9,000 oz. for the week.

Prices of Foreign Coins.

	Bid.	Asked
Mexican dollars	\$.47 1/2	\$.49
Peruvian soles and Chilean pesos	.43	.45
Victoria sovereigns	4.85	4.88
Twenty francs	3.84	3.88
Twenty marks	4.71	4.79
Spanish 25 pesetas	4.78	4.82

Average Prices of Silver per oz. Troy.

Month.	1899.		1898.		1897.	
	London Pence.	N. Y. Cents.	London Pence.	N. Y. Cents.	London Pence.	N. Y. Cents.
January	27.42	59.36	26.29	56.71	29.74	64.79
February	27.44	59.42	25.89	56.01	29.68	64.67
March	27.48	59.64	25.47	54.90	28.96	63.06
April	27.65	60.10	25.95	56.02	28.36	61.85
May	28.15	61.23	26.31	56.98	27.86	60.42
June	27.77	60.43	27.09	56.61	27.58	60.10
July	27.71	60.26	27.32	59.06	27.36	59.61
August	27.62	60.00	27.48	59.54	24.33	54.19
September	27.15	58.89	28.05	60.68	25.66	55.04
October	26.70	57.98	27.90	60.42	26.77	57.57
November	27.02	58.67	27.93	60.60	26.87	57.93
December	.....	.....	27.45	59.42	26.83	58.01
Year.	.....	.....	26.76	58.26	27.55	59.79

The New York prices are per fine ounce; the London quotation is per standard ounce, 925 fine.

Average Prices of Metals per lb., New York.

Month.	COPPER.		TIN.		LEAD.		SPELTER.	
	1899.	1898.	1899.	1898.	1899.	1898.	1899.	1898.
Jan	14.75	10.99	22.48	13.87	4.18	3.65	5.34	3.96
Feb	18.00	11.28	24.20	14.08	4.49	3.71	6.28	4.04
March	17.54	11.98	23.82	14.38	4.37	3.72	6.31	4.25
April	18.43	12.14	24.98	14.60	4.31	3.63	6.67	4.26
May	18.25	12.00	25.76	14.32	4.44	3.64	6.88	4.27
June	17.93	11.81	25.65	15.25	4.43	3.82	5.98	4.77
July	18.33	11.63	29.63	15.90	4.52	3.95	5.82	4.66
August	18.60	11.89	31.53	16.25	4.57	4.00	5.63	4.68
Sept.	18.46	12.31	32.74	16.03	4.58	3.99	5.50	4.67
October	17.76	12.41	31.99	17.42	4.575	3.78	5.32	4.98
Nov.	16.93	12.86	28.51	18.20	4.575	3.70	4.64	5.29
Dec.	.....	12.93	.....	18.30	.....	3.76	.....	5.10
Year.	.....	12.03	.....	15.70	.....	3.78	.....	4.57

The price given in the table is for Lake Copper. The average price of electrolytic copper in January was 14.36c.; in February it was 17.02c.; in March, 16.35c.; in April, 17.13c.; in May, 17.2c.; in June, 16.89c.; in July, 17.09c.; in August, 17.42c.; in September, 17.34c.; in October, 16.94c.; in November, 16.49c.

Financial Notes of the Week.

General business continues exceedingly active and there is no change in the accounts of good demand and high prices for manufactures, and of increases in wages in various trades. The speculative markets are dull, and are feeling the effects of the over-manufacture of industrial stocks, which will be a load for some time to come. The rates for money are still rather high, but are lower generally than in London and Berlin, so that balances are still kept abroad. There has been some transferring of loans from London to Berlin, where rates are higher and demand pressing.

Imports and Exports of Metals.

Port.	Week, Dec. 6.		Year 1899.	
	Expts.	Impts.	Expts.	Impts.
*New York.				
Aluminum long tons	.....	.....	363	12
Antimony ore	.....	.....	.....	1,569
regulus	.....	.....	.....	1,056
Chrome ore	.....	1190	56,657	2,376
Copper, fine	1,577	2,578	66,617	27,432
matte	47	.....	612	1,099
ore	.....	.....	.....	45,123
ash	.....	.....	.....	215
sulphate	.....	.....	11,627	.....
other	.....	.....	.....	135
Cop-nickel matte	.....	.....	.....	53
Ferro-manganese	.....	.....	.....	278
Iron ore	.....	.....	.....	50
pig, bar, rod	157	.....	6,409	3,971
plates, sheets	265	140	25,773	.....
other	150	748	1,749	251
Lead	940	1,260	52,060	51,065
ore	.....	.....	.....	941
Manganese, ore	.....	.....	.....	6,440
Metals, old scrap	78	1275	4,786	4,493
Composition	.....	.....	6,886	255
Nails	282	.....	17,692	.....
Nickel	87	.....	1,869	105
Ore	.....	.....	.....	4,071
Railroad material	79	.....	7,407	3,983
Rails, old	.....	115	15,772	.....
Spiegeleisen	.....	140	1,170	.....
Steel bars, plates	.....	1516	40,592	16,447
rails	1,798	.....	47,830	150
hoops	.....	.....	831	100
wire	1,517	.....	38,009	1,225
not specified	89	184	25,485	11,817
Tin	.....	775	.....	25,823
dross or ashes	.....	.....	.....	63
and black plates	.....	11,832	.....	34,144
Zinc	.....	.....	272	358
dross	.....	.....	437	.....
ashes, skim	14	.....	2,143	290
ore	1,472	.....	9,919	.....
oxide	84	.....	4,139	293
†Baltimore.				
Alumina bags	.....	.....	.....	3,479
Antimony regulus, casks	.....	.....	.....	286
Chrome Ore long tons	.....	.....	.....	2,300
Copper, fine	1,728	.....	34,116	2,494
matte	.....	.....	.....	.....
sulphate	15	.....	1,577	.....
pipe	.....	.....	100	.....
Ferro-manganese	.....	.....	.....	2,163
Ferro-silicon	.....	.....	184	96
Iron pig, bar, etc.	34	800	1,233	8,412
pyrites	.....	.....	.....	247,527
Manganese ore	.....	.....	.....	47,084
Metals, old & RAILS	.....	.....	4,604	51
Nails	.....	.....	720	.....
Pipe, iron & steel	162	.....	13,748	.....
Spiegeleisen	.....	.....	.....	1,337
Steel, bars, plates	838	.....	35,753	.....
wire	14	.....	1,532	53
rails	.....	.....	67,903	276
not specified	89	.....	2,898	23
Tin	.....	.....	563	.....
and black plates	.....	138	.....	2,804
other	.....	.....	43	.....
Zinc	.....	.....	25	5
dross, skim	.....	.....	362	.....
oxide	19	.....	19	.....
*Philadelphia.				
Antimony long tons	.....	.....	.....	10
Chrome ore	.....	.....	.....	3,060
Copper, fine	.....	.....	535	.....
ore	.....	.....	.....	36,507
old	.....	.....	.....	11
Ferro-manganese	.....	.....	.....	1,572
Ferro-silicon	.....	.....	.....	160
Iron, pig	.....	290	.....	5,190
ore	112,230	.....	.....	274,083
pyrites	.....	.....	.....	16,153
Manganese ore	11,450	.....	.....	86,581
Steel sheets	.....	.....	.....	2,110
Spiegeleisen	.....	.....	.....	510
Tin	.....	.....	.....	1,079
and black plates	.....	.....	.....	4,517
Zinc dust	.....	.....	.....	10
ore	.....	.....	3,063	.....

Total United States.

Articles.	October.		Jan.-Oct.	
	Expts.	Impts.	Expts.	Imp. a.
Antimony long tons	.....	117	8	1,229
ore	.....	98	.....	1,778
Copper fine	10,293	3,737	84,749	23,903
matte	165	.....	11,800	.....
ore & matte	342	12,717	4,347	19,916
Iron, pig & bar	14,182	7,025	218,102	43,534
ore	1,193	72,931	22,283	498,330
Iron & steel plates	6,124	1,191	54,263	4,319

The silver market has continued firm and steady on China demand without special feature.

The statement of the United States Treasury on Wednesday, December 6th, shows balances in excess of outstanding certificates as below, comparison being made with the statement of the corresponding day last week.

	Nov. 29.	Dec. 6.	Changes.
Gold	\$241,111,980	\$238,065,588	D. \$3,046,392
Silver	10,174,870	9,798,425	D. 406,445
Legal tenders	15,915,246	15,549,813	L. 365,433
Treas. notes, etc.,	1,058,986	1,210,883	L. 151,897

Totals

	Nov. 29.	Dec. 6.	Changes.
Totals	\$268,261,082	\$264,594,709	D. \$3,666,373

Treasury deposits with national banks amounted to \$82,791,273, an increase of \$498,811 during the week.

The statement of the New York banks—including the 63 banks represented in the Clearing House—for the week ending December 2d, gives the following totals, comparison being made with the corresponding weeks in 1898 and 1897:

	1897.	1898.	1899.
Loans and discounts	\$597,744,000	\$697,747,400	\$682,159,800
Deposits	686,278,600	789,525,800	748,078,000
Circulation	127,540,000	16,439,200	16,480,900
Reserve:			
Specie	104,489,800	158,462,300	145,314,500
Legal tenders	84,202,800	56,017,100	50,241,700

Total reserve

	1897.	1898.	1899.
Total reserve	\$188,692,600	\$214,479,400	\$195,556,200
Legal requirements	166,569,650	197,381,450	187,019,500

Balance, surplus

	1897.	1898.	1899.
Balance, surplus	\$22,122,950	\$17,097,950	\$8,536,700

Changes for the week, this year, were increases of \$5,523,400 in loans and discounts, \$10,120,000 in deposits, \$9,300 in circulation, \$3,303,900 in specie, \$1,110,000 in legal tenders, and \$1,884,500 in surplus reserve.

The following table shows the specie holdings of the leading banks of the world at the latest dates covered by their reports. The amounts are reduced to dollars, and comparison is made with the holdings of the corresponding dates last year:

Banks.	1898.		1899.	
	Gold.	Silver.	Gold.	Silver.
N.Y. Ass'n	\$158,462,300	.....	\$145,314,500	.....
England	160,948,365	.....	155,653,445	.....
France	366,295,540	\$243,340,750	377,549,295	\$233,779,645
Germany	127,540,000	65,700,000	123,320,000	63,530,000
Spain	55,310,000	32,285,000	68,000,000	70,615,000
Aus.-Hun	177,960,000	62,355,000	191,635,000	62,705,000
Neth. Inds	21,575,000	33,470,000	18,300,000	29,280,000
Belgium	14,690,000	7,330,000	14,815,000	7,410,000
Italy	74,456,000	11,465,000	77,040,000	7,455,000
Russia	491,440,000	17,500,000	432,410,000	24,005,000

The returns of the Associated Banks of New York are of date of December 1st, and the others are of date of November 30th, as reported by the "Commercial and Financial Chronicle" cable. The New York banks do not report silver separately, but the specie carried is chiefly gold coin. The Bank of England reports gold only.

The Treasury Department estimates of money in the United States on December 1st is as follows.

	In Circulation.	In Treasury.	Totals.
Gold Coin	\$627,480,101	\$248,843,301	\$876,323,402
Silver Dollars	78,232,454	404,389,922	482,622,376
Subsid. Silver	76,322,965	3,187,384	79,510,349
Gold Certif.	150,908,292	23,987,917	174,896,119
Silver Certif.	394,292,800	6,350,704	400,643,504
Treas'y Notes	87,441,680	1,534,600	88,976,280
U. S. Notes	317,811,976	28,869,040	346,681,016
Cur'y Certif.	13,605,000	90,000	13,695,000
Nat. Bank Notes	239,835,736	4,006,282	243,842,018
Totals	\$1,985,930,964	\$721,309,150	\$2,707,240,114

The estimated circulation per capita on December 1st was \$25.85. The amount in circulation shows an increase of \$22,214,816 during November; and of \$99,051,460 as compared with December 1st, 1898.

Shipments of silver from London to the East for the year up to November 23d, 1899, are reported by Messrs. Pixley & Abell's circular as follows:

	1898.	1899.	Changes.
India	£3,977,465	£4,749,725	I. £772,260
China	577,930	1,265,978	I. 678,009
The Straits	365,541	269,506	D. 96,035
Totals	£4,910,936	£6,285,209	I. £1,374,273

Arrivals for the week, this year, were £76,000 in bar silver from New York, £210,000 from Australia, £17,000 from the West Indies, and £4,000 from New Zealand; total, £118,000. Shipments were £81,000 in bar silver in China, and £77,700 to Bombay; total, £158,700.

Indian exchange has been weaker and there has been less demand for Council bills in London, though 35 lakhs were taken and the rate of 16.09d. per rupee was maintained. Some silver has been bought in London for Indian account, and a good deal for China.

Other Metals.

Daily Prices of Metals in New York.

December	Sterling Exchange.	Silver.			Copper.			Tin, cts. # lb.	Lead, cts. # lb.	Spelter, cts. # lb.
		Fine oz. Cts.	Lon-don, P'nce	Lake, cts. # lb.	Elec-tro-lytic, # lb.	Lon-d'n stand-ard # lb.	Tin, cts. # lb.			
24.86 1/4	59	27 1/2	16 3/4	16 3/4	73 10 0	27 3/4	4.60	4.40		
4.86 1/4	58 7/8	27 1/2	16 3/4	16 3/4	73 10 0	27 3/4	4.60	4.50		
5.4.86 1/4	59	27 1/2	16 3/4	16 3/4	73 15 0	27 3/4	4.60	4.65		
6.4.86 1/4	59	27 1/2	16 3/4	16 3/4	73 10 0	27 3/4	4.60	4.75		
7.4.86 1/4	59	27 1/2	16 3/4	16 3/4	73 10 0	27 3/4	4.60	4.75		
8.4.86 1/4	59	27 1/2	16 3/4	16 3/4	73 10 0	27 3/4	4.60	4.85		

The quotations given for electrolytic copper are for cakes, ingots and wirebars; the price of electrolytic cathodes is usually 0.25c. lower than these figures.

Copper.—The market has been very quiet. Some business has been done both here and abroad at slight concessions from last week's prices. We have to quote Lake copper at 16 3/4 c. electrolytic copper, in cakes, bars and ingots at 16 3/4 c.; in cathodes at 15 7/8 c.

The speculative market in London has been steady at about the closing prices of last week, which were £73 5s. for spot, £72 5s. for three months. It closes this week at £73 10s. for spot, £72 10s. for 3 months.

Copper statistics for the second half of November showed an increase of 200 tons.

Refined and manufactured sorts we quote: English tough, £78 @ £78 10s.; best selected, £79 10s. @ £80; strong sheets, £84 10s. @ £85; India sheets, £83 10s. @ £84 10s.; yellow metal, 6 3/4 @ 6 7/8 d.

Tin.—The market has been without any special feature, though toward the end of the week a decline was recorded and the metal has been selling at prices varying between 28c. and 27 1/2 c.; closing at the lower figure.

The foreign market, which closed last week at £125, opened at £126 5s., but soon receded to £125, and then declined further to £123. The closing quotations are £121 for both spot and 3 months.

Statistics for November showed an increase of 1,600 tons.

Imports of tin into the United States for the 10 months ending October 31st are reported by the Treasury Department at 65,619,547 lbs., against 53,773,230 lbs. in 1898, and 47,251,274 lbs. in 1897. Of the total this year 44,973,587 lbs., or 68.5%, were imported directly from the producing countries—the East Indies and Australasia; the balance coming by way of Great Britain and Holland.

Lead.—The market is strong and a large business has been done both in the East and in the West. The prices in the West have gone up somewhat, and we quote 4.50 @ 4.55c. St. Louis; New York is 4.60c.

The European market is slightly weaker, Spanish lead being quoted at £17 7s. 6d., English lead 5s. higher.

Imports of lead into the United States for the 10 months ending October 31st, and re-exports of foreign lead, are reported by the Treasury Department as below, in pounds:

	1898.	1899.
Mexico	120,461,015	137,563,985
Canada	27,067,080	16,515,108
Other countries	672,251	1,409,791
Total imports	148,199,346	155,493,884
Re-exports	126,641,154	127,639,767
Balance	21,549,192	27,854,117

The imports were almost entirely—all except 465,523 lbs. this year and 871,720 lbs. in 1898—in ores or base bullion. The re-exports were metallic lead smelted or refined here in bond.

St. Louis Lead Market.—The John Wahl Commission Company telegraphs us as follows: Lead strong and higher. As the year draws to a close, lead appears to be very scarce, and it is quite evident that we are going to commence the new year with very light stocks of unsold lead. Common is selling at 4.52 1/2 c. and chemical and corrodng at 4.55 @ 4.57 1/2 c.

Spelter.—There is a decided change in the tone of the market. Large transactions have taken place at considerably higher values. It is rumored that an export sale has been made which will greatly reduce the quantity available for domestic consumption, and it is feared that the supplies may prove inadequate. We quote at the close of transactions at 4 1/4 c. New York, 4 1/2 c. St. Louis.

In London the market has advanced 5s., and good ordinaries are quoted £20 2s. 6d., with specials 5s. higher.

Exports of spelter or metallic zinc from the United States for the 10 months ending October 31st are reported by the Treasury Department at 6,482 short tons, against 8,392 tons in 1898, and 12,455 tons in 1897. Exports of zinc ore this year were 21,259 tons, against 9,131 tons in 1898 and 7,252 tons in 1897.

Antimony is without change. We quote Cookson's at 10 1/2 @ 11c.; Hallett's, 9 1/2 @ 9 3/4 c.; U. S. Star and Hungarian, 9 1/2 @ 9 3/4 c.

Nickel is firm and demand very brisk. Quotations are firm at 40 and 45c., according to size of order.

Platinum.—Demand is good, and prices are firmer. In large lots we quote \$17.75, and for smaller quantities, \$18 per oz., in New York.

For chemical ware (crucibles and dishes), best hammered metal, we quote as follows: In lots of 250 grams or more, 67 1/2 c. per gram, and for smaller quantities, 70c. per gram; unmanufactured platinum will be supplied in same quantities at 2c. less per gram.

Quicksilver.—The New York price is 50c. higher, at \$51 per flask. Small lots sell at \$52 @ \$53. The London price has been raised 2s. 6d., and is now £9 12s. 6d. per flask, with the same price quoted from second hands.

Exports of quicksilver from all United States ports for the 10 months ending October 31st, as reported by the Treasury Department, were 1,158,052 lbs., against 825,883 lbs. in 1898, and 875,594 lbs. in 1897.

The Minor Metals.—Quotations are given below for New York delivery:

	Per lb.		Per lb.
Aluminum, No. 1, 99 1/2 ingots	35 @ 37c.	Bismuth	\$1.45 @ \$1.50
No. 2, 90 1/2 ingots	31 @ 34c.	Magnesium	\$2.75 @ \$3
Rolled sheets	38c up	Phosphorus	40 @ 50c.
Alum.-brnze	20 @ 23c.	Tungsten	70c.
Nickel-alum	33 @ 30c.	Ferro tungsten, 60%	60c.

Variations in price depend chiefly on the size of the order.

LATE NEWS.

A dispatch from Ottawa, Canada, December 7th, says: "The Government has not yet perfected its regulations in respect to meeting the views of those who have been clamoring to have lead refined in the United States from Canadian ores placed on the free list when returned to Canada. It has, however, been decided to charge on the refining only, which means that such lead would pay about 6c. on 100 lbs., while the duty on foreign lead would be about 65c."

The Champion Copper Company filed articles of incorporation at Houghton, Mich., December 7th. The capitalization is \$2,500,000, with a cash capital of \$100,000. William A. and Charles H. Paine, Frederick Stanwood, George E. Leonard, and Frederick Hall of Boston, with John H. Rice and Albert R. Gray of Houghton are the Directors of the new company. The mining property is located 20 miles south of Houghton, and is now being opened.

Recent New Haven dispatches stated that the proposed consolidation of the Ansonia Brass & Copper Company, the Coe Brass Company and the Waterbury Brass Company had been consummated. The formal transfer of the respective properties had not yet been made, though this will be done in the near future. The only new feature in the situation is that the organizers of the new company have decided to use the charter of the American Brass Company, which was taken out under a special act of the Connecticut Legislature several months ago, when a \$20,000,000 consolidation was in contemplation.

The capital of the new company will be about \$6,000,000, all in common stock. An organization meeting for the election of permanent officers and directors will be held shortly, and the new company will probably be in full operation by the first of the new year.

Yale District—British Columbia.
(From Our Special Correspondent.)

No. 7.—Machinery is beginning to arrive. The road to the mine will eventually reach Greenwood, making a highway between that place and Columbia.

Sunset.—Twenty men are putting up buildings. A water tank to hold 8,000 gals. will be completed shortly. The water will be carried 1,400 ft. from Deadwood Creek. A 20-drill compressor, a 75 H. P. hoist, and two 80 H. P. boilers are ordered.

British Columbia Copper Company.—Sixty men are at work on the smelter at Greenwood. The stone foundation for the sampling mill, 60 by 100 ft., is ready. The dust chambers are almost completed. The storehouse, 24 by 44 ft., and the blacksmith shop, 20 by 30 ft., are finished. Other buildings are under construction. The smelter may blow in next June.

Mother Lode.—Forty-five men are at work. The main shaft is down 314 ft. At the 200 ft. level the north drift is in 540 ft. The ore reserves are large, and the mine is expected to supply all the ore the smelter will be able to reduce.

Granite & Banner.—This is a free milling property in Camp McKinney. On the Granite claim one shaft is down 10 ft. and another 35 ft. on the ledge. At the end of an 80-ft. tunnel a winze has been sunk 46 ft. At the 30-ft. level the vein is 14 ft. wide. The average value of the ore is put at \$17 a ton. A 5-stamp mill is dropping. A larger mill may be put in.

CHEMICALS AND MINERALS.

(For further prices of chemicals, minerals and rare elements, see page 720.)

New York. Dec. 8.

Heavy Chemicals.—Contracts for domestic alkali and caustic soda for future delivery have been booked in a large way, and so immediate shipments command higher prices. Sal soda is in better demand. Bleaching powder prime sold at \$2½@2¾ on spot and for January arrival at \$2¾. Chlorate of potash for 1900 contracted at \$8½. Imports of bleaching powder at this port this week amounted to 533 casks and 153 bbls. Receipts of domestic soda ash aggregated 1,105 sacks and 400 drums.

Imports into the United States in the 10 months ending October 31st were as follows, the figures in parenthesis being for the corresponding period last year: Bleaching powder, 98,946,861 lbs. (89,024,871 lbs.); soda ash, 32,628,903 lbs. (58,437,008 lbs.); caustic soda, 11,800,073 lbs. (21,065,250 lbs.); sal soda, 5,584,650 lbs. (4,175,422 lbs.); chlorate of potash, 1,372,748 lbs. (4,156,478 lbs.). The re-exports in the same periods were: Bleaching powder, nil (against 28,495 lbs. in 1898); soda ash, 1,157,951 lbs. (2,895,645 lbs.); caustic soda, 897,677 lbs. (1,052,834 lbs.); sal soda, 14,280 lbs. (1,272 lbs.); chlorate of potash, 49,009 lbs. (11,383 lbs.).

Articles.	Domestic.		Foreign.
	F.o.b. Works.	In New York.	In New York.
Alkali, in bags.	80@85c.	95@1.00	95@1.05
Caustic Soda, high test.	\$1.85@2.00	\$2.00@2.05	\$1.95@2.00
98% powd.	.....	3 1/2@ 3.50	.....
80@74% pwd	.....	2.50@ 2.62 1/2	.....
Sai Soda	60@70c.	.....	67 1/2@72 1/2
" conc.	1.30@1.75	.....	1.50@1.65
Bicarb. Soda.	1.25@1.37 1/2	.....	2.25@2.37 1/2
" extra	3.25@3.50	.....	.....
Bleach. Pdr.	.....	.....	2.15@2.25
Enz. prime.	.....	.....	2@2.15
Other brnds.	.....	.....	8 25@9.00
Chl. Pot cryst.	.....	.....	9.25@9.37 1/2
" powd.	.....	9.12 1/2@9.37 1/2	9.50@9.62 1/2

Prices are generally for large quantities, and in many cases depend upon make, test and package.

Acids.—Acetic is strong, and sulphuric and muriatic are well contracted for 1900. Oxalic is in good request. Blue vitriol is moving on spring trade, and is easier. Exports of blue vitriol from United States in the 10 months ending October 31st amounted to 26,434,049 lbs., as against 12,952,183 lbs. last year.

Quotations are in large lots delivered in New York and vicinity, per 100 lbs unless otherwise specified.

Acetic, No. 8.	\$1.62@1.75	Nitric, 42°	4.75@ 5.00
Blue Vitriol, best	5.00@5.25	Oxalic	5.75@ 6.00
Muriatic, 18°	1.20@ 1.15	Sulphuric, 60°	1.20@ 1.25
Muriatic, 20°	1.35@ 1.40	Sulphuric, 60°	1.05@1.10
Muriatic, 22°	1.50@ 1.55	Bulk 50° ton	16@17.00
Nitric, 36°	3.87@4.12 1/2	Sulphurous, 100%	.....
Nitric, 38°	\$4.12 1/2@4.37 1/2	SO ₂ anhydrous.	8.00@10.00
Nitric, 40°	4.37 1/2@ 4.75	.....	.....

Brimstone.—Imports at New York this week were 1,100 tons. Best unmixed seconds on spot are quoted \$21.50@22 per ton and shipments at \$20.75@21, while thirds are \$2 less.

Fertilizing Chemicals.—Southern buying for this and next month's delivery is better. Sulphate of ammonia, gas, is stronger, and imports at this port this week amounted to only 490 bags. Imports of potash salts were 6,750 bags muriate, 1,800 bags sulphate and 5,000 bags manure salt.

Exports of domestic fertilizers (not including phosphates) from the United States in the 10 months ending October 31st, amounted to 41,315 tons, valued at \$845,258, as against 10,826 tons, valued at \$286,648 in the same time last year.

Articles.	F. o. b. Wks.	In N. Y.
Potash, muriate, 80@85%, 100 lbs.	.....	\$1.78
" " 95% "	.....	1.81
" sulphate, 90% "	.....	1.98 1/2
" " 96% "	.....	2.10 1/2
" d'ble m're salt, 48@53%, 100 lbs.	.....	80c.
" " 30% "	.....	87c.
" kainit, 12.4% long ton.	.....	8.70@8.95
" sylvanit, per unit.	.....	37@38c.
Sulph. Am., gas (25%) 100 lbs.	.....	2.92 1/2
" bone	.....	2.77 1/2
Blood, dried, h-gr. Chl. per unit	1.71 1/2@1.75	.....
" N.Y.	.....	1.85
Azotine	1.75@1.80	1.80@ 1.85
Bone black, dies., 17@18% ton	.....	16.00@16.50
Fish scrap, acid	10.50@11.00	12 50
" dried	19.50@20	21 50
Tankage h. gr. Chicago	14.50@15.00	21 00
" concentrated, unit.	1.45@1.50	1.90@1.19
" bone	.....	23.00@21.00
Bone, steam gd. domestic	.....	21.00@23.00

The quotations on potash are on the basis of foreign in voice weights, tares and analysis, in quantities of not less than 500 tons bulk salts or 50 tons concentrated salts.

Pyrites.—Market steady and prices unchanged. Imports into the United States in the 10 months ending October 31st were 261,495 tons, showing an increase of 145,714 tons over last year. Charters noted recently are 1,728 tons from Huelva to Philadelphia at 12s. 6d., option Mobile at 13s., and 1,106 tons to Elizabethport at 12s.

We quote American pyrites as follows: Mineral City, Va., lump ores, \$3.25 per long ton (basis 42%), and fines \$3; Charlemont, Mass., lump, \$5.50, and fines \$4.75; Pilley's Island, lump, \$6.50, and fines \$4.50 per long ton, delivered in New York. Spanish pyrites, 12@14c. per unit, according to percentage of sulphur contents, delivered ex-ship New York and other Atlantic ports. Spanish pyrites contain from 46% to 51% of sulphur; America, 42% to 44%, and Pilley's Island, N. F., 50%.

Nitrate of Soda.—The market is firm at \$1.70@ \$1.72 1/2 per 100 lbs for spot, and \$1.65 and upward for shipment. Imports into the United States in the 10 months ending October 31st were 120,642 tons, a decrease of 7,246 tons from last year. It is reported that the Chilean consul to Germany, Mr. Herman G. Schmidt, has gone to London to effect the consolidation of 40 nitrate companies for the purpose of limiting their output.

Messrs. Mortimer & Wisner's monthly statement of nitrate of soda, dated New York, Dec. 1st, gives the following statistics:

	1899.	1898.	1897.
Bags.	Bags.	Bags.	Bags.
Imp. into Atlantic ports from West Coast S. A., from Jan. 1 to date.	915,300	903,638	568,153
Imp. from Jan. 1 from Europe	.....	55,171	.....
	915,300	958,809	568,153
Stock in store and afloat Dec. 1, in New York	43,723	44,617	37,295
Boston	.....	.....	.....
Philadelphia	1,500	.....	1,332
Baltimore	1,500	2,000	1,000
Norfolk, Va	.....	.....	.....
Charleston	.....	.....	.....
To arrive, due Mar. 15, 1900	177,500	200,000	215,000
Vis. supply to Mar. 15, 1900	224,223	246,617	254,627
Stock on hand Jan. 1, 1899	58,406	15,383	123,593
Deliveries past month	131,894	155,471	79,855
Deliv's from Jan. 1 to date	926,983	927,575	652,119
Total yearly deliveries	.....	937,525	710,971
Prices current, Dec. 1, 1899	1.70 @ 1.72 1/2 c.	1.55 @ 1.57 1/2 c.	1.62 1/2 c.

Salt peter.—Spot is quoted at 3 1/2 c. per lb. and shipments at 3 1/2 c. Refined, 4 1/2 c. @ 5 1/4 c. The imports into the United States for the 11 months ending November 30th are reported at 56,659 bags, against 56,719 bags last year. Stocks on hand in New York on November 30th amounted to 5,800 bags, against 1,700 bags at the same time in 1898. The visible supply November 30th was estimated at 18,662 bags, against 7,777 bags last year. The deliveries in New York and Boston during the 11 months aggregated 53,859 bags, against 71,219 bags in 1898.

Phosphates.—The market is quiet and prices practically unchanged. Charters noted are 1,267 tons from Tampa to St. Nazaire, France, at 21s., December sailing, and 1,201 tons from the same port to Boness at 21s., also sailing in December. Shipments from Punta Gorda in November were 3,963 tons domestic, making a total of 31,872 tons for the 11 months, besides 45,033 tons foreign, or a grand total of 76,905 tons.

Latest quotations for the European market, c. i. f. United Kingdom or North Sea ports, are as follows: Florida high grade rock (77@80%), 8 1/2 d. (\$14 per long ton); Florida pebble (68@73%), 7 1/4 d. (\$9.80 per ton); Florida Peace River (58@63%), 7 1/4 d. (\$9.00 per ton); Tennessee high grade rock (78@80%), 7 1/4 d. (11 per ton); Algerian (63@70%) rock, 7 1/4 d. (\$9.38 per ton); and 58@63% rock, 6 1/2 d. (\$7.80 per ton).

We quote: Florida high grade, 78@80% rock, \$9.50@10 per long ton f. o. b. Fernandina. The freight rate to New York is about \$2 per ton. Florida land pebble, 68@73%, \$7@7.50 per ton, delivered in New York. Florida Peace River, rock, 58@63%, \$4.50 per ton f. o. b. Punta Gorda. South Carolina crude rock, \$4.25@4.50; hot-air dried, \$4.50@5 per long ton f. o. b. Fetteressa, S. C. Tennessee, 78% rock, \$4@4.50 f. o. b. Mt. Pleasant, and 75% rock, \$2.75@3 f. o. b. High grade Tennessee rock, ex-velles New York, \$9 @10 per ton. Hickman County blue-gray rock, 65%, and not over 3% iron and alumina, \$2.50@ \$2.75 per ton f. o. b. mines. Concentrated phosphates, 13@15% av. P₂O₅ 60c. per unit at sellers' works. Acid phosphates, \$6.25 per ton for 14% in bulk f. o. b. Charleston, S. C.

Liverpool. Nov. 29.

(Special Report of Joseph P. Brunner & Co.) The export demand for heavy chemicals is not quite so active, which is rather a relief than otherwise, seeing that for several lines manufacturers are practically full up to the end of the year.

Soda ash continues scarce, and some makers are refusing orders for earlier delivery than February next. Quotations vary according to export market, the range for tierces being about as follows: Leblanc ash, 48%, £4 15s. @ £5; 58%,

£5 @ £5 5s. per ton net cash. Ammonia ash, 48%, £4 5s. @ £4 10s.; 58%, £4 10s. @ £4 15s. per ton net cash. Bags are 5s. per ton under price for tierces. Soda crystals are in good request, and £3 2s. 6d. per ton, less 5%, is generally quoted for barrels, or 7s. less for bags, with special quotations for a few favored markets. Caustic soda is offering very sparingly, most makers being fully sold for a month ahead. We quote range as follows: 60%, £8 5s.; 70%, £9 5s.; 74%, £9 15s.; 76%, £10 @ £10 5s. per ton net cash. Bleaching powder is fairly active, and £6 5s. per ton net cash is about minimum figure for hardwood casks.

Chlorate of potash is dull at nominally 3 1/2 d. per lb. for crystals and 3 1/2 d. per lb. for powder, usual terms. For 1900 delivery 3d. per lb. net cash is quoted.

Bicarb. soda is in fair request at varying prices, according to market, ranging from £5 5s. @ £6 15s. per ton, less 2 1/2% for the finest quality in 1-cwt. kegs, with usual allowances for larger packages.

Sulphate of ammonia has hardened again, and nearest value is about £11 12s. 6d. @ £11 15s. per ton, less 2 1/2% for good gray, 24@25% in double bags f. o. b. here.

Nitrate of soda is maintained at £8 @ £8 5s. per ton, less 2 1/2% for double bags f. o. b. here as to quality.

MINING STOCKS.

Complete quotations will be found on pages 717 and 718 of mining stocks listed and dealt in at:

Boston.	Philadelphia.	London.
Colo. Springs.	Spokane.	Mexico.
Denver.	Salt Lake.	Paris.
New York.	San Francisco.	Toronto.

New York. Dec. 8.

The higher priced stocks have weakened. Amalgamated Copper, after selling 200 shares at \$86 1/2, dropped on further sales to \$85 1/2, and later \$84 1/2 was bid. Anaconda for several days showed no trading, and when some buying was done it sold down to \$42 1/2 from \$45 1/2. Tennessee was featureless at \$14 bid and \$16 asked, while Union of North Carolina was nominally quoted \$28 with no dealings.

British Columbia sold at \$10 1/2 @ \$11. The Arizona stocks—Markeen, Arizona Lead and Whipsaw Copper—were quiet at \$8 @ \$9 1/4, \$9 1/2 @ \$10 1/4 and \$12 1/2 @ \$13 1/2 respectively.

American Smelting and Refining shares were lower at \$40 1/2 @ \$37 1/2 for the common, and \$91 1/2 @ \$88 1/2 for the preferred. Fairly large trading was reported in Sloss-Sheffield common at \$37 @ \$35, while the preferred was quiet at \$73 1/2 bid. Flemington Coal and Coke sold 200 shares at \$28 1/2 @ \$28 3/4. Of Virginia Coal and Coke stock sales were made at \$30, and for the bonds \$68 1/2 was bid. Some heavy selling of New England Gas and Coke bonds was reported on curb at 77 1/2 @ 78; on Wednesday alone \$100,000 bonds changed hands at 77 1/2 @ 77 3/4. Of Standard Oil sales were made at \$461 @ \$467, the latter price being paid for 150 shares.

Ontario of Utah sold up to \$9.50. A 10c. dividend has just been declared, the first since November, 1897, when a clean-up dividend of 75c. was paid. Alice, of Montana, brought 50c.

The Cripple Creek output in November (\$2,515,000) well supported that group of stocks. Isabella sold at \$1.40; Portland at \$2.40; Elkton at \$1.10 @ \$1.15; Tornado at 50c.; Anaconda at 47c.; Mt. Rosa at 40 @ 43c.; Work at 31 @ 33c.; Mollie Gibson at 24c.; Argentum-Juniata at 20c., and Cripple Creek Consolidated, 17 @ 17 1/2 c. In the other stocks Iron Silver sold at 60c. and Leadville at 8 1/2 @ 8c.

Standard Consolidated of California changed hands at \$2.75 @ \$2.80; Brunswick at 24c.; Quick-silver common sold at 2 1/2, and preferred at \$3 1/2 @ \$3 3/4.

In the Comstock section Consolidated California and Virginia brought \$1.85 @ \$2.20; Sierra Nevada, 65c. (assessment of 15c. paid); Best & Belcher, 50c.; Mexican, 56 @ 55c.; Crown Point, 25c., and Yellow Jacket, 20c.

Auction sales recently were 14 shares Big Muddy Coal and Iron Company at \$6 1/4; 125 shares Arizona Copper Smelting Company (new concern) par \$10, at \$100 for lot; 160 shares preferred Central Coal and Coke Company at 60.

Miscellaneous dividends declared were William Cramp & Sons Ship and Engine Building Company, regular quarterly of 1 1/4%, payable December 20th; Republic Iron and Steel Company, semi-annual, of 3 1/2% on preferred stock, December 20th; Republican Iron and Steel Company, 1 1/4% on preferred, January 1st; National Steel Company, regular quarterly of 1 1/4% on preferred, December 30th; Maryland Coal Company, semi-annual of 2% and an extra of 1% on preferred, December 30th.

Boston. Dec. 7.

(From Our Special Correspondent.)

The predictions of a better market, to which we were treated last week, failed again. The market has been a heavy and narrow one, and the copper stocks have been generally neglected. Even the announcement of the \$20 dividend on Calumet & Hecla—making \$100 declared this

year—failed to put any life into it or to excite any interest.

Calumet & Hecla sold at \$760, or \$740 ex-dividend; Tamarack, \$211; Quincy, \$150; Osceola, \$78; Wolverine, \$39½; Atlantic, \$26. In the miscellaneous coppers Old Dominion was off \$1, at \$26; United States sold at \$31½; Utah, \$34; Centennial, \$20; Franklin, \$16½; Isle Royal, \$29; Santa Fe, \$6½@7; Rhode Island, \$5½. In the blind pool group, Amalgamated stock sold at \$85; Boston & Montana, \$310; Butten & Boston, \$69; Parrot, \$40; Arcadian, \$28½. Weakness is noted all through the list.

The gold stocks showed a little demand. Cochiti was quoted at \$15½; Santa Ysobel, \$9½. No variation in the others can be noted.

Continental Zinc brought \$4½ on Wednesday. People are a little shy just now of the zinc stocks they were so eager to get only a little while ago.

Dominion Coal was a little lower and sold at \$48½@49. Montana Coal and Coke brought \$5.

It is stated that the purchase of the rest of the outstanding stock of the Centennial-Eureka Mining Company has been completed, and all the shares are now owned by the Boston parties. The price paid is reported at \$504,000 for 8,000 shares.

Salt Lake City. Dec. 2.
(From Our Special Correspondent.)

Trading in Utah mining shares is confined mostly to sparring among brokers. Generally the speculative shares are weak, with a little buying.

Bullion-Beck is said to show improvement at the mines which is not reflected in the stock. Daisy has put on strength from its grand toboggan act of last Saturday, advancing from 5 to 14½. It looks very much like manipulation. Daly is lower than last Saturday, but strong. Daly-West declared the regular \$30,000 dividend. It did considerable business, climbing from \$11.96 to \$12.40 in the past week. Dexter rules unchanged. There is more talk of a 40c. assessment to pay the outstanding debts, aggregating over \$80,000, on which the interest charge is 1% per month, and it is said \$2.50 will be paid for all delinquent shares. Four Aces is badly disfigured. An assessment of 5c. was levied to-day, payable January 1st, 1900, to prosecute the suit to be brought against the South Swansea over apex rights. Grand Central is a shade stronger; the ore production for the week is greater than since dividends were suspended. Joe Bowers is firmer. The settlement of the Burnham title contest out of court is agreed upon. Lower Mammoth is crawling toward the \$3 notch again; a grand spurt was given to production this week. Mercur sags. Current reports as to increased gold yield and new supplies of oxidized ores are largely mythical. Star Consolidated has made another low record. It is decided to call the stockholders together to act on amending incorporation articles so as to make the shares assessable. Sunbeam is a shade lower. Swansea has declared a double dividend—\$10,000—payable December 9th, and the shares are stronger. South Swansea is a shade lower, attributable to the Four Aces threatened litigation.

San Francisco. Dec. 2.
(From Our Special Correspondent.)

Reports circulated about the finding of some ore in the Consolidated California & Virginia workings had a favorable effect on the market, and prices have been higher this week than for some time past. The volume of business, however, was not much increased. Thursday's holiday broke into business a little, but quotations are firm at the close.

The sales on regular call at the San Francisco Stock Exchange for the year to date compare as follows:

	1898.	1899.
January shares	157,360	121,955
February	151,055	350,800
March	166,260	272,675
April	203,355	209,215
May	118,535	164,580
June	12,780	201,375
July	55,900	147,340
August	105,030	153,305
September	187,510	136,865
October	158,600	168,770
November	202,045	167,755
Total	1,627,440	2,094,645

Some improvement has been shown this year, but not all that was expected and predicted.

The Truckee River General Electric Company, which is to furnish the cheap power under articles of agreement with 27 Comstock mining companies, has awarded a contract to the Westinghouse Electric and Manufacturing Company for the construction of two generators of 1,000 H. P. each to be placed in the power-house at Floriston, on the Truckee River. The contract with the Westinghouse people provides for the delivery of the machinery within 6 months from date.

On the Oil Exchange there has been a fair business. Yukon sold at \$2.20@2.25; Anaconda, \$1.10@1.15; Barker Ranch, \$1.10; Century, \$1; Oakland, 30c. More companies are to be listed.

London. Nov. 22.

(From Our Special Correspondent.)

The mining market continues to be strongly influenced by the course of the war in South Africa. Owing to the arrival of troops and the expected turn of the tide all South African shares are much brighter and stronger, and Rhodesians and land shares are particularly in request. Chartered shares also are being bought. The unsuccess of the Boers during the first few weeks of the war, while they considerably outnumbered the English, is a cause of as great gratification on the Stock Exchange and financial circles as it is on the country generally. The promoters who have plenty of schemes ready for the public have been postponing active work for several months, owing to the uncertainty of the political situation, but they are now getting their preparations ready for a winter season. On all hands I hear the same opinion expressed that activity in the mining market is expected shortly.

The long expected Nickel Corporation, Limited, of Mr. Whitaker Wright has been offered to the public this week. This is a financial twin of the Caledonia Copper Company, which he floated at the beginning of summer. The nickel properties to be acquired cover some 90 square miles in New Caledonia on the opposite side of the island to those of the French Nickel Company, and apparently the ore is of similar character. It is estimated that the output will be 10,000 tons of ore a month, averaging 5% of nickel. The present price of nickel is calculated at 1s. a pound and the cost of production is given as 7½d. per pound, so that the estimated profits of the company are £252,000 per annum. The promoters, however, add that the price may go to 10d. when the metal becomes more plentiful, but even then a large margin of profit is left. The capital is £750,000, of which £630,000 (£95,000 in cash and £535,000 in shares) is the purchase price, while £120,000 is to be devoted to working capital. No expert report nor opinion on the properties is given with the prospectus, so everything has to be taken on trust. As Abraham Lincoln used to say, "For those who like this sort of thing, it is just the sort of thing they like."

Several times lately I have mentioned that the iron and coal people in England have been asking for money from the public for the purpose of reorganizing and extending their businesses. Two other instances of this have occurred this week. The two companies, Vickers, Son & Maxim and John Brown & Company, have both offered additional shares to the public, and wise men have snapped them up. The first named company was formed a few years ago to acquire the Vickers armor plate and engine works at Sheffield, the Maxim gun business and the shipbuilding and engineering works of the Naval Construction and Armament Company at Barrow-in-Furness. The latter company is an old established armor plate and steel construction works at Sheffield, and recently acquired the works of the Clydebank Shipbuilding and Engineering Works at Glasgow, a prominent firm of builders of steamers and battleships. Both of these companies have been very successful since their formation, and the increase in capital is required to cope with their expansion of business.

On the other hand, another well known English steel business, the Barrow Hematite Steel Company, has to report a great depreciation in the value of its possessions. The explanation of this phenomenon is couched in the report in more or less formal language, but the real meaning is that the method of management is out of date, the plant becoming obsolete and the iron ore mines worked out. The principal owner and director is the Duke of Devonshire, and the company used to control the Naval Construction and Armament Company at the same place before it was sold to Vickers, Son & Maxim as related above. The Duke is a "solid" man, but he is a typical English slowcoach such as one meets in the comic papers. Neither he nor anything he controls moves very fast, so that in these days of hustle they get left in the lurch. It is not surprising, therefore, to find that the capital of the steel company is to be reduced by one-half. Perhaps the best thing to do would be to sell the whole thing to Vickers, that is, of course, providing the latter would have it.

Paris. Nov. 26.

(From Our Special Correspondent.)

The stock market is still very uneven, and is inclined to be affected by the conditions of the money market. The Bank of France has not raised its rate of discount, but is treating that as a minimum and not as a maximum rate. Outside of the Bank higher figures are asked for money, and securities are very carefully looked at.

The metallurgical shares are the strong point of the market and the tendency is to rise still further. The copper stocks are uncertain; there have been few declines, but the tendency is downward.

The market for the South African gold stocks is much agitated, but the strong support given

to it in London has prevented any decline so far. The transactions on our Bourse have been quite limited.

Good authorities estimate that the sales of French holdings in Transvaal stocks during the past three months amount to about 250,000,000fr., reducing by about one-sixth the French investments in South Africa. Of course it is impossible to get exact figures. I am informed that an extensive speculation for the fall has been undertaken by a party of large speculators. They are not covered, and in case the market goes against them must be very heavy losers; but they believe that London cannot sustain prices much longer, and that they can hold out until the break comes.

I find that a majority here wish for the success of the Boers, and this includes a number of holders of Transvaal stocks. For my part, I cannot see why. In an English colony the working of the mines could not be hampered by monopolies and other restrictions, and the rights of foreign owners would certainly be respected. Moreover, the mine owners and not the cattle owners would control the government, and as a consequence legislation and taxation would certainly not discriminate against the mines. The situation would certainly be better in every way as far as mine stockholders are concerned.

Our home affairs are quiet on the surface, but no one can say how long this will last. Financiers regard the situation with a defined uneasiness. Azote.

DIVIDENDS.

Calumet & Hecla Mining Company, of Michigan, \$20 per share (\$2,000,000), payable December 29th. Total to date, \$66,850,000.

Daly-West Mining Company of Utah, 20c. (\$30,000), payable December 10th. Total to date, \$90,000.

New York & Honduras Rosario Mining Company, of Mexico, 10c. regular monthly and 10c. extra (\$30,000 in all), payable December 16th. Total to date, \$1,160,000.

Ontario Silver Mining Company of Utah, 10c. per share (\$15,000), payable December 20th. Total to date, \$13,572,500.

Stratton's Independence, Limited, of Cripple Creek, Colo., second quarterly dividend of 48c. per share (\$488,000), payable December 12th. Total to date, \$976,000.

Swansea Mining Company of Utah, regular and extra of 5c. each (\$10,000 in all), payable December 9th. Total to date, \$261,000.

MEETINGS.

NAME OF COMPANY.	Meeting.	Date.	Place of Meeting.
Andes Nev.....	Annual.	Dec. 18	399 Montgomery st., San Francisco
Consolidation Coal, Md.	"	Dec. 14	Baltimore, Md.
N.Y. & Hon. R.Rs., Mex.	"	Dec. 14	35 Broadway New York City.
Old Colony, Mich.	"	Dec. 11	60 State st., Boston, Mass.
Rabbit Foot, Utah.....	Special.	Dec. 18	2 1/2 So. W. Temp st Salt Lake
Santa Rosalia, Cal.....	Annual.	Dec. 15	31 Pine st., San Francisco.

ASSESSMENTS.

NAME OF COMPANY.	Loca- tion.	Assessment.	Diq.	Sale.	Amt.
Alta.....	Nev.	28	Nov.		.05
Blue Bird	Utah	1	19	Dec. 9	.00½
Christmas	Utah	1	24	Dec. 9	.01½
Confidence	Nev.	33	23	Dec. 14	.15
Crown Point.....	Nev.	77	23	Dec. 14	.10
Hillside.....	Utah	1	24	Dec. 15	.01½
Justice	Nev.	66	22	Dec. 14	.05
Little Chief.....	Utah	2	25	Dec. 13	.01
Lucky Bill.....	Utah	1	29	Dec. 19	.02
Molly Bawn.....	Utah	1	29	Dec. 18	.01
National Con.....	Cal.	9	27	Dec. 21	.10
New Klondike.....	Utah	3	27	Dec. 18	.01
Revenue.....	Utah	2	6	Dec. 11	.02
Sacramento Con.....	Utah	1	18	Dec. 18	.01½
Tetro.....	Utah	10	18	Dec. 9	.01
Alliance.....	Cal.	22	1	Dec. 22	.10
Arresterville.....	Cal.	4	11	Jan. 3	.19
Bellefontaine.....	Cal.	11			.01
Brunswick Con.....	Cal.	13	19	Jan. 17	.03
Gould & Curry.....	Nev.	88	27	Jan. 18	.15
Joe Bowers Ext.....	Utah	4	10	Dec. 30	.01
Lulah Con.....	Utah	2	5	Dec. 20	.00½
Ophongo.....	Nev.	3	14	Jan. 4	.01
Orr Water Ditch.....	Nev.	117	11	Dec. 26	3.00
Sierra Nevada.....	Nev.	117	7	Dec. 26	.15
Yellow Jacket.....	Nev.	2	26	Jan. 31	.15
Grape Vine Canyon.....	Cal.	1	8	Jan. 23	.10
N.W. Imperial.....	Utah	1	2	Jan. 21	.01
Occidental.....	Nev.	34	3	Jan. 24	.05
Thorpe.....	Cal.	2			.01

STOCK QUOTATIONS.

NEW YORK.

Table of stock quotations for New York, listing companies like Adams, Alamo, Anaconda, and others with columns for location, par value, and prices for Dec. 1-7.

BOSTON, MASS.

Table of stock quotations for Boston, Mass., listing companies like Aetna, Alamo, and others with columns for location, par value, and prices for Nov. 30 and Dec. 1-6.

Official quotations Boston Stock Exchange. Total sales, 96,893. * Holiday. + Ex-dividend.

COLORADO SPRINGS, COLO.

Table of stock quotations for Colorado Springs, Colo., listing companies like Alamo, Anaconda, and others with columns for par value and prices for Nov. 27-30 and Dec. 4-5.

Colorado Springs Mining Stock Exchange. Sales for four days ending Nov. 30th, 464,820 shares; quotations for Dec 4th and 5th by telegraph. * Holiday.

SPOKANE, WASH.

Table of stock quotations for Spokane, Wash., listing companies like Admiral Dewey, Alamo, and others with columns for par value, prices, and sales for Nov. 29.

Official quotations Spokane Stock Exchange. Total sales, 89,000.

COAL AND INDUSTRIAL STOCKS.

Table of coal and industrial stocks listing companies like Am. Sm. & Ref., Am. S. & W. Con., and others with columns for par value and prices.

PHILADELPHIA, PA.

Table of stock quotations for Philadelphia, Pa., listing companies like Am. Alkali, Bethlehem Iron, and others with columns for location, par value, and prices for Nov. 30 and Dec. 1-6.

SALT LAKE CITY, UTAH.

Table of stock quotations for Salt Lake City, Utah, listing companies like Ajax, Alamo, and others with columns for par value, bid/asked prices, and sales for Dec. 2.

*From Our Special Correspondent. † Utah companies. ‡ Mines in Vanderbilt, Cal. § Mines in Tuscarora, Nev.

STOCK QUOTATIONS.

DENVER, COLO.

Table of stock quotations for Denver, Colorado, listing various companies and their prices for different dates from Nov. 25 to Dec. 1.

Official Quotations Denver Stock Exchange. Total sales, 11,400 shares. * Holiday.

SAN FRANCISCO, CAL.

Table of stock quotations for San Francisco, California, listing various companies and their prices for different dates from Nov. 25 to Dec. 6.

Official telegraphic quotations of San Francisco Stock Exchange. * Holiday.

TORONTO, ONT.

Table of stock quotations for Toronto, Ontario, listing various companies and their prices for different dates from Nov. 28 to Dec. 4.

Official quotations of the Standard and Toronto Mining and Industrial Exchanges. Total shares sold, 287,100.

MEXICO.

Nov. 24.

Table of stock quotations for Mexico, listing various companies and their prices for different dates from Nov. 24 to Dec. 1.

PARIS.

Nov. 16.

Table of stock quotations for Paris, listing various companies and their prices for different dates from Nov. 16 to Dec. 6.

LONDON.

Nov. 25.

Table of stock quotations for London, listing various companies and their prices for different dates from Nov. 25 to Dec. 6.

* Ex-dividend. † Dividend pending

DIVIDEND-PAYING MINES.

Main table listing dividend-paying mines with columns for Name and Location of Company, Capital Stock, Shares (No., Par Val), Dividends (Paid, Total to Date, Date and Amount of Last), and Name and Location of Company, Capital Stock, Shares (No., Par Val), Dividends (Paid, Total to Date, Date and Amount of Last).

NON-DIVIDEND-PAYING MINES.

Main table listing non-dividend-paying mines with columns for Name and Location of Company, Capital Stock, Shares (No., Par Val), Assessments (Levied 1899, Total to Date, Date and Amount of Last), and Name and Location of Company, Capital Stock, Shares (No., Par Val), Assessments (Levied 1899, Total to Date, Date and Amount of Last).

G., Gold. S., Silver. L., Lead. C., Copper. Z., Zinc. This table is corrected up to Dec. 1. Correspondents are requested to forward changes or additions.

CHEMICALS, MINERALS, RARE ELEMENTS, ETC.—CURRENT PRICES.

Table with multiple columns listing various chemicals and minerals such as Carbonyl, Calcium, Manganese, and others, along with their current prices and measurement units.

NOTE.—These quotations are for wholesale lots in New York unless otherwise specified, and are generally subject to the usual trade discounts. This table is revised up to Oct. 25th. Readers of THE ENGINEERING AND MINING JOURNAL are requested to report any corrections needed, or to suggest additions which they may consider advisable. See also Market Review of Chemicals and Minerals.