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CONTENTS.

Table listing contents with page numbers. Includes sections like Klondike Companies and London, Bessemer Steel Production in 1899, Mining Conditions in the Transvaal, Freight Rates on Anthracite Coal, New Publications, Books Received, Correspondence, Bessemer Steel Production in the United States, Addison C. Rand, British Columbia, XXVII, The Mineral Production of Canada in 1899, A Furnace Tapping Flood, The Transvaal Mining Industry for the Second Half of 1899, Abstracts of Official Reports, Recent Decisions Affecting the Mining Industries, X-Rays in Examination of Coal, Mineral Vein Formation at Boulder Hot Springs, Montana, An Apparatus for Testing Fuel, The Avino Mine and Mill Mexico, An Improved Hydraulic Press, Mineral Collectors' and Prospectors' Column, Questions and Answers, Patents Relating to Mining and Metallurgy, Personal, Obituary, Societies and Technical Schools, Industrial Notes, Trade Catalogues, Machinery and Supplies, Mining News, United States, Arizona, California, Colorado, Florida, Idaho, Michigan, Minnesota, Missouri, Montana, Nevada, Oregon, Pennsylvania, Advertisers' Directory, Dividends, Meetings, Assessments, Stock Quotations, New York, Philadelphia, San Francisco, Boston, Salt Lake City, Toronto, Spokane, Colo Springs, Montreal, Mexico, Denver, Paris, London, Mining Co's., Current Prices, Minerals, Chemicals, etc., Advt. Rates, Market Reviews, New York, Boston, Salt Lake City, San Francisco, London, Paris, Mining Stocks, Market Reviews, New York, Boston, Salt Lake City, San Francisco, London, Paris.

We have made this week a change in the tables of average prices in our metal market, giving the quotations of electrolytic copper as the standard of average values, and putting Lake copper in the subordinate place. The daily quotations of Lake will, of course, be given as heretofore. Our reason for this change is that electrolytic copper is far more important, the transactions in it being larger, and it has become practically the standard metal. While Lake copper has and always will have its special market, the electrolytic is preferred for electrical and some other purposes, and is accepted for nearly all. It is a well known fact that the percentage of iron in Lake copper has increased in recent years, partly because the copper is found to contain more of this impurity as the mines increase in depth, and partly because of the closer concentration, which saves more iron as well as copper. We believe that before long that some of the Lake Superior companies will find it to their interest to refine their metal by the electrolytic process, and we shall then have a new brand of "Lake Electrolytic" which will be sure to command a higher price than any other copper in the market.

If, as recent letters state, a workable deposit of coal has been found within a few miles of Dawson City, it means a great deal to the mining interests of the Yukon. The reports say that 8,000 tons have been taken out ready for shipment, which is very probably an exaggeration. But the presence of coal, even of comparatively poor quality, ought to result in a considerable reduction in the cost and difficulty of mining and living in the country. In the Yukon fuel is almost the first essential to maintaining life at all, and a large quantity of it is needed in mining operations in ground which is frozen all the year round. The supply of wood in the region is not sufficient to last very long at the present rate of consumption, and the cost of transportation will prevent the bringing of any large quantities of coal from the coast. Coal mining in the Yukon ought to be very profitable.

The mineral production of Canada, an advance statement of which is given on another page, attained in 1899 a total value of \$47,275,512. This is \$8,614,502 more than in 1898, and more than twice as great as the total of 1896. The most important single item was gold, the total value of which was \$21,049,730, an amount which exceeded the entire value of the mineral output of the Dominion in 1895. The greater part of this large gain is in gold from the Yukon Region, the total value of which last year is estimated by the Geological Survey of Canada—to which we are indebted for these figures—at \$16,000,000. There was, however, a substantial increase in the production outside of this, a part of which, however, was due to the advance in prices of copper and other metals. Of the metals last year gold furnished 44.5 per cent. of the total values, copper 5.6, nickel 4.4, silver 3.9 and lead 2.1 per cent. Iron is still an unimportant feature of Canadian production, though we believe that the development of the great reserves of iron ore in the country will not be long postponed. Of the non-metallic products coal was the most important, and in value it was second only to gold among all the items of production, constituting 19.1 per cent. of the total. Among the minor products we note a small output—55 ounces—of platinum.

The increase would have been still greater had not the eight-hour law and labor troubles interfered to some extent with mining developments in British Columbia. The greatest advance shown in any of the mining districts of the Dominion last year was in Western Ontario, which increased its gold output and promises to add copper and zinc to its list of products.

Very few of the Klondike companies worked from London have ever done any good for their shareholders; in fact, there have been a large number of splendid failures. The latest is the Klondike, Yukon & Stewart Pioneers, Limited, which was formed in the middle of 1897 for the purpose of sending Lt.-Col. Domville, a Canadian, to run transport, trading and mining operations in the Klondike. The company started with fair prospects of success, as the directors and supporters in London were good people, and Col. Domville was highly endorsed by eminent people in the Dominion. It turns out, however, that nothing was done properly, that no accounts were kept, and that things got into a terrible muddle. The directors blame Col. Domville, but his side of the question has not been stated, so that it is hard to tell the rights and wrongs of the matter at present. A complete investigation ought really to take place, but probably the whole matter will be buried in voluntary liquidation. The outside public will not lose much money, for most of the subscriptions came from directors and their friends and underwriters. One of the speculations was a transport steamer, which was wrecked before long. The insurance people refused to accept proof of the wreck at first, but eventually the matter was compromised. Then it was proposed to buy timber lands, and some money was spent in acquiring them, but it was found that they could not be worked profitably. The same thing happened with the mining claims

acquired; either no gold was found, or the contents were too low, or they were in the wrong place, or something. Altogether the record for a succession of muddles could hardly be beaten; and the failure has helped to give the Klondike a bad name in London.

BESSEMER STEEL PRODUCTION IN 1899.

In the "Engineering and Mining Journal" for January 6th, 1900, we estimated the Bessemer steel production of the United States for 1899 at 7,620,000 long tons. The official statement of the American Iron and Steel Association gives the total output at 7,586,354 tons, showing a reduction from our estimate of less than 0.5 per cent. This proves again how close an approximation to the actual production we have been able to secure in our preliminary statements.

The total production in 1898 was 6,609,017 tons, so that there was last year a gain of 977,337 tons, or 14.8 per cent. The make of Bessemer steel for 1899 was more than double that of 1894, and was greater than our entire production of pig iron only a few years ago. Of the total there were 3,968,775 tons, or 52.3 per cent., made in Pennsylvania; 1,679,237 tons, or 22.1 per cent., in Ohio; 1,211,246 tons, or 16.0 per cent., in Illinois; leaving only 727,092 tons, or 9.6 per cent., made in other States.

The largest single item of manufacture from Bessemer steel is rails, although the proportion used for that purpose has decreased largely. The increased output of steel is used for bars, plates, structural shapes and similar forms. The consumption of the rail mills last year was a little under 30 per cent. of the total steel made. There were 2,240,767 tons of steel rails made from Bessemer steel in 1899; an increase of 285,340 tons, or 14.6 per cent. over 1898. The quantity made from open-hearth steel and from old rails re-rolled will bring the total production of rails in 1899 up to 2,300,000 tons. The largest output reported in any preceding year was 2,044,819 tons, in 1887.

For three years past the American Association reports have classified the rail output by weight of sections, and the comparison is an interesting one, as showing the increasing tendency to the use of heavy rails on our railroads. Last year there were 130,135 tons, or 5.8 per cent. of the total, of 45 pounds to the yard or under; 1,531,108 tons, or 68.3 per cent., between 45 and 85 pounds; while 579,524 tons, or 25.9 per cent., over 85 pounds. A considerable part of the latter were of sections as high as 100 pounds to the yard. That over a quarter of the rails made should be of these very heavy sections shows the growth of our railroad traffic and the consequent use of heavy rolling stock.

Nearly all the Bessemer steel made in the United States continues to be made by the acid process, the proportion of basic Bessemer being very small. This will doubtless continue to be the case as long as we have at our command such a large supply of ores comparatively low in phosphorus. There has been much complaint in recent years, which is growing rapidly under the high pressure demand for rails, of the increasing percentage of phosphorus in rails now manufactured—indeed so large is this that many of our rails are far too brittle to be quite safe and an increasing number of "accidents" from this cause may be expected. The scarcity of ores and the cheapness of the Bessemer process have induced the steel makers to use, in Bessemer steel, phosphorus material that should not be passed. The consequence will certainly be to throw much discredit on our rails and this, at a time when we are building up a large foreign market for them, is a very serious matter.

The more general adoption of the basic and open-hearth processes will certainly come as the low phosphorus ores become scarcer, and it is to be hoped that this change will come promptly and before serious injury is done.

MINING CONDITIONS IN THE TRANSVAAL.

The second letter from Johannesburg, which we publish in another column, brings the reports of the conditions of the Transvaal mines up to the close of December, at which time there were, as we noted last week, ten mines in operation under Government charge, and 40 others at which pumping was being carried on, and the properties kept in fair condition, while the remainder of the mines were entirely closed down and guarded only by the Boer police, their managers and employees having been sent out of the country. The letter referred to contains an elaborate report on the condition of the Ferreira Deep, to which we have given considerable space because it may be taken as a typical case, and probably shows very much the condition in which most of these mines were at the close of the year. It will be observed that the report made by the Boer manager lay great stress upon the bad condition of the property and its machinery. The inference drawn by the Transvaal engineers is that during the period immediately before the opening of hostilities repairs and ordinary care of the machinery had been neglected and there is also an intimation that intentional damage had been done to the machinery.

There may be some truth in this, but we are inclined to think that

there is much less than the Transvaal reports intimate. It is not likely that the managers would permit the machinery to run down to any serious extent, even during the ante-war excitement, nor is it probable that any deliberate damage would be done to the machinery, except, perhaps, the removal of a few parts which could be done, as any engineer knows, without any real or serious injury to the machines themselves. It is altogether probable that a considerable portion of the damage may have resulted from the careless or ignorant work of the new employees, who would find it very easy to attribute the result of their own poor work to their predecessors.

About the close of December a very stringent tax law was enacted by the Transvaal Government, imposing taxes varying from 30 per cent. to 50 per cent. on the net amount of gold produced from the mines and carefully drawn so as to cover the case of the gold commandeered at the opening of the war by providing that the tax enacted in the law should date back for three months. The companies whose gold was seized last October, therefore, find that the Government of the Transvaal claims to owe them nothing, having simply applied the gold taken to the payment of the taxes under this new law.

Recent events have changed very much the condition of affairs in South Africa. The successful campaign of Lord Roberts makes it probable that the duration of the war will be short. The rejection of the terms proposed by Presidents Kruger and Steyn has made it plain that the British Government will bring the two States under the same control as that exercised in Cape Colony and Natal. The comparatively slight resistance opposed to the British advance to Bloemfontein inclines us also to the belief that the Boer resistance is collapsing. It is easy enough to hold a loosely organized force under the excitement of victory, but discipline and long habit are required to hold an army under defeat.

Apart from this there is beginning to be a fear lest the damage done to the mining industries may be much greater than has been heretofore expected. The act of vandalism of the Boer forces in setting fire to the coal mines in Natal before retiring from the colony, may indicate a determination to do all the damage possible, and it is possible that before giving up Johannesburg the Boers may endeavor to injure the mines. It is to be hoped, however, that better counsel may prevail, and that the recognized rules of modern civilization, which call for respect for private property, will be observed. The Boers themselves would necessarily be heavy losers by any act that would not only subject them to heavier taxation in the future to make good the damage, but which would greatly injure their own earning power by injuring the industry to which the whole Transvaal owes its recent prosperity and almost its life.

Our correspondent's reports already received cover the operations up to January 23d, and include a full official report of the operations at the Robinson Mine.

No doubt we shall soon receive reports up to the time when the appreciation of the inevitable success of the British may convince the Boers that their control of the mines will be short.

FREIGHT RATES ON ANTHRACITE COAL.

We have now before us the reports for 1899 of two of the more important anthracite coal roads, which give some figures on the much discussed question of freight rates on that description of coal. The roads—the Lehigh Valley and the Delaware, Lackawanna & Western—are very similarly situated in many respects. While both bring the greater part of their tonnage to tidewater, both have lines to Buffalo and to Lake Ontario, and both carry a considerable quantity of coal for shipment up the Lakes and for consumption in the large cities of Central and Western New York. The Lehigh Valley carries some bituminous coal and the Delaware, Lackawanna & Western hardly any; but the tonnage of that class of coal on the Lehigh is only 8 per cent. of its total, so that the lower rates charged upon it do not affect the average coal rate materially. The similarity in conditions would lead us naturally to expect a close approximation in rates; but this is not the case, as is shown in the following table:

	1898.		1899.	
	D., L. & W.	Lehigh Valley.	D., L. & W.	Lehigh Valley.
Tons coal carried.....	6,643,402	11,574,835	6,731,753	13,067,530
Coal ton-miles.....	932,074,585	1,339,426,385	994,815,755	1,547,523,068
Average haul, miles.....	140.3	115.7	147.8	118.4
Rate per ton-mile, coal.....	1.062c.	0.630c.	0.946c.	0.617c.
Rate per ton-mile, freight.....	0.653c.	0.312c.	0.679c.	0.352c.
Proportion of coal ton-miles, total.....	51.1	42.6	51.8	43.7

On both roads the increase in average haul was due to the larger proportion of coal sent to the Lakes. The Lehigh Valley has a heavier tonnage of general freight than the Lackawanna, especially of through freight, on which rates are low, and its coal tonnage was only 43.7 per cent. of the total, against 51.8 per cent. on the Lackawanna.

It will be seen from the table that while the ton-mileage of coal on the Lehigh Valley was greater by 55.6 per cent. the average haul was less by 19.9 per cent., which would again suggest a higher rate, since the

terminal charges do not differ greatly. We find, however, that the Lehigh Valley rate was less by 34.8 per cent. than that of the Lackawanna, a very remarkable difference. It is true that each company owned a large part of the coal which it carried, and that the difference in the rate may be in reality merely a matter of bookkeeping; that is that in one case it may have been considered better policy to credit a larger share of the earnings to the railroad and to make a correspondingly higher charge to the coal department than in the other. It is still remarkable that two roads operated under such similar conditions should show a difference of over one-third in the average rates charged on traffic of the same class.

It may be said that the Lehigh Valley is more open to competition than the Lackawanna, but this is not really the case. The line traffic of both roads is very similar both in quantity and direction, and in the tidewater business both roads are on equal terms. Outside of the difference in accounts which has been suggested, there is apparently no sufficient reason for the difference.

The individual operators or shippers of anthracite coal will again be aroused to protest by seeing that the rate per ton-mile charged on their product is from three to four times greater than that which the bituminous coal shippers of Western Pennsylvania and West Virginia have to pay on their tidewater business. It is those operators and not the large companies who are really affected by the rates.

It is, by-the-way, pleasant to note that the Delaware, Lackawanna & Western Company has, for the first time in many years, made public a report which really gives some information about its business, and from which some facts regarding its operations can be learned. This is one of the innovations introduced by the new management, which has instituted important reforms in the operation of the road, and is evidently not afraid to let the stockholders and the public know the results. While the report is not all that could be desired, it is nevertheless a great improvement on the brief statements which the company has heretofore issued, which meant almost nothing and left the reader entirely in the dark so far as the company's real operations were concerned.

NEW PUBLICATIONS.

"Geological Survey of Canada. Annual Report, Volume X.; 1897." G. M. Dawson, Director of the Survey. Ottawa, Canada; Dominion Printers. Pages, 1,116; with maps and plates.

This volume contains in bound form the summary report showing the work done by the Canadian Geological Survey during the year 1897. It also contains four of the reports on the geology of different sections of the Dominion, and the report of Mr. E. D. Ingall on Mineral Statistics and Mines. The geological reports mentioned include the Seine River and Lake Shebandowan District in Western Ontario; the Nipissing and Temiscaming areas, also in Ontario; the Auriferous Region of Southeastern Quebec, and the mineral resources of the Province of New Brunswick. All of these reports have heretofore been issued in separate form, and have been reviewed in our columns at various times. The general report shows once more the extent and value of the excellent work which the Geological Survey of Canada is doing.

BOOKS RECEIVED.

In sending books for notices, 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.

"South Australia: Statistical Register for 1898." Compiled from official records. Adelaide, S. A.; Government Printer. Pages, 420.

"Twenty-second Annual Report of the Bureau of Statistics of Labor and Industries of New Jersey. For the Year Ending October 31st, 1899." William Stainsby, Chief of Bureau. Trenton, N. J.; State Printers. Pages, 354.

"Statistique des Mines, Minières, Carrieres, Usines Metallurgiques et Appareils a Vapeur du Royaume de Belgique, pour l'Annee, 1898." Par Emile Harze, Directeur General des Mines. Bruxelles; Polleunis & Ceuterick. Pages, 62.

"Jahrbuch fur das Berg und Huttenwesen in Koenigreiche Sachsen. Jahrgang, 1899. Statistik von dem Jahre, 1898." Prepared by C. Menzel under charge of the Ministry of Finance. Freiberg, Germany; Craz & Gerlach. Pages, 460; with diagrams and tables.

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.

Some Arizona Mining Schemes.

Sir: In the Engineering and Mining Journal for February 10th there was an article entitled "An Arizona Wild Cat," signed by "Traveler." This individual must be a Hassayamper, and the Arizona tradition is that he who drinks of the waters of the Hassayampa can never afterward tell the truth. I do not know Mr. Clifford and have never seen

him, but if he has got a firm grip on the Belcher Mine, in the Big Bug District, I cannot but admire his business acumen. I am not interested in any property in the district, but I lately examined the mine out of curiosity. It shows two long tunnels, both drifting along the vein, which is continuous in both, and the lower one is some 200 ft. below the apex. The ore is from 3 to 6 ft. wide, and about a quarter is good smelting stuff, and the balance is concentrating ore of as good grade as that of the Anaconda at Butte, which I am familiar with. The copper ore carries about \$1 gold to the unit, so that the doré pig will run about \$100 in gold to the ton. Like all the mines of this region, the copper is more or less leached out in the oxidized zone, but at greater depth the grade is sure to be higher until the unaltered sulphides are found. If this is an "Arizona Wild Cat" I will squat here until I can trap one. The mine was shut down, it is true, some years ago when copper was one half its present value, and there was no railroad. "Traveler's" slur, also, upon the Arizona, Eastern & Montana Company is unjust. It is in no sense a wild-cat, but has some excellent property of its own, not much developed yet, but showing the signs of good business upon depth, and it has secured a long lease on a smelter and water power so near to producing mines, just now waking up, that in a year's time it is bound to do a grand business. In short, it is a very promising and perfectly legitimate enterprise and there is no question but that it will make money. I am told that the claim of "Traveler" that it bought at \$2.90 and sold at \$2.60 a unit is not true. It sold at the same price it purchased, but got \$12 a ton for smelting, which is a very good profit and plenty of the same sort will pay dividends.

C. Wade Stickney,
Superintendent Arizona, Eastern & Montana Company.
Mayer, Ariz., Feb 19, 1900.

Sir: I notice in your last issue the remarks of a correspondent signed "Traveler," referring to the Great Belcher Gold Mine, of Yavapai County, Arizona, and also to my recent connection with the affairs of the Arizona, Eastern & Montana Company. Your correspondent intimates that I had serious trouble with the company concerning mining properties bought by Mrs. Maude M. Clifford, and that the Arizona, Eastern & Montana were not satisfied with my management, etc. Any party not knowing me and reading these remarks would infer that I had in some manner been unjust to the organization with which I was connected.

Regarding that portion of "Traveler's" remarks in reference to the Great Belcher Gold Mine, I see no benefit in discussing matters in which he has no interest, especially since the stockholders of the Belcher are satisfied, and not one of them is willing to sell without a handsome profit. The house of Henry B. Clifford & Co. are aware of the ore values of the Great Belcher, for that firm has now invested nearly \$150,000 in the project, and are preparing to invest \$200,000 more.

It is also strange that so many of the old timers of Arizona are mistaken as to the values of the Belcher ores. The \$700,000 of gold product accredited to the Belcher by the "Prescott Courier" last month must have been hauled there. We may yet be sorry we leased the Annie mill and the Lottie mill for the purpose of running on Belcher ores until the great 500-ton mill, recently bought and paid for by Clifford money, is in operation.

S. J. Fleming, formerly President of the Annie Company, who had the original bond on the Belcher, informs us that the last 50 tons he ran from the lower tunnel and winze of the Belcher gave a gross product of \$31 in gold and copper per ton. Perhaps we are too modest in only claiming that the Belcher will average \$16. So we will let the Belcher part of his communication rest for the present.

But I want to take notice of his reference to my affairs with the Arizona, Eastern & Montana. Mrs. Clifford sold the Lone Pine to the Arizona, Eastern & Montana Company for a large sum of money, and she executed a deed to them, and that deed is now on record in Yavapai County. The Lone Pine Mine has never stopped work for an hour since last September, and its pay rolls have been sufficiently large to bring happiness to many miners in that section.

The following resolution is explanatory in itself:

"Resolution offered by Milton Roblee at the directors' meeting of the Arizona, Eastern & Montana Company, New York City, December 27th, 1899:

"Whereas, the committee who were sent by this board of directors to Arizona to report upon the properties of the Arizona, Eastern & Montana Company in Yavapai County, have reported to this board that all the representations made by Henry B. Clifford and Maude M. Clifford have been verified, and that it has been found that no misrepresentations have been made by them regarding the extent and value of the various mining claims sold by them to the Arizona, Eastern & Montana Company, and

"Whereas, Henry B. Clifford has retired from all official connections with this company, be it

"Resolved, that the Board of Directors of the Arizona, Eastern & Montana Company do hereby extend to Henry B. Clifford their thanks and full appreciation of his last labors, officially and otherwise, and express confidence in his integrity and truthfulness, and wish Mr. and Mrs. Clifford both a happy and prosperous new year."

Henry B. Clifford.

New York, March 13, 1900.

The Arizona, Eastern & Montana Company.

Sir: I enclose you a statement of facts signed by the secretary of the Arizona, Eastern & Montana Company. These things are easily verified by an examination of the records of Yavapai County, Arizona. Kindly give the communication your valuable attention.

R. C. Flower.

New York, March 14, 1900.

Sir: I see in your issue of March 10th an article signed "Traveler," dated Yuma, Arizona. The gist of this article is an attack on several mining companies in Yavapai County, Arizona. While the Engineering and Mining Journal seeks the mining news of the world and is known

to be a watch dog in the people's interest against imposition and fraud, it is also a faithful guardian against slanderous and venomous attacks against legitimate interests, whether they be personal or corporate. Mildly speaking, "Traveler" has been wrongfully informed.

1. "Traveler" states that it looks down here as if the Arizona, Eastern & Montana Company was practically defunct. This is not only untrue, but so notoriously so as to hardly deserve a denial, for the Arizona, Eastern & Montana Company is working and has been continuously working large forces of men on two or more of their properties. Their largest producer is the Lone Pine Mine, though out of their other properties they are taking about 600 tons of ore per month.

2. "Traveler" says it is stated that the Arizona, Eastern & Montana Company cannot and will not pay their rent due on the smelter. This smacks of rank maliciousness and can hardly be accounted for. The Arizona, Eastern & Montana Company owes nothing for smelter rent. There is no rent due. The company is able to pay anything it contracts to do and almost anything it may want to do in the financial world.

3. "Traveler" says that the Arizona, Eastern & Montana Company does not own the "Lone Pine Mine." This is the most malicious of his train of falsehoods. I speak of what I know when I say that the Arizona, Eastern & Montana Company owns the "Lone Pine," and some dozen or dozen and a half properties in Yavapai County, including "Copper Czar," "Copper Prince," "Boston Girl," "El Capitan," "El Dorado," "Antler," "Great Western," "Easy Boss," "Governor Teddy," "Pride of Arizona," "Warship," "Anaconda," and "Corporal," and deeds to all these properties are on record in the county seat of Yavapai County.

4. In addition to these properties owned by the Arizona, Eastern & Montana Company in Yavapai County, Arizona, this company owns large and extensive mines in Cochise County, Arizona, including stamp mills, hoisting works, etc.; all paid for, and for the benefit of "Traveler" the deeds are on record.

5. In addition to their various Arizona properties the company owns a 200-ton smelter in Spokane, Washington. It is now believed that this large smelter will be removed to Arizona and put up on one of their large copper properties.

It would seem, Mr. Editor, almost criminal for a correspondent, though it be done unintentionally, to write a letter teeming with such false statements about a company which owns three large mining camps, two stamp mills, one of the largest smelters in the West and other smelters and mills under lease. A company which gives employment to a large number of men in the various sections of the West; is free from debt, attending quietly to its own affairs, but pushing vigorously its large undertakings.

Arizona, Eastern & Montana Company,
Maurice Willis, Secretary.

New York, March 14, 1900.

BESSEMER STEEL PRODUCTION IN THE UNITED STATES.

The American Iron and Steel Association has collected and published complete statistics, received direct from the manufacturers, of the production of Bessemer steel ingots and Bessemer steel rails in the United States in 1899, except the comparatively small quantity of standard rails and street rails which were made from purchased blooms or were re-rolled from old steel rails. There was no Clapp-Griffiths works in operation in 1899 and only one Robert-Bessemer plant was active. Four Tropenas plants were at work in that year, and all were employed in the production of steel castings. The ingot statistics include the production of a few thousand tons of Bessemer steel casings.

The total production of Bessemer steel ingots in 1899 was 7,586,354 gross tons, against 6,609,017 tons in 1898, showing an increase in 1899 of 977,337 tons, or 14.8 per cent. It need scarcely be added that the production of 1899 was very much the largest in our history. It was more than twice the production of 1894, and was almost twice the production of 1896. Of the total production for the year 3,939 tons were steel castings, against a similar production in 1898 of 3,539 tons. The following table gives our production of Bessemer steel ingots, including direct castings, in the last six years, in long tons:

1894.....	3,571,313	1896.....	3,919,906	1898.....	6,609,017
1895.....	4,909,128	1897.....	5,475,315	1899.....	7,586,354

The following table gives the production of Bessemer steel ingots in the last four years, in long tons:

	1896.	1897.	1898.	1899.
Pennsylvania	2,292,814	3,060,049	3,402,254	3,968,779
Ohio	568,535	1,041,541	1,489,115	1,679,237
Illinois	780,105	943,774	1,105,040	1,211,246
Other States.....	278,452	429,951	612,608	727,092
Total	3,919,906	5,475,315	6,609,017	7,586,354

The production of all kinds of Bessemer steel rails by the producers of Bessemer steel ingots in 1899 was 2,240,767 gross tons, against a similar production in 1898 of 1,955,427 tons and 1,614,399 tons in 1897. The maximum production of Bessemer steel rails by the producers of Bessemer steel ingots was reached in 1899. The year of next largest production was 1887, when 2,044,819 tons were made. The following table shows the production, in long tons, by States of Bessemer steel rails by the producers of Bessemer steel ingots in the last four years. The figures given do not include the rails made each year from purchased blooms or re-rolled rails, statistics for both of which products for 1899 are not yet available:

	1896.	1897.	1898.	1899.
Pennsylvania	663,096	1,024,386	1,052,771	1,224,307
Other States	439,796	590,013	902,656	1,015,960
Total	1,102,892	1,614,399	1,955,427	2,240,767

At the request of the manufacturers the report separated for 1897, for the first time, the production of Bessemer steel rails weighing 45 lbs.

and less than 85 lbs. to the yard from those weighing less than 45 lbs. and over 85 lbs. This separation continued for 1899, as follows:

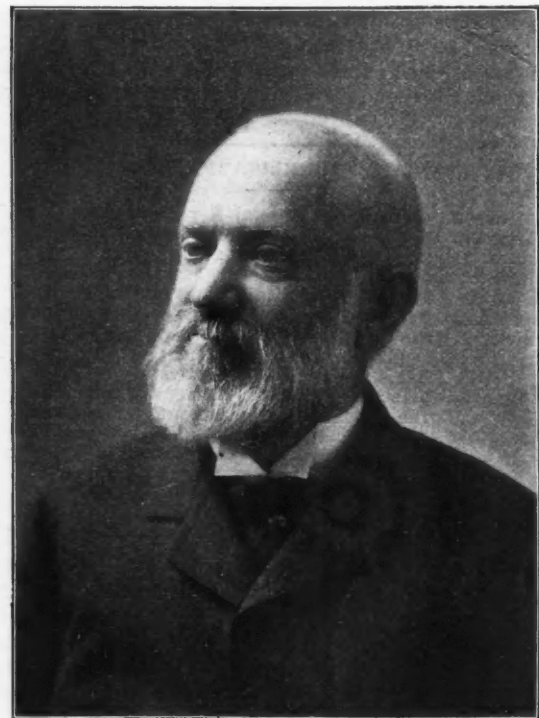
	Tons.	Per ct.
Under 45 lbs. to the yard.....	130,135	5.8
Between 45 lbs. and 85 lbs.....	1,531,108	68.3
Over 85 lbs.....	579,524	25.9
Totals	2,240,767	100.0

The total production of rails in 1899 will include rails made from open-hearth steel and iron rails. When all the figures are obtained it will probably be found that our total production of all kinds of rails in 1899 was about 2,300,000 tons.

ADDISON C. RAND.

Addison C. Rand, long president of the Rand Drill Company of New York, died suddenly at his residence in New York City, on the evening of March 9th. His illness was the result of a severe cold and lasted only 24 hours, his death being entirely unexpected to his family and business associates. He was born in Westfield, Mass., September, 1841, and was a member of an old New England family, which had been prominent in Massachusetts from the first settlement. He was educated in the local schools and early turned his attention to mechanical pursuits. He was one of the pioneers in the manufacture of rock drills and air compressing machinery, and for a large part of his life the designing and construction of such machinery absorbed his attention. He studied carefully the working of machinery in his own factory, in the field and abroad, and was a thorough master of the subject, both theoretically and practically. The Rand Drill Company, with its extensive business, is chiefly the result of his work. He was also interested in the manufacture of explosives, and was a stockholder and director in the Lafin & Rand Powder Company.

Mr. Rand found time to take much interest in general engineering progress. He was a member of many mechanical and engineering societies, including the American Institute of Mining Engineers and the American Society of Mechanical Engineers. He was also an active



ADDISON C. RAND.

member and a director of the New England Society in New York. He served for several years as a director of the Ninth National Bank in New York, and was a member of the Chamber of Commerce. With all his many activities he found time to make numerous friends, and his death will be generally regretted.

RAILROADS IN BORNEO.—It is reported that a contract has been concluded by the British North Borneo Company for the construction of a railway 60 miles long to connect the important harbor of Gaya and Brunei Bay, where coal exists in large quantities, and the line, 50 miles in length, now under construction by the company, with the interior of North Borneo. Gaya Bay is said to be of greater strategic importance, from a naval point of view, than Wei Hai Wei.

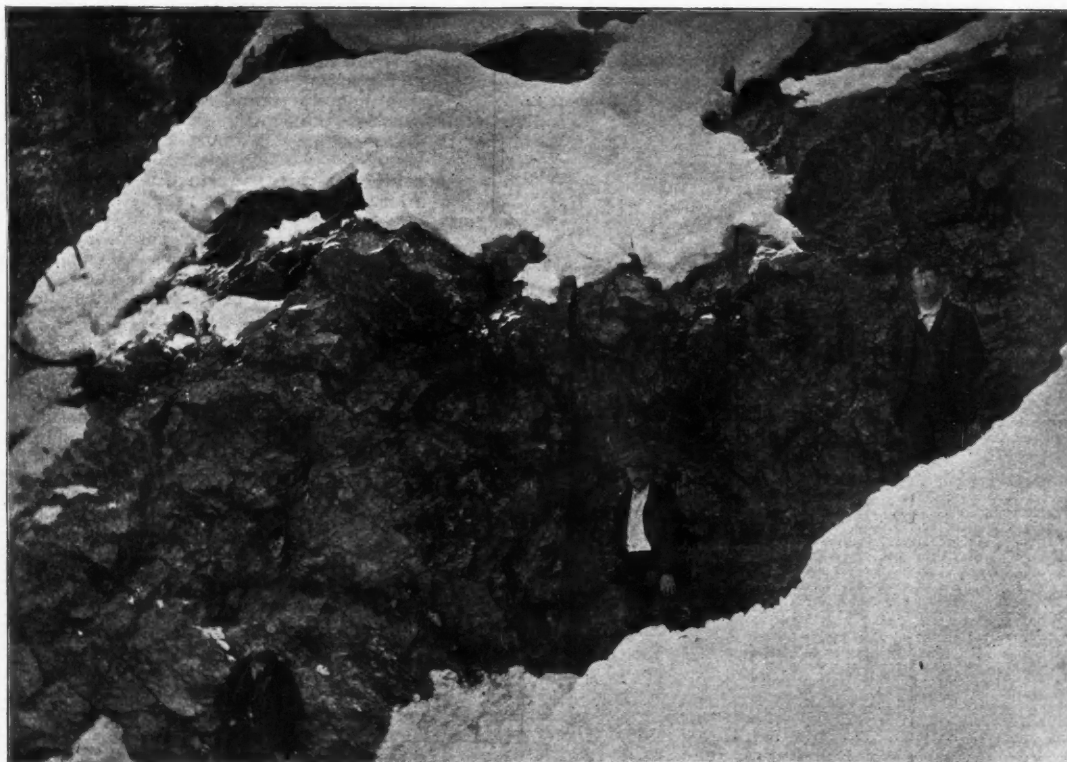
ACTION OF COPPER ON ACETYLENE.—A communication was made at a recent meeting of the Paris Academy of Sciences on the action of copper upon acetylene. The authors, MM. Paul Sabatier and T. B. Senderens, have found a formation of a condensed hydrocarbon, cuprene. Acetylene, passed over copper heated to 200° C., undergoes a complicated transformation, giving a liquid hydrocarbon and a mixture of ethylene, propylene, butylene, ethane, and hydrogen. At the same time the copper becomes coated with a solid deposit, to which the name of cuprene is given.

BRITISH COLUMBIA.—XXVII.
PROSPECTS ON HOWE SOUND, WEST COAST.

Special Report of W. M. Brewer, Traveling Correspondent.

About Christmas, 1898, some trappers discovered a zone of mineralized schist of considerable extent on the east side of Howe Sound, and located the Britannia Group of mineral claims about 30 miles northerly from Vancouver. The discovery was reported to Boscowitz & Co., a firm of fur buyers of Victoria. An examination by these gentlemen led to their acquiring an interest in the claims. Work was commenced to determine what value the prospects possessed. This has been carried on until the present day, and it is only recently that the attention of mining men in the Province has been called to the fact.

Within the past month several mining operators and experts from the United States have been visiting this section and acquired seven-tenths of the property from the Boscowitz firm. On January 27th the writer had the opportunity of examining the underground workings of this group. He found the camp situated about 4 miles from the beach by trail, and at an elevation of 3,500 ft. above sea level; 1,300 of this elevation is gained within a distance of about $\frac{3}{4}$ mile. Although no snow had fallen in the near neighborhood of the Sound, yet at an elevation of 2,000 ft. there had been a sufficient fall of snow to cover the surface, and the depth of this mantle increased until in the camp itself, it was some 4 ft. deep. Consequently it was impossible to make any thorough exploration of the surface outcroppings except at two or three points where the snow had been shovelled away and open cuts had been run to expose the outcrop.



BREAST OF COPPER ORE, JANE CLAIM, HOWE SOUND, B. C.

Beyond the fact that the belt of schist apparently extends from the beach of Howe Sound with its line of strike about 20° south of east some distance beyond the limits of the Britannia Group, it was impossible during the brief visit the writer made to the district to determine the geological characteristics. Along the trail the geology is almost entirely hidden by debris from slides. Several mineral claims have been located under the name of the Goldsmith Group and extending from the shore line to the western boundary of the Britannia Group. Easterly from the Britannia Group 11 mineral claims have been located on what is supposed to be an extension of the ore already discovered. Consequently, as each claim is supposed to occupy an area of 1,500 by 1,500 ft. these locations extend for a total distance of about 6 miles in an air line.

Several outcrops on the Britannia group occur in the form of bold bluffs, an examination of which caused the writer to form the opinion that a considerable thickness on the foot-wall side had been carried off by erosion. The belt of schist is probably eruptive, having derived its schistosity from shearing. Its thickness cannot be determined as long as the surface is covered with snow, but the main cross-cut tunnel has been driven a distance of about 220 ft. in the schist, which is heavily mineralized with white iron and occasional splotches of copper pyrites nearly the entire distance. This cross-cut is being driven with the expectation of intersecting an ore body which had been opened on the outcrop by an open cut. That cut demonstrated that a zone in the schist carried copper pyrites as impregnations with the white iron in sufficient quantity to warrant the presumption that an extensive body of concentrating ore occurred, having the same line of strike and practically the same dip as the schist itself.

The level of the cross-cut tunnel is about 140 ft. below the outcrop. At a point 132 ft. from the mouth of the cross-cut, drifting was started, apparently in the belief that ore carrying values had been reached. This work was done before the property was acquired by the Ameri-

cans. After a careful examination by their experts it was decided that the material in this drift did not represent the ore as exposed on the surface, consequently a cross-cut was started from the breast of the drift in a southerly direction and continued until a body of ore 26 ft. in thickness had been traversed.

From its general appearance and the yield from assays, this body of ore, while not possessing sufficient average value for direct shipment, could be concentrated with very satisfactory results. The results of assays reported by the syndicate showed about 6 per cent. in copper, with low values in gold and silver, from samples representing an average of the entire 26 ft. A drift was started in ore, along what is presumed to be the foot-wall. This had been run about 30 ft. when work was suspended at that point. From the appearance of the cross-cut through this body of ore, the writer is of the opinion that no well-defined walls enclose the body, but that the ore occurs in a zone or zones in the mineralized schist, and, probably judging from the thickness cross-cut at this particular point, that these zones will be found to possess considerable extent.

After suspending work on the drift it was concluded to continue the main cross-cut tunnel with the expectation of intersecting the same ore body at another point along its line of strike, and three shifts are working now to accomplish that end. It is also proposed by the management to connect the cross-cut level with the outcrop by an upraise as well as continuing the work of drifting. At first sight it would appear as though it would have been more advisable to continue working in the drift instead of attempting to cross-cut the ore body at another point on the same level, but an examination of the workings demonstrated that as the main cross-cut is run on a straight

line, while the cross-cut to the west has been made after considerable angling, it will be more economical to transport ore through the straight rather than through the crooked tunnel.

The face of the main cross-cut tunnel at the time of the writer's visit was still in the schist mineralized with white iron, but it is expected that only a short distance will have to be driven to intersect a body of ore carrying practically the same values as the 26-ft. body. As previously stated in this article, the outcrop in places occurs in bold bluffs. About 500 ft. easterly from the mouth of the main cross-cut tunnel is situated the most prominent of these bluffs. On the northern side erosion has carried off a quantity of the schist of which the bluff is composed, and all of its face which is uncovered by snow shows oxidized material which would warrant the presumption that such forms the capping of an ore body. Acting on this presumption, the management selected a point about half way up the bluff for prospecting, and started a cross-cut tunnel. At the time of the writer's visit, although only a few feet had been run, mineralized material which was being extracted carried a considerable amount of copper pyrites associated with white iron. From its general appearance it may be presumed that this ore will carry about the same values as that in the 26-ft. ore body already referred to.

After as careful an examination of the property as could be made under the present conditions, the writer drew the following conclusions:

1. That possibly the entire belt of schist carried some values.
2. That the 26-ft. ore body certainly possessed sufficient values to make it a valuable concentrating proposition, provided, of course, its continuity is maintained both along the line of strike and with depth.
3. That although for the amount of work done a very good showing was made, yet that it was impossible, until upraises and drifts had been run, to correctly estimate the quantity of ore in sight.

4. That owing to the fact that a sufficient water power could be obtained from a creek flowing on the property to run concentrating machinery, that concentration would be the most desirable method to be adopted for treating the ledge matter.

5. That an aerial tramway could be constructed from the Britannia Group to the beach by means of which ore could be transported at very low cost.

6. That provided a sufficiently large body of ore was blocked out to warrant the erection of a smelter, smelting operations could be carried on at a minimum cost, because it is only a short distance by water from the Union coke ovens on the east coast of Vancouver Island to Howe Sound.

7. That if the property was worked under a careful management with a sufficiently large cash capital to install necessary machinery, and work a large force of men, the Britannia Group ought to develop into a producing mine of great capacity.

So far as the Goldsmith Group, situated westerly from the Britannia, is concerned, there has been but little work performed on it, but the results from such work would warrant the presumption that this property should develop into one having at least as great producing capacity as the Britannia, while it has the advantage of being located nearer to salt water.

The accompanying illustration is from a photograph taken in January, and shows a glimpse of 20 ft. of the 50-ft. breast of massive copper ore, showing above the accumulated snow on the Jane claim of the Britannia Group.

THE MINERAL PRODUCTION OF CANADA IN 1899.

We are indebted to the courtesy of the Geological Survey of Canada for the accompanying figures, sent us in advance of the publication of the report. The table has been compiled by Mr. Elfric Drew Ingall, chief of the Section of Mineral Statistics. The total value of the mineral production of the Dominion for a series of years has been as follows:

1886.....	\$10,221,255	1891.....	\$18,976,616	1896.....	\$22,584,513
1887.....	11,321,331	1892.....	16,628,417	1897.....	28,661,430
1888.....	12,518,894	1893.....	20,035,082	1898.....	38,661,010
1889.....	14,013,913	1894.....	19,931,158	1899.....	47,275,512
1890.....	16,763,353	1895.....	20,639,964		

The production for the year 1899 is given in detail as below:

Mineral Production of Canada, 1899.		
Product.	Quantity (a).	Value (a).
Metallic.		
Copper (fine, in ore, etc.) (b), lbs.....	15,078,475	\$2,655,519
Gold, Yukon District.....	\$16,000,000	
Gold, all other.....	5,049,730	21,049,730
Iron ore, tons.....	77,158	245,372
Lead (fine, in ore, etc.) (c), lbs.....	21,862,436	877,250
Nickel (fine, in ore, etc.) (d), lbs.....	5,744,000	2,067,840
Platinum, oz.....	55	835
Silver (fine, in ore, etc.) (e), lbs.....	3,078,837	1,834,371
Total metallic.....		\$28,833,717
Non-Metallic.		
Arsenic, lbs.....	114,637	\$4,872
Asbestos and asbestic, tons.....	25,285	483,299
Chromite, tons.....	1,980	23,760
Coal, tons.....	4,565,993	9,040,058
Coke (f), tons.....	100,820	350,022
Felspar, tons.....	3,000	6,000
Fire-clay, tons.....	599	1,295
Graphite, tons.....	1,220	16,179
Grindstones, tons.....	4,511	43,295
Gypsum, tons.....	244,566	257,329
Limestone for flux, tons.....	53,202	45,662
Manganese ore, tons.....	308	3,960
Mica.....		163,000
Mineral pigments—		
Baryta, tons.....	720	4,402
Ochres, tons.....	3,919	19,900
Mineral water.....		100,000
Moulding sand, tons.....	13,724	27,430
Natural gas (g).....		387,271
Petroleum (h), bbls.....	808,570	1,202,020
Phosphate (apatite), tons.....	3,000	15,000
Pyrites, tons.....	27,687	110,748
Salt, tons.....	57,095	234,520
Soapstone, tons.....	450	1,960
Structural Materials and Clay Products.		
Cement, natural rock, bbls.....	131,387	\$119,508
Cement, Portland, bbls.....	255,366	513,983
Flagstones.....		7,600
Granite.....		90,542
Pottery.....		200,000
Sewer pipe.....		161,546
Slate.....		35,406
Terra Cotta.....		220,253
Building material, including bricks, building stone, lime, sands and gravels, and tiles.....		4,250,000
Total structural materials and clay products.....		\$5,596,843
Total all other non-metallic.....		12,544,952
Total non-metallic.....		\$18,141,795
Total metallic.....		28,833,717
Estimated value of mineral products not returned.....		300,000
Total, 1899.....		\$47,275,512

*Returns incomplete.
 (a) Quantity or value of product marketed. The ton used is that of 2,000 lbs.
 (b) Copper contents of ore, matte, etc., at 17.61c. per lb.
 (c) Lead contents of ores, etc., at 4.47c. per lb.
 (d) Nickel contents of ore, matte, etc., at 36c. per lb.
 (e) Silver contents of ore at 59.58c. per oz.
 (f) Oven coke, all the production of Nova Scotia and British Columbia.
 (g) Gross return from sale of gas.
 (h) Calculated from inspection returns at 100 gals. crude to 42 refined oil, and computed at \$1.48 2/3 per bbl. of 35 imp. gals. The barrel of refined oil is assumed to contain 42 imp. gals.

The increase in the value of the mineral production of Canada which has been so noticeable a feature in the figures for the previous four years, is continued during 1899. Compared with the corrected total for 1898, the preliminary figures for 1899 show an increase of over 22.2 per cent., the increases for 1898 and 1897 having been nearly 35 per cent. and nearly 27 per cent., respectively.

Of the above-mentioned 22.23 per cent., 15.52 per cent. is to be cred-

ited to the increased output of gold from the Yukon placers, 2.92 per cent. to the increases in the other metallic products, and 3.84 per cent. to the growth of the non-metallic mineral industries.

The value of the mineral production of the country per capita for 1899 would be about \$8.90, having increased almost fourfold in the 14 years since 1886, when the first figures were available.

A study of the figures given in the table accompanying shows that the metallic products contribute some 61 per cent. of the value of the whole, and these, together with coal, petroleum and building material, account for all but about 9 per cent. of the grand total.

The proportional contributions of the various products for 1898 and 1899 are shown below:

Product.	1898. Per ct. of total.	1899. Per ct. of total.
Gold.....	35.63	44.53
Coal.....	21.27	19.12
Building material.....	10.77	8.99
Silver.....	6.71	3.83
Copper.....	5.52	5.62
Nickel.....	4.71	4.37
Lead.....	3.12	2.07
Petroleum.....	2.75	2.54
Asbestos.....	1.27	1.02
Cement.....	1.03	1.34
Natural gas.....	0.83	0.82
Coke.....	0.74	0.74
Salt.....	0.64	0.50
Gypsum.....	0.60	0.54
Pottery.....	0.55	.....
Iron ore.....	.....	0.63

The chief points of interest brought out by the above figures lie in the much greater prominence assumed by gold, and the falling off in silver and lead, which now occupy the sixth and eighth places, as compared with the fourth and seventh positions formerly occupied by these metals.

In copper, owing to the large advance in prices, there was a marked increase in value notwithstanding the decrease in the output. The main features of the industry consisted in decreases in the production of the Quebec and Ontario mines, for although in the latter case the amount of ore treated was greater than in 1898, the content of copper was lower. The shipments of ore from the Parry Sound District, although small, constitute a new feature in this industry. In British Columbia there was a large advance in the production, chiefly from the Rossland mines.

The value of the gold production shows a large percentage increase, in the Yukon and Ontario especially, the former having grown 60 per cent. and the latter over 58 per cent. In the case of iron ore the large advance shown was only to be expected from the great demand which arose, and in view of the growth in the last few years of the iron smelting industry of the country.

The increase in the quality and value of the nickel produced attests the continued prosperity of the mines of Sudbury, Ontario, notwithstanding their decreased output of copper, as mentioned above. Of the chief contributors to the total mineral production of the country, lead and silver are the only two showing a considerable falling off, and that notwithstanding more favorable prices. This is due to local causes in British Columbia, not dependent on the value of the deposits, but which have led to the restriction of operations there.

With the exception of a slight falling off in the value of the asbestos, all the other chief minerals show considerable advances, both in amount and value. Inspection of the figures shows this especially to be the case in the cement and coke making industries.

UNION OF SPANISH IRON COMPANIES.—According to the "Revista Minera," negotiations are going on for the consolidation of the two great Spanish iron companies, La Vizcaya and Altos Hornos de Bilbao. The plan is to have the works of each company run on certain classes of products and thus to economize costs and do away with competition. The two companies last year produced 60 per cent. of the pig iron and 78 per cent. of the steel made in Spain.

COKE PRICES IN FRANCE.—According to "L'Echo des Mines," the average price paid for coke by the companies connected with the Comptoir Metallurgique de Longwy was 25.27 fr. (\$4.88) per metric ton, f. o. b. cars, in July, 1899. In December the average had increased to 26.82 fr. (\$5.18), and in January it was no less than 30.85 fr. (\$5.95). The prices charged to buyers outside of the association in January were 40 to 42 fr. (\$7.72 to \$8.11) per ton. Outside orders, however, are being generally refused, as the contracts already made cover all the coke controlled by the Comptoir.

RUSSIAN RAILROADS IN PERSIA.—The London "Engineer" says that the Russian Government has evidently made up its mind to set to work in earnest in Persia. Russia has already begun to construct a line of railway from Julfa, a suburb of Ispahan, to Tabriz and thence to Hamadan, 160 miles southwest of Teheran, and also a branch line in continuation from Hamadan to Teheran. This Russian line will be continued eventually by Ispahan and Kerman to Bender Abbas. Several officers of the Russian General Staff are superintending the work of construction, and have a few regiments of Cossacks at their disposal. It is believed that this new line to Bender Abbas will be ready for traffic in 1903. This direction has been chosen for the projected railway because it seemed the most advantageous to Russian both from economic and strategical points of view. The end in view before Russia's steadily pursued policy, both in Asia Minor and in Persia, is that of acquiring an outlet to the sea on the southern coastline of Persia, so that it may become mistress of the great trade routes which lead to India and the Far East. At the same time Russia will make a point of taking no steps which eventually could be of any service to Turkey. To this end there will be no railway communication brought about either with the rivers Tigris or Euphrates or even with Bushire, but solely with Bender Abbas; since Russia considers that place the political, commercial, and strategical center of Persia.

A FURNACE TAPPING HOOD.

Written for the Engineering and Mining Journal by E. H. Messiter.

The removal of smoke from the furnace houses of smelting works has in the past been attended with considerable difficulty. Various types of hoods and ventilators have been used, with both natural and artificial draft. The results, however, have generally been quite unsatisfactory, partly on account of ever-present air currents which blow the smoke from under the hood, not only filling the furnace house, but vitiating the air of feed-rooms as well, with smoke which finds its way through the floor.

In the attempt to catch all the smoke in many cases the effort has been to make the openings to the hood or ventilators as large as possible. The writer, on the contrary, concluded that they should be as small as possible and that the ventilator should remove all of the smoke and as little of the surrounding air as possible, and accordingly designed the hood illustrated herewith.

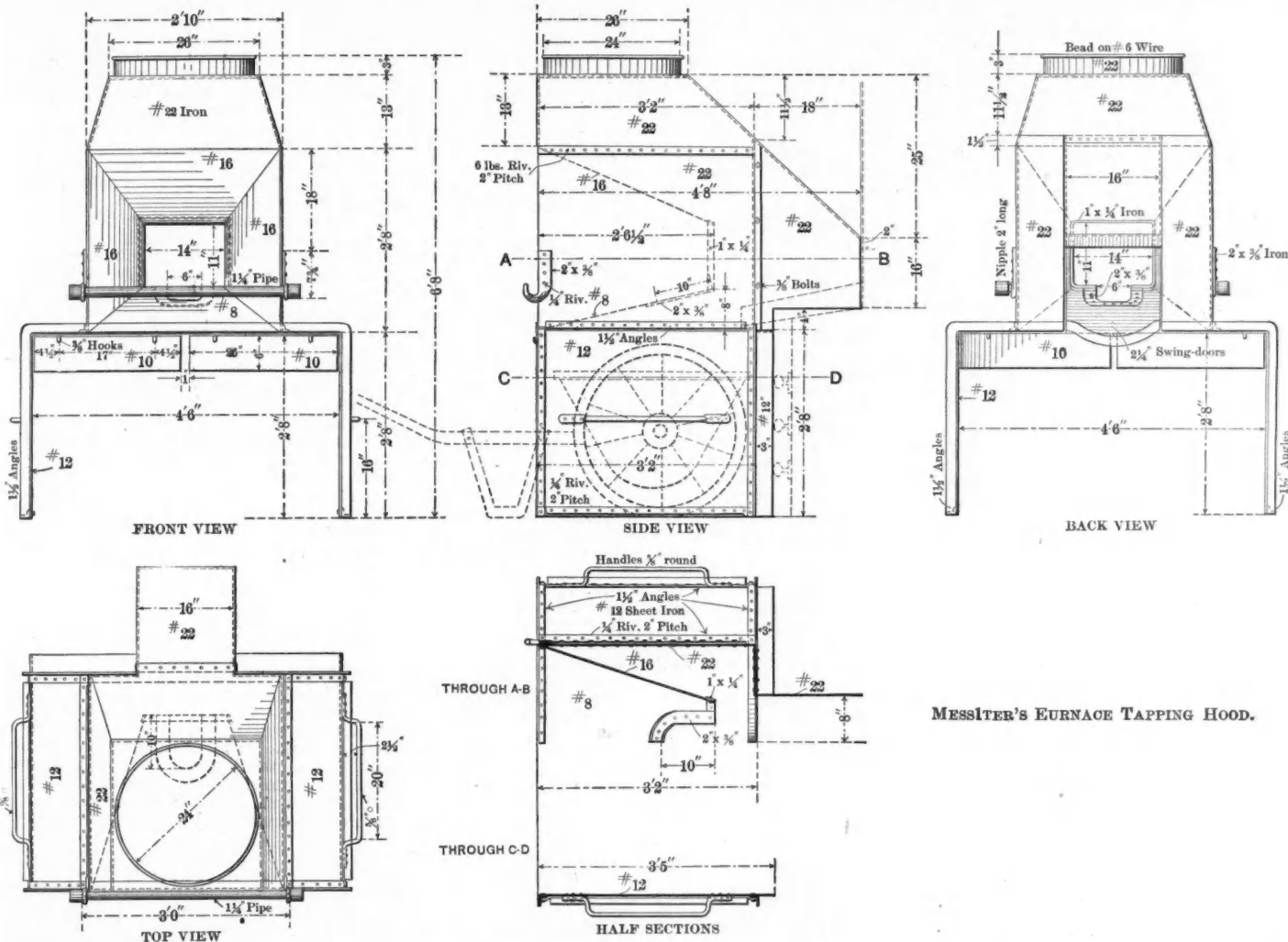
The hood proper is an approximately cubical sheet iron box, the back of which is extended to meet the jackets of the furnace around the tap-hole; while the front is formed of an entering pyramid of sheet iron whose sides extend nearly to the back of the hood and converge toward the tap-hole. The top and bottom are open. The hood rests on a

THE TRANSVAAL MINING INDUSTRY FOR THE SECOND HALF OF 1899.—II.

Special Correspondence of the Engineering and Mining Journal.

(Continued from page 288.)

As stated in my previous letter, there are now 30 gold mines and one coal mine where pumping and some other work are carried on under the charge of the Government. In these mines at least work enough is being done to keep them ready for production. These 30 gold mines form a reserve for the Government, which can be brought into production at any time, in addition to the 10 mines which are already in operation. Each of these is owned by some company in which the majority of the stock is owned by French or German shareholders. It was found that the foundry and machine shops of the Robinson Company could not do all the work required for the pumps and other machinery of these mines. The Government therefore opened the works of Wright, Boag & Company and of Thomas Bigbie & Company, Limited, which are the largest foundries and machine shops on the Witwatersand, and are well supplied with machine tools. In these shops a large amount of work for the mines has been done, besides the manufacture and repair of gun carriages, shot and shell for war purposes. The Trans-



rectangular angle-iron base, the sides of which are closed with sheet iron and provided with handles.

It has been found, after extensive trials, that this hood will remove all of the smoke incidental to the operation of tapping by means of the natural draft produced by a 24-in. ventilator pipe 35 ft. or 40 ft. in height. Of course the back of the hood and base must be closed with reasonable care against the jackets and crucible with thin sheet iron. The narrow swinging doors in front of the base are left 1 in. apart in order that the tapper may see when the slag pot is full. The attachment to the ventilator pipe is conveniently made with a piece of canvas wired on. Should it be necessary to reach the front of the furnace quickly in an emergency, the canvas may be cut and the hood instantly removed by two men.

This device will not be patented.

COKE FROM SIBERIA.—At a recent meeting of the Oural Mining Union an offer was presented to supply coke from the Povlodar District in Siberia at 20 kopeks per pood (about \$5.50 per ton) delivered at furnaces. It was resolved to make a trial of this coke as soon as shipments can be arranged. The Povlodar mines are now being actively worked; they are connected with the Irtysh River by a railroad just completed. Shipments can be made by river barges from the railroad terminus to the town of Tiumen, from which there is railroad connection with many of the Oural furnaces.

vaal Government has shown an unexpected determination in refusing to permit the conduct of work by individual or corporations, and in reserving to itself the entire administration and supervision of the mines. Requisitions for material are not made until it is needed, but once made nothing is allowed to stand in the way.

As to the remaining mines—more than 100 in number—which are controlled by English stockholders, they are entirely closed, even the pumping being stopped; and therefore, according to the law of the South African Republic, the property of these companies is forfeited to the Government. At first these mines kept a small staff and a sufficient number of workmen on the premises to serve as a nucleus at any time when they thought it best to resume work. These men, however, did no work but simply watched the property. This left knots of Englishmen at more than 100 mines, few or none of them having Government permits to stay in the country. They also formed good hiding places for other Englishmen from the towns and villages outside of Johannesburg. Most of these men were not well disposed to the Government, while there were no men to spare to guard or watch them, and consequently all of these—both white and black—were ordered to leave by December 1st. The works and dwelling houses were accordingly deserted, and were placed under the guard of the mine police, nobody being permitted to enter them. The police occupy only such buildings as are needed for their guard-rooms and quarters, and are not allowed to enter any of the buildings without special order. The negro workmen, who had been living at their ease in the quarters

near the closed mines, were ordered out and sent to the mines working under Government control, the women and children being quartered by themselves on certain reservations, where they are provided with food and shelter. The mine works and the houses were carefully protected against injury and theft, attempts at stealing being very severely dealt with.

At this time there were many Englishmen in Johannesburg who had permits to stay, but few of them could refrain from showing their hostility to the Government. In many cases they made attempts, by running out of town on their bicycles, to drop dynamite under culverts or bridges on the railroads, and sometimes employed Kaffir boys to do this kind of work. Accordingly an order was made that no bicycle should be allowed to go beyond the town limits, and a large number of the English offenders were ordered to leave at once. They were sent away under police supervision, and furnished with passes on the trains to Lourenco Marques, on Portuguese territory, whence they could take the steamers to the Cape of Good Hope or Durban. When the greater number had gone, the English left were required by the Government to make new application for permits.

On December 19th bids were called for by the Mining Department for scraping amalgamating plates, cleaning up mortars, cyanide precipitating boxes and all other places where gold might be found in the mills which were not working. Bids were received up to December 26th, and bidders were required to give proper security for the performance of the work. It was ordered then, and afterward, that all communications with the Mining Department must be made in the Dutch language.

The usual custom at the Witwatersrand mines has been to clean up at the close of each month, and it is well known that at the end of July, August and September, this work was done with unusual thoroughness. As war was declared on October 11th, there was a considerable amount of gold on the plates, mortars, etc., which had accumulated there since the September clean-up. There is no doubt that a considerable amount of gold was thus left in the mills and also in the extractor rooms, and in the smelting rooms. Men who were familiar with the mills could have secured a large part of this gold, and it would have been almost impossible for the small force of mine police to prevent or detect them. When the order first came to shut down, no time was spent in recovering any of the metal, but the few hours left were devoted to damaging the machinery and plants as much as possible. Engines were disconnected, pieces hidden, and as much confusion as could be left at most of the mines.

The most important point to be considered next is the condition of the mines operated by the Government officials. In these, in every case, preference was given to men who had been employed before the war, and who still remained in the place. Not only were those taken who applied for work, but they were sought out wherever possible and asked to take their position. As an example of the work done, I give herewith an English translation of the report made by Mr. E. Kunh-munch, who had been appointed manager of the Ferreira Deep Gold Mine by the Government. He had previously been one of the Government mine inspectors. This report was published in the Government "Gazette," published at Pretoria. I may mention here that the positions of managers at the operating mines were filled by the mine inspectors, some of whom were born in the Transvaal, while others came originally from Europe and had been naturalized in the South African Republic. They were all competent mining engineers. Most of the men placed in charge of the engines and machinery were taken from the corps of steam boiler inspectors. The report for the Ferreira Deep, as published, covered the period from October 19th, when the Government took charge, up to November 4th, and is given below very nearly in full.

At the date when possession was taken, the mine works had been stopped for eight days, and only a care-taker and a few guards were left. All the books and records of the mine had been removed. In the safe there was found 1,112 oz. amalgam, 411½ oz. of concentrates, and 1,215 oz. of quicksilver. Plans of the mines were also found, and records of assays, while the store-rooms contained a large quantity of material for the operations of the mines. The mine plant consists of two shafts, connected on the surface by a tram line operated by a small locomotive; a crushing and sorting station, in good condition; a battery, of which 60 stamps had been at work and 40 more were in course of erection; a mill engine house with an air compressor; a large engine for running the battery; a dynamo, and another compressor in course of erection. At shaft No. 1 there was a set of 8 boilers, with a ninth in course of construction; and at shaft No. 2 there were 3 boilers.

The Ferreira Deep is one of the latest deep-level mines, and is close to Johannesburg. It is owned by the Rand Mines, Limited, controlled by the Ecksteins. The plant had been designed for 200 stamps of 1,250 lbs. each, and was considered the latest model plant on the Rand, with that of the Langlaagte Deep. Mr. J. Richards, who is well known in San Francisco, was general manager, and Mr. Mills was chief engineer of the mine. The plant had been designed under the supervision of Mr. L. J. Seymour, consulting engineer of the Rand Mines.

On taking possession of the property, the care-taker notified the engineer that there was a large pump placed in one of the levels of shaft No. 1, without which it would not be possible to work the mine. On examination it was found that one of the main parts of this pump was broken, but a day or two later a duplicate casting was found, which required some fitting work in the machine shop before it could be put in place, and the pump started. When this was done the water in shaft No. 1 was under control, but it took until November 6th to unwater it completely. The water can, in case of emergency, be handled by bailing tanks, but when these are in use no ore can be hoisted. Work in the stopes was resumed October 30th, and in a few days as much ore was hoisted daily as before the mine was closed.

At the surface work the first trouble was with the water supply. There were three reservoirs formed by dams; the first is called the cooling dam, and is kept full by a large pumping engine, which pumps water from the Langlaagte Deep reservoir. The second is called the tailings dam, and receives the overflow from the first dam and the water returned from the battery. The third dam, near shaft No. 1,

is a reservoir which receives the overflow from the tailings dam and also the water pumped from the shaft. These dams were substantially built and were about the best on the Rand. The bottom of the reservoir is formed by the natural surface of the ground, which, at that point, has a nearly uniform slope. The material for the dam was obtained from the excavation made for the cyanide plant. In building it the earth was spread out uniformly and rolled down hard by a large steam roller, the layers being 6 to 8 in. thick. This work was done by American contractors.

On taking possession of the mine it was found that some one had let the water out of all the dams, except that about 2 ft. of water was left in the first reservoir. Accordingly it was necessary to take possession of the pumping station at the Langlaagte Deep, which is about 2 miles distant from the Ferreira; the reservoirs had already been connected by a 16-in. steel pipe. The reservoir and all the valves in the connecting pipe were carefully guarded by the police. The next trouble was the fact that nearly all the mine machinery was found in bad condition, and much repair work was necessary. The same condition existed in the mill, while at the cyanide plant the centrifugal pumps were all out of repair, and the principal pipe lines were stopped up by brick and cement. The repairs cost, in all, about £1,500. The coal supply was obtained from the Cijferfontein Coal Mine, which is on the West Rand, and is much nearer to the Ferreira than any of the coal mines on the East Rand.

In order to give a basis for comparison, it may be stated that for the month of August, when the property was in full operation, the production was as follows: From 10,020 tons of ore milled, 6,143 oz. fine gold, valued at £25,706; from 6,730 tons of tailings cyanided, 2,305 oz. gold, value £9,634; from 2,452 tons of slimes treated, 261 oz. gold, value £1,092. The total value of the production was, therefore, £36,422, while the expenses were £15,747, leaving a profit for the month of £20,734. Under the same conditions Mr. Kunh-munch expected, after November, to make a monthly production of about £35,000, at a cost of £15,000, leaving a profit of £20,000. For the first month of operation, however, the expenses amounted to more than 50 per cent. of the production, owing to the repairs which were necessary.

The report of J. Van Pesch, formerly boiler inspector, but now chief engineer of the mine, shows the condition of the machinery substantially as follows: At shaft No. 1 there is a direct-acting hoisting engine, 16 by 22 by 60 in. This engine had to be partly repaired and the valves set. The poppet valves leaked so that it was difficult to stop the engine on time, and one skip was over-hoisted. The low-steam brake was off and the spindle bent, as were several of the small rods. The brake blocks were worn out and the governor was out of order. The overhead sheaves for the rope had also to be re-pressed safety valve had to be reset. The balance weight of the pair. The engine had evidently been neglected for some time.

Besides this there was a small hoist used for taking the men up and down the shaft. This was a 15 by 30-in. indirect-working engine, and was in a dangerous state. The brasses of the pillow blocks, the cross-head, a part of the link motion, and several of the couplings were in bad order. Several teeth were broken in the gearing and the indicator was not correctly set. In short, this engine was in such condition that it would be dangerous to use it. The condenser for both engines was in bad order, giving only 14 in. vacuum instead of 22 in., as it should have done. The signal bells and ropes were out of order, the axles of the skips were worn, and the wheels had sharp flanges, so that they were not safe to run.

The large Riedler pump on the first level was broken, as mentioned above. This pump raises water about 1,200 ft., so that the broken part was exposed to a pressure of about 530 lbs. per square inch, and it could not be safely run until a new casting was put in. There were three small pumps, all of them in good condition.

At shaft No. 1 there are 8 tubular boilers with outside fireboxes, and a ninth in course of erection. All the boilers had to be repaired, as the tubes were leaking, and valves jammed. Some of the steam pipes were rusted through, while the gauge cocks were jammed and out of repair. Boilers and flues; ash pits, and the main flue leading to the smoke-stack, were full of ashes, so that no draft could be obtained until they had been cleaned out. The boiler feed pump was also out of repair.

In the mill engine house the Fraser & Chalmers air compressor had to be thoroughly overhauled and the valve gear reset. The governor did not work, and the pressure in the low-pressure cylinder was too high owing to leaky valves. The condenser required overhauling and the connections were all more or less leaky. In the battery engine the high and low-pressure cylinders were in good condition except that the valve gear had to be readjusted. The intermediate cylinder was disconnected and the engine run as a compound instead of a triple-expansion engine. The condenser had to be thoroughly overhauled. In fact of the whole engine hose was in very bad order. In the battery the shafting and gearing were in good condition, all being new. The power ropes were, however, in bad order.

The cyanide works stand at the side of the battery building, and were in a better state, although the rope which transmits power to the tailings wheel had to be repaired. The shafting, however, was in poor order, as were the couplings for the centrifugal pumps, while the large triplex pump had to be repaired, as the suction pipes would not work.

At shaft No. 2 the hoisting engine, which is of the same size and pattern as that at No. 1, was in bad condition. The valve rods had to be taken off, and some of the pieces could not be found, so that new ones had to be made in the shop. The governor did not work. The small hoist, also the same as that of shaft No. 1, was in such bad order that it cannot be used at all. In the boiler house at this shaft the boilers were full of ashes, so that much time was required to clean them out; the masonry was partly broken down under one of the boilers, so that it had to be repaired before that boiler could be used. The skips and signal gear were in a very bad state, even worse than at shaft No. 1. The pump in the shaft, however, was in a pretty good state.

The locomotive on the tramway connecting the two shafts was in

bad order, and some parts had to be renewed. In the machine shop the tools could not be used, some of the parts having been removed; many of them have not since been found. The same thing was the case with the shop engine.

At the Langaagte Deep pumping station the engine of the old pump was in bad condition and the valve gear defective. The inlet for the water was partly filled up and had to be dug out. The new pump needed adjustment and the boilers were in poor condition. The pipe line leaked and had to be repaired. The dynamo for the electric light plant was badly worn and many of the lights needed renewal, although the wire system was in fair order.

It will be seen that matters were in much worse condition than they should have been with machinery most of which was nearly new, and this condition must be ascribed to neglect of an inexcusable character; if not, to intentional injury.

(To be Continued.)

ABSTRACTS OF OFFICIAL REPORTS.

Mercur Gold Mining Company, Utah.

This company's property is in the Mercur District in Utah. The capital stock is \$5,000,000, divided into 200,000 shares of \$25 par value each. The report is for the year ending December 31st, 1899.

The total receipts for the year were: Gold recovered from ore, \$449,437; from old tailings reworked, \$23,382; miscellaneous, \$180; total, \$472,999. The operating expenses were \$294,832; new construction, \$32,157; total, \$226,984, leaving a profit of \$146,010 for the year. The dividends paid were \$125,000, leaving a balance of \$21,010. Adding \$24,366 brought forward from the previous year, there was a total balance of \$45,376 on January 1st, 1900.

The total ore from the mine treated during 1899 was 128,804 tons. The average costs are given as follows: Mining, \$1.05 per ton; milling, \$0.68; hauling, \$0.35; royalty, \$0.05; general expenses, taxes, insurance, etc., \$0.14; total, \$2.27 per ton. As the average recovery was \$3.49, this shows a profit of \$1.22 per ton. In 1898 the cost of mining was \$1.16 and of milling \$0.72 per ton, showing material reductions last year.

In addition to the ore worked there were 21,388 tons of old tailings treated during the year, and gold recovered from them to the amount of \$23,382, or \$1.09 a ton. The cost of treatment was \$12,851, or \$0.60 a ton, leaving a profit of \$10,531, or \$0.49 a ton.

The total amount paid by the company in dividends up to January 1st, 1900, was \$1,366,000.

The president's report says that no sorting has been done in the mine, but everything carrying values has been sent to the mill. This has resulted in a reduction of the mining and milling expenses, but has reduced the average value of the ore treated. With the installation of new machinery and new leaching vats, which are to be completed in March, the capacity of the mill and cyanide plant will be 600 tons a day. Large quantities of low-grade ore have recently been opened up in the mines.

United States Oil Company.

This company's report for the year ending September 30th, 1899, shows receipts from sales of oil, \$638,162. Working expenses were \$167,280, and dividends \$318,750, leaving a balance of \$152,132. The premium on stock sold was \$330,755, making a total of \$482,887. Payments for construction and improvements were \$375,478; premium on bonds redeemed, \$7,240.

During the year the company drilled 118 new wells, of which only 19 were dry. Total number of producing wells, September 30th, was 273, compared with 79 same date a year ago. The company has 7,245 acres in West Virginia of which 1,798 are developed, 1,318 partially so, and 4,129 undeveloped. In Ohio the company has 3,681 acres of which 480 are developed, 340 partially developed, and 2,861 undeveloped.

The last fiscal year the average price received for crude oil has been very satisfactory. The market remained stationary at about \$1.15 per barrel for the first nine months of the year, and then steadily advanced until it reached \$1.50 on September 30th, 1899, this being the highest price at which crude oil had sold since 1896.

The money received from the sale of 50,000 shares of stock in January, 1899, has been largely used by the company during the past year in the purchase of many properties, the most important being that of the Alleghany Company, at Scio, O., made in February, and of the National Company, at St. Mary's, W. Va., made in June. The production of the company has reached a point where most of it may be called settled, coming as it does from a large number of small wells. For the month of December, 1899, it averaged over 1,800 barrels net per day.

Hall Mines, Limited, British Columbia.

The report of this company covers the year ending September 30th, 1899. The total receipts, as reported from the London office, were £107,769.

The amount of work done during the year included 917½ ft. raising, 258½ ft. sinking and 3,039 ft. drifting; a total of 4,215 ft. The total quantity of ore mined and shipped to the ore bins was 32,700 tons.

The report of the copper smelter for the year shows that the ore charged was 30,764 tons; matte and by-products, 1,106 tons; a total of 31,870 tons. There were used 3,651 tons limestone, 35 tons lime and 7 tons iron ore, making the total charge, 35,563 tons. The net result—deducting matte recharged—was 1,638 tons of matte, containing 1,492,065 lbs. copper, 490,009 oz. silver and 2,714 oz. gold. The smelting cost was: Flux, \$0.20; fuel, \$1.44; labor, \$1.32; total, \$2.96 per ton of ore.

The lead smelting report shows 1,470 tons ore and 230 tons tailings, matte, scrap, etc., treated, a total of 1,700 tons. The products were 318 tons lead bullion, 146 tons matte, 75 tons flux dust, 5 tons lead in crucible and 60 tons borings from shaft. The contents were 713,148 lbs. lead, 26,852 lbs. copper, 50,600 oz. silver and 1,830 oz. gold. The smelting cost was: Fuel, \$1.96; flux, \$0.74; calcination, \$1.78; labor, etc., \$3.73; total, \$8.21 per ton of ore.

The report says: "Last year, each ton of ore cost us \$3.66 to smelt; this year the cost is but \$2.96, despite the fact that 55 per cent. of the

time the small furnace was in service. The matte produced during the year averaged 45.7 per cent. copper, 290 oz. of silver, and 0.77 oz. gold per ton, while the total furnace product, including metallic copper, averages 45.5 per cent. copper, 300 oz. silver, and 1.65 oz. gold per ton. Without prejudice, this may be regarded as good work, considering the fact that our charge, including flux, has averaged for the whole year but 2.25 per cent. of copper (wet assay), and has at times dropped as low as 1.75 per cent. copper. Likewise, in lead smelting, the metallurgical results have been exceptionally good, all operations during the year accounting for fully 98 per cent. of the total values charged to the furnace."

The directors' report says: "This balance sheet shows a gross profit of £28,873, which, with £1,246 brought forward from 1898, makes a sum of £30,119, from which has been deducted £640, being 6 per cent. interest to September 30th on £24,560, which was the total amount subscribed of the £50,000 debentures authorized and offered. Having made this deduction there remains the sum of £29,479, from which the board propose that £6,368 be written off for depreciation and machinery; £10,277 for cost of development and prospecting work prior to October 1st, 1898, and £3,470, the amount expended on the True Blue and other copper claims, the results from which have failed to bear out expectations and which have therefore been abandoned. After writing off these amounts and £336, being the year's proportion of the cost of the debenture issue, there remains the sum of £9,027 to carry forward. . . .

"The rate of miners' wages in British Columbia having been already high, mine owners were compelled, in self defence, to make a proportionate reduction for the 8 hours' day, which the miners, backed by their Unions, have refused to accept, and the result has been that most of the mines have closed down, while those that have continued to work have done so under great difficulties, as the majority of the best miners have left the district. In face of these labor troubles, work at both our mine and smelter has necessarily been of an intermittent character. The mine superintendent's report shows that only a comparatively small amount of ore was taken from below the main tunnel No. 5, and further, that his anticipations of output from the Kootenay Bonanza were far from realized, the amount actually taken out having been restricted, in consequence of the protracted winter preventing surface mining, to 3,000 tons, which, however, materially aided in the carrying on of development work in other parts of the mine.

"Lead smelting promises to be an important branch of the company's business in the near future, and the board has therefore had alterations made in the large smelter which will admit of its being used for that purpose, as well as the smaller one if required. The large furnace was in blast for 80 days and the small furnace 104 days on copper ore, while the latter was also in blast for 92 days on lead ore. The wire tramway has continued to work satisfactorily, the average cost per ton of ore brought down having been 40c.; the rope, however, will not last much longer, and a new one has therefore been ordered, which can be put in place when necessary while the large smelter is closed down.

"The board has not lost sight of the desirability of opening up the Kohinoor. Daylight, and other claims on Toad Mountain, but without more capital at command that work must perforce remain in abeyance until the development of the Silver King to the 10th level has been accomplished. The Nelson Coke and Gas Company having applied to purchase part of our company's land at Nelson, on which to erect works, and having as an inducement offered to supply the company with cheaper coke, the board decided to sell a block of land containing about 2 acres for \$5,000, a portion of which sum the board will invest in the purchase of adjoining land from the Canadian Pacific Railway Company which is now held under lease from that company."

RECENT DECISIONS AFFECTING THE MINING INDUSTRIES.

Specially Reported for the Engineering and Mining Journal.

FILING CERTIFICATE OF LOCATION IN COLORADO.—Where the locator of a lode claim lodges his certificate with the proper officer for record within three months of discovery, and the officer notifies him that it will be recorded, he has done all that is required of him by the laws of Colorado (Mills' Annual Statutes, Section 3,150) requiring that he shall record his claim in the office of the county recorder by a location certificate within that time.—Shepard vs. Murphy (Supreme Court of Colorado); 58 Pacific Reporter, 588.

DUTY ON CARBON IN STICKS OR RODS.—Sticks or rods of carbon, in lengths of 24 in., and not suitable for electric lighting until further manufactured, are dutiable at the rate of 35 per cent. ad valorem, under paragraph 97, tariff act of 1897, as articles composed of carbon not specially provided for. They are not dutiable under the provision in paragraph 98 for "carbons for electric lighting," at the rate of 90c. per hundred, either on the basis of the number of pieces as imported, or of the number of electric-light carbons of the usual lengths, that may be presumed to be intended to be made out of the sticks as imported.—In the protest of Knauth, Nachod & Kuhne against ruling of Collector of Customs at New York; United States Board of General Appraisers.

DUTY ON FERRIC OXIDE.—A dark-gray impalpable powder, having a metallic luster, described in the invoices as "dry ferrodor," and valued at 18s. per hundredweight, equal to \$88 United States currency per ton, and containing 64.43 per cent. metallic iron, equal to 92.04 per cent. ferric oxide, 8.46 per cent. insoluble residuum, is not dutiable at 40c. per ton under paragraph 520 or 614 of said act, or dutiable at 20 per cent. ad valorem under paragraph 183 of the act, not being in a crude state, but appears to fall properly under section 6 of the tariff act at a duty of 20 per cent. ad valorem.—In the protest of Wm. Somerville & Sons against ruling of the Collector of Customs at New York; United States Board of General Appraisers.

X-RAYS IN EXAMINATION OF COAL.

Prof. Henri Courot of the Ecole Centrale des Arts et Manufactures, Paris, has communicated to the Societe de l'Industrie Minerale, Saint Etienne, France, an interesting and instructive memoir on the "Use of the Roentgen Ray in Estimation of the Impurities in Coal," and its consequent valuation. The author states that in an analysis after incineration the ash determined is undoubtedly that belonging to the particular quantity taken for analysis, but that errors in sampling may occur which will render the conclusion arrived at of little value. Prof. Cariot thinks this difficulty will be obviated by means of a radiosopic examination and analysis through the aid of the Roentgen ray.

This method of analysis is based on the faculty the X rays have of traversing such hydrocarbons as wood and such an element as the diamond, while silicate of alumina (schists), or silica (sandstone) found in the coal measures as well as a pure quartz crystal, are opaque to them. It was deduced from these known results that the cathode rays would traverse the mineral fuels which were produced by the transformation of the wood cellulose during geological periods, while the silicious impurities would be opaque. This deduction proved to be correct, so Prof. Courot was able to perfect a highly interesting method.

the closed frame, when the impression will be formed through the shutter of the wooden frame. An exposure varies from 20 seconds to 5 minutes, according to the strength of the coil, the thickness of the specimen and the sensitiveness of the plate. With a coil giving a spark of 40 cm., with a piece of coal from 3 cm. to 4 cm. thick, the exposure need not be more than from 15 to 30 seconds.

When an examination is made it is sufficient to place between the core and the fluorescent screen the specimens, broken on their natural cleavage planes, in fragments varying from 2 cm. to 8 cm. thick. The screen is placed on a permanent wooden stand, so that the specimen may be observed through an aperture through the dark chamber, thus rendering it unnecessary to darken the room. It is, however, advisable to operate on specimens of a constant thickness varying from 2 cm. to four times that thickness. It is also advisable to so place the specimen that any rocky intercalations may be in the path of the rays when they will appear with distinctness.

When a radiometric analysis is made the sample should be reduced to a state of fine division after a radiograph has been taken. This precaution is exceptionally valuable if the sample is from a bore hole. The dust is then placed in a cubical box, not exceeding 4 cm. on its edge, made of wood not exceeding 3 mm. in thickness. The pencil of rays

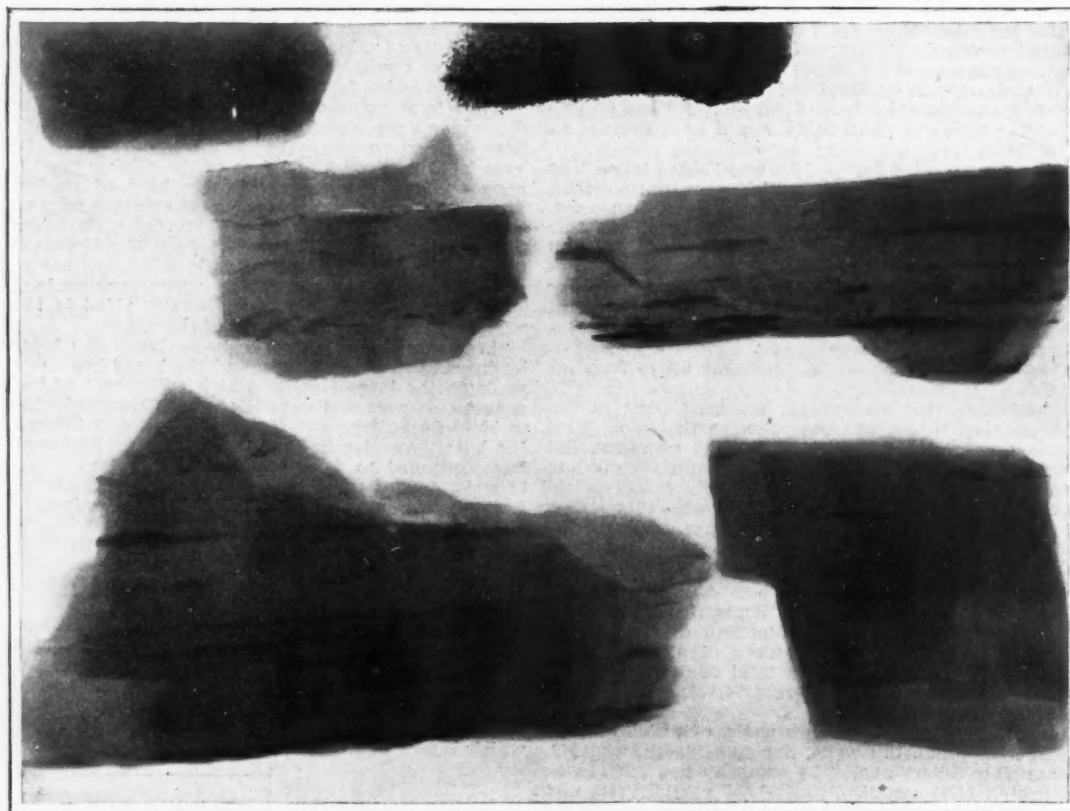
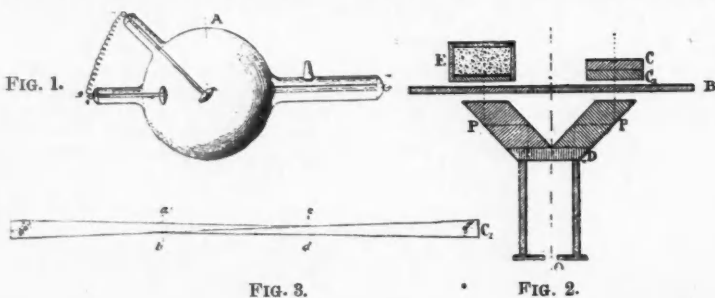


FIG. 4.—X-RAYS IN THE EXAMINATION OF COAL.

His apparatus is simple; it consists of a Ruhmkoff coil capable of sparking from 25 cm. to 35 cm., an independent interrupter with powerful coils being employed. Accumulators are made unnecessary by employing a reducer, which permits of utilizing, after transformation, the current of any electrical distribution that may be available. Villard anti-cathode tubes are preferably employed for the core, in which the rays furnished by a sphero-concave mirror as a cathode are concen-



trated on a plate of palladium or platinum, acting as the anti-cathode. A small lateral receptacle containing coal or caustic potash permits of varying the pressure of the residual gas in order to obtain a constant pressure in the tube. Lastly a fluorescent cardboard screen, coated with platino-cyanide of barium pulverized and incorporated in collodion with acetate of amyl, and carried vertically by a stand, or a dark chamber closed by a screen (held in the hand in that case) will complete the radiosopic apparatus.

Any plate may be employed to obtain a radiograph, the ortho-chromatic plates answering well. The plate is placed in a wooden frame with a sheet of lead on the side opposite to the sensitive film; then the frame is closed; the specimens under examination are placed on

traverses the box containing the sample, and at the same time passes through a system of two compensating prisms of aluminum for reproducing the "facies" furnished by the rays passing through the dust to be examined.

Fig. 1 of the accompanying illustrations indicates in plan the relative position of the apparatus described above, A showing the anticathode bulb. The pencil of rays falls upon the sample placed in the box, E—see Fig. 2; and C C₁ are the compensating prisms which permit, by their superposition, of passing increasing thicknesses of aluminum before the screen, B, situated behind them. On the other side of this screen there are two double glass prisms, P and P₁, with facets at 45°, attached to a common plate, D, the office of which is to bring back the images by double reflection to the axis of this system, in order to juxtapose the images furnished by the sample and by the compensating prisms, so as the better to permit comparison of them through the sight-hole, O. The compensating prisms, C C₁, present a single inclined face, the two others being at 90°, so that their superposition furnishes, between the vertical planes, a b and c d (Fig. 3), parallel faces procuring uniform shades comparable with that of the sample.

If the compensating prisms be given a length of 30 cm. and a width of 15 mm., and if the length be divided into half millimeters, 600 divisions will be obtained; and the thickness of 15 mm. will thus, in the longitudinal displacement of a millimeter, become increased by $15 \div 600$, i. e., one-fortieth of a millimeter. For attaining absolute black, corresponding with 60 mm. the observer may pass through $60 \times 40 = 2,400$ intermediate shades, which are reduced to 1,200 by the riding of the prisms one over the other. The successive thicknesses are obtained by placing under the compensating prisms as many as three flat rules of aluminum, the combination of which with the prisms permits of obtaining any thickness from zero to 60 mm.

It is not necessary to push the approximation further than $1 \div 1,200$ in estimating the purity of a sample, as so great a precision is not appreciated by the eye. Referring to Fig. 2, the screen, B, may be suppressed and replaced by two small pieces of fluorescent paper, stuck upon the faces of the prisms, P and P₁, on the same side. The double prisms,

P and P₁, need only have a side of 20 to 30 mm. (mean 1 in.); but the compensating prisms, C and C₁, must be of sufficient width to cover the base of prism P.

For preserving the usual notation of ash percentage it is sufficient to compile a table of these values with their corresponding radiometric measurements; or, if it be preferred, the corresponding figures may be inscribed on the face of the prism where the readings are taken.

The illustrations, Figs. 4 and 5, show radiographs of various coals and products. Commencing at the upper left-hand corner, Fig. 4, they are: English anthracite; coal broken in a fold; English anthracite; dry coal; French anthracite; Belgian anthracite. An eggette, Fig. 5, French gas coal; oven coke, showing protosulphide of iron, the result of reduction of pyrites by the carbon. As this method of analysis does not reveal the condition in which the carbon exists, and as it is impossible to determine the percentage of sulphur while approximating the amount of ash, it would seem to have greater scientific than technical value.

THE EASTERN CHINESE RAILROAD.—From reports just received at St. Petersburg it appears that an unusual amount of activity is being displayed in the work of constructing the Eastern Railway of China, which is the Pacific end of the Siberian Railroad. The length of the main line will be 960 miles, and that of the branch line running through

VEIN FORMATION AT BOULDER HOT SPRINGS, MONTANA.*

By Walter Harvey Weed.

The Boulder Hot Springs are situated in the heart of the Rocky Mountain Region of Western Montana, a few miles east of the Continental water shed, and occur on the southern slopes of the intermontane basin called the Boulder Valley. The waters issue from granite and are a few miles from Bull Mountain, a mass of andesite. The slopes are scantily grassed and around the springs area are dotted with pines. The granite rocks are well exposed, forming boulder masses rising above this mantle of disintegrated material, in part in situ, in part loose sand. The areas of decomposed rock, or glaring white sinter deposits, common about solfataric or hot spring areas, are wanting.

The hot waters issue from fissures, now filled and sealed up by the deposit, making veins; the only openings seen are those at the point of outflow. These fissures are not parallel but run in various directions, like the cracks of a twisted strained mass (torsional strain).

The waters are clear and tasteless, but have very faintly sulphurous odor. They form the entire water supply of a hotel, a prominent and successful health resort, where they are utilized for drinking, cooking, heating and bathing. The surplus is used for irrigation.

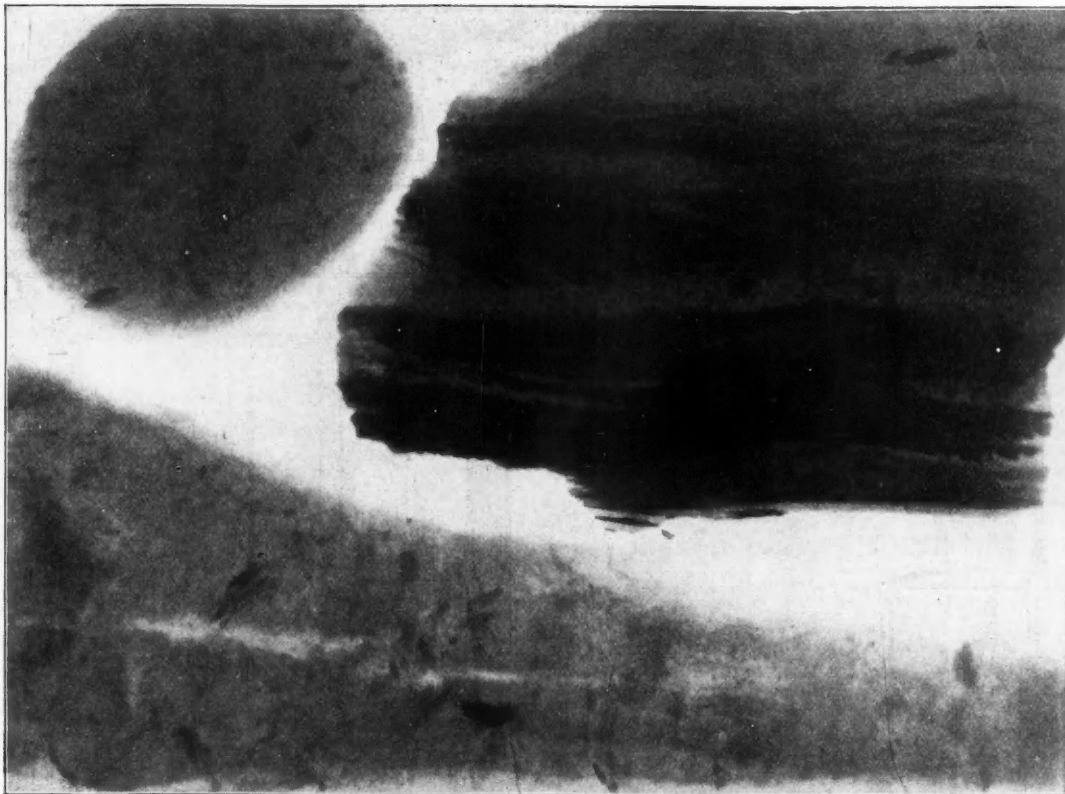


FIG. 5.—EXAMINATION OF COAL BY X-RAYS.

Southern Manchuria will be 654 miles. The Trans-Baikal frontier is crossed by the main line at the village of Nagadan. Thence its course is across a high-lying plateau for 200 miles, and it crosses the River Nanni at the town of Bukui, which lies in the interior of Manchuria. A bridge is being built across the River Sungari, at Charbin, and the work of construction is directed from this place. There are now about 475 miles of track laid, while 60 locomotives and over 8,000 men are at work on the line.

IRON ORE IN NOVA SCOTIA.—In a recent paper before the Nova Scotian Institute of Sciences, Mr. E. Gilpin, Jr., says: "The district lying between Little Bras d'Or and East Bay, in Cape Breton, is traversed diagonally by lower Silurian strata and by the felsitic and limestone divisions of the Pre-cambrian, which are flanked by lower Carboniferous strata. The presence of iron ore near the junction of the George's River limestone and lower Carboniferous has long been known near Gillies' Lake, and outcrops are known at Upper French Vale and near the mouth of the Barasois River, emptying into the Little Bras d'Or. At the latter place the Silurian slates are literally soaked in iron oxide, and at several points they present deposits which may, on further investigation, prove of economic value."

"To the southwest of the railway bridge at Barasois, on a line running toward Eskasonie, on East Bay, are several large outcrops of magnetite. As yet, little work has been done to test the value of these deposits. Should they prove to be free from titanitic acid, they should, judging from the following analysis, be available for the operations of the miner: Oxide of manganese and alumina, 0.60; lime, 0.11; magnesia, 0.10; sulphur, 0.05; phosphoric acid, 0.04; silica, 2.12; volatile, 0.84; metallic iron, 67.29.

"There is no known geological reason why Labrador, Newfoundland and Cape Breton should not contribute to the supply of iron ore. The existence of iron ore at many points of Cape Breton is already known. The attempts made to find deposits, and to test them, are scarcely worth noticing."

The natural outflows are, in two cases, walled about by masonry, and the water supply has been increased by tapping two of the veins, in open cut and tunnel. The waters are hot, the temperatures 100°-164°, carbonated, and carrying alkaline sulphates and carbonates. H₂S is present in traces.

The deposits, properly so called, form vein filling, there being no overflow or surface sinter. They consist of crystalline and amorphous quartz (chalcedonic and opaline silica), and of carbonate of lime with films of silica in cleavages and of zeolites. The latter are present in large amounts. The vein filling is banded, shows crystalline crusts, and coats included fragments of granite, making a true breccia vein filling. Where it contains calcite this is removed by weathering, and a cellular quartz like that of the De Lamar Mine results. The rock alongside of the fissures is sheathed and has been altered by the hot waters soaking into it along cracks. Metasomatic replacement has taken place. All the minerals, including quartz, are energetically attacked, sericitized, and replaced by silica in successive order. The waters are leaching the rock alongside of the fissures, removing silica, soda and lime. Where a tunnel is run through this altered rock, the hot waters dripping from the roof and sides deposit a pure white stalactic growth consisting of silica, sodium carbonate and sulphate, representing material removed from the granite by the waters. Some blood-red iron oxide is also deposited.

The fissures have been reopened since the formation of the vein by hot waters. Such reopening has resulted in a brecciation of the vein matter and its recementation by recently deposited silica, zeolites and calcite. These facts prove that movement has recently taken place and is probably still going on.

The vein filling all contains a small amount of silver, and the white calcite and silica deposit contains gold. The altered granite alongside contains both gold and silver. These metals are present in small

*Abstract of paper read before American Institute of Mining Engineers at Washington, February 23d, 1900.

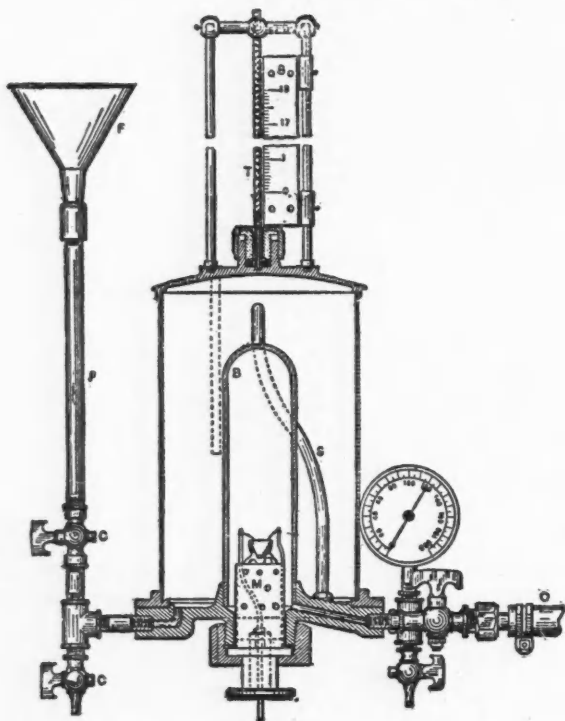
amounts, the highest being 0.05 oz. of gold per ton, with 0.4 oz. of silver per ton.

The complete analogy between the veins formed by these springs and the veins seen at Lump Gulch, Clancy, Wickes, Boulder Canyon, Basin and elsewhere throughout the granite area of Jefferson County, Montana, prove that the ore deposits of these places are the result of hot spring action, following the period of rhyolite intrusion.

AN APPARATUS FOR TESTING FUEL.

An oxygen calorimeter for testing fuel oil and combustibles has been recently devised by Mr. J. R. Chapman. The construction of Mr. Chapman's apparatus will be made clear from the accompanying illustration and the following description taken from the London "Iron and Coal Trades Review." A large vessel, A, water sealed at the bottom and connected with a pipe fitted with cocks, CC, and a funnel, F, by which it may be filled and emptied, is also connected with an open glass tube, T, extending vertically from the top some 20 in. or more, and paralleled by a graduated scale, S. Inside the vessel, A, is a closed retort, or bomb, B, into the bottom of which passes a metal plug, M, carrying on its top a little cauldron, or charcoal pot. The bomb is connected at its base with an inside source of supply, O, through which oxygen gas may pass into the bomb, expelling the air before it through tube S.

The apparatus works as follows: The plug, M, is removed, and one gramme of fuel oil, coal, or other combustible to be tested, is placed in the cauldron, and a platinum wire connected with an outside electric battery is immersed in the combustible. The plug is then screwed into position, the vessel, A, is filled with water to a point such that the water in tube, T, is approximately at O. The water is allowed to assume the temperature of the room as nearly as possible, as determined by a thermometer, oxygen is passed into the bomb until the pressure reaches a predetermined testing point, and when all the temperature conditions are stable and uniform, connection is made between the battery and the platinum fuse, the combustible is ignited, and combustion takes place with great rapidity in the oxygen atmosphere. The air in the bomb becoming heated, the walls of the bomb expand, forcing the liquid in A further up into the tube, T, and the maximum point reached by the



CHAPMAN'S FUEL TESTING APPARATUS.

water is noted on the scale. The initial point having been previously noted, the differences between these readings are compared with the readings found by the combustion of pure graphite, or chacoal, and the relative efficiencies of different fuels are thereby obtained. The whole apparatus is extremely simple, and should be quite accurate within desired limits, and the apparatus can be made in any machine shop without great difficulty.

WOLFRAMITE IN NOVA SCOTIA.—According to Mr. E. Gilpin, Jr., a discovery of this mineral was made last spring at North East Margaree, Inverness County. Full particulars of this deposit are not yet available. It is stated to occur in a vein, in places 3 ft. wide, and to be present in amounts permitting readily of concentration to a high percentage. The mineral is of dull gray color, in places almost black, and with a somewhat metallic luster. Its specific gravity is 7.1 to 7.5, and its hardness 5 to 5.5. It is sometimes feebly magnetic, and contains 67.47 per cent. WO. The price quoted for the mineral on this Continent is stated to be \$375 per ton of 65 per cent. ore. The demand at present is not large, and is met by an annual output of a few hundred tons. Its principal, if not its only commercial value, is as an alloy for steel. It is believed that, if a large and permanent supply of the mineral could be secured, it would be utilized for hardening armor plate and similar purposes.

THE AVINO MINE AND MILL, MEXICO.

The Avino Mine was purchased by C. B. Flynn three years ago from Ignacio de la Torre, whose family had been in possession of the property for 50 years. A company was organized in London as the Avino Mines of Mexico, Limited, and £100,000 working capital was paid in. The Avino Mine is one of the oldest producing properties in Mexico, dating back 350 years. It was continuously worked even during the revolutionary period of the Republic of Mexico, and many millions of dollars were extracted from it. Its immense ore body consists principally of lead and copper sulphides, carrying silver and gold values. The company has, during the past two years, opened up the virgin part of the mine, and developed a large tonnage of high grade copper ores. The following is a description of the new mill built for this company, from which, when running, it expects to ship 30 tons of high grade lead

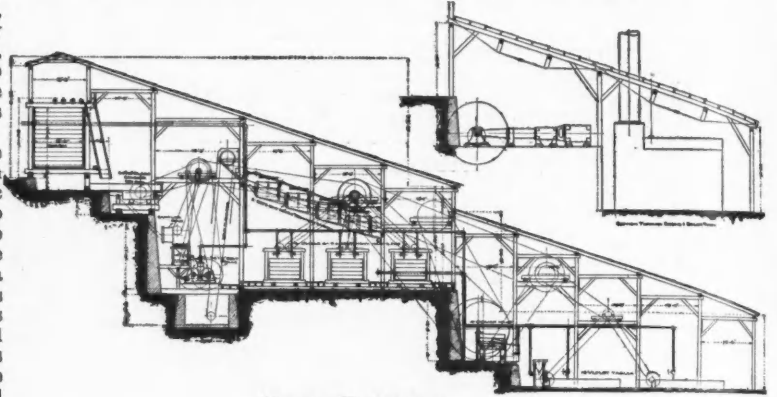


FIG. 1.—ELEVATION.

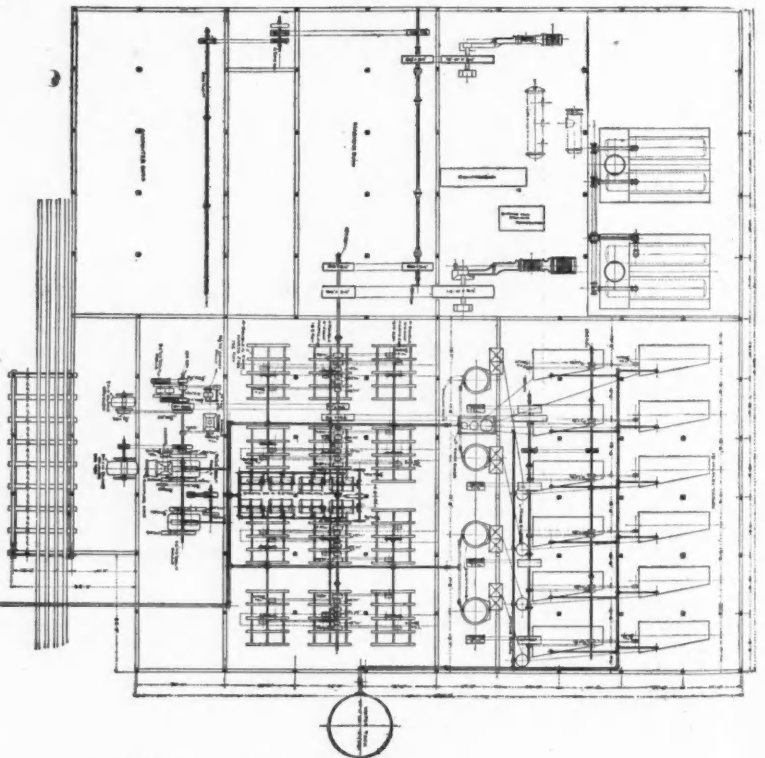


FIG. 2.—PLAN, AVINO MILL, MEXICO.

concentrates a day, besides shipping a large tonnage of high grade silicious ores direct to smelters in Mexico. The mine is 7 miles from the station of Gabriel. There is plenty of cheap labor. Every condition is favorable to economical extraction and reduction. Mr. A. A. Blow is consulting engineer, and Mr. C. B. Flynn managing director.

The concentrating mill is built on the hillside just below the mine tunnels in a most suitable situation; at present it has a capacity of 250 tons of ore per day of 24 hours, but power is provided for double the capacity and the arrangement of the whole plant is such that the mill can be increased to its ultimate capacity without interfering with the operation of the present mill. All the machinery for the mill was furnished by Fraser & Chalmers of Chicago, and the whole plant was designed by this firm under the supervision of Superintendent H. Claggett of Avino.

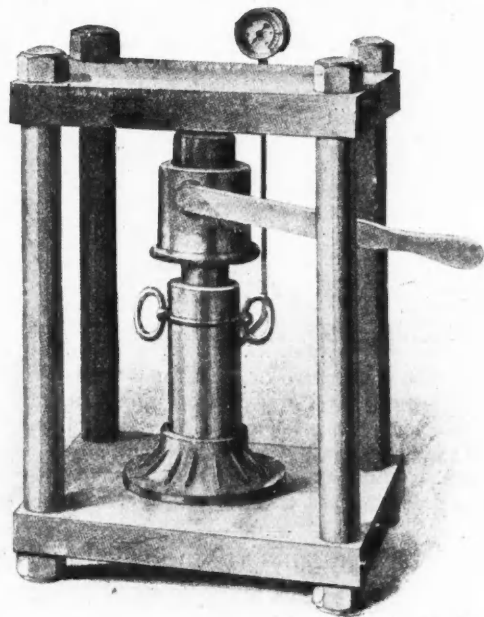
The ore is delivered from the mine to the mill on a double track; the cars are landed direct above the storage bins, and ore may be dumped either into these bins or direct to the mouth of the crusher. When the mill is at work regularly, the ore is delivered direct to the crusher, whence it passes through the mill by gravity, the process being entirely automatic. Storage bins are provided to hold sufficient ore to run the mill two days in case of interruption in the regular supply. These storage bins are constructed of 12 by 12 in. timbers well bound with iron and provided with a number of ore gates to deliver the ore to the

crusher. The distance from the mouth of the tunnel to the storage bins is only 200 ft.

The crusher is of the Blake type, with large surplus capacity. It breaks up the ore as it comes from the mine, and the broken material passes through a steel chute into a sample cone so arranged as to pass the bulk of the material to a roller feeder, while at the same time taking out a certain percentage and collecting it in a car to be transferred to the sampling mill located close to it. The roller feeder delivers the ore in a regular stream to the coarse rolls. This feeder is a very important part of the whole arrangement and on its proper working depends to a great extent the success of the concentrating process.

The coarse crushing rolls are 36 in. in diameter by 12 in. face. They are of the latest and strongest design and are provided with tires or working faces of the best forged steel. These rolls will crush the ore to about $\frac{3}{8}$ in. maximum size and under, and deliver it to a specially designed bucket elevator by which it is raised to a system of revolving screens, located about 25 ft. above the rolls. Here all material coarser than $5\frac{1}{2}$ mm. is separated and returned to a second set of rolls (the finishing rolls) which recrush it to the size finally required. These finishing rolls are exact duplicates of the coarse rolls and all parts are interchangeable. Both the coarse and fine rolls are provided with large band wheels and are driven by belts direct.

The sizing arrangements comprise two lines of revolving screens, each line having four trommels, built entirely of steel and covered with perforated steel plates. Each trommel separates a certain size of material, the one uppermost returning the very coarsest to the finishing rolls, while each of the remaining delivers a certain size to corresponding jigs. All trommels are provided with heavy steel collectors and the general arrangement is such that each line of screens can be run separate with half of the other machinery making a complete plant independent of the other half of the mill. Twelve double four compartment eccentric jigs are located on the jig floor directly below the screens, each screen supplying two jigs by means of wooden sluices lined with chilled iron. The jigs are of a large size and are provided



AN IMPROVED HYDRAULIC PRESS.

with adjustable eccentrics, automatic concentrating discharge gates and all the latest improvements. The boxes are built of 3 in. planks with frames of 6 by 8 in. and 6 by 6 in. timbers, all fitted with special care and secured by bolts and rods.

All material too fine for the jigs flows to a three compartment hydraulic classifier by which the superfluous water is taken out and the residual slimes are divided and directed to the slime concentrators. All middlings and tailings which may pay to be worked over are sluiced to four Chilean mills where they are recrushed, discharged to hydro-metric classifiers and delivered to the slime concentrators.

The concentrates which are collected from the jigs and slime concentrators are ready for the smelter. The tailings pass through a system of settling ponds from which the clear water is pumped back into a large tank located above the mill, to be used over again. The profile of the ground is very favorable for this purpose, giving sufficient elevation and a large space below the mill for settling tanks and for tailings deposits.

The steam engines, boilers, air compressors and electric light plant are located all under the same roof with the concentrating machinery and are all of the most economical type. The main engine is a Fraser & Chalmers tandem Corliss engine of 300 H. P., and the boiler plant consists of four Woods water-tube boilers of 200 H. P. each. These are set in two nests of 400 H. P. each, and are provided with feed pumps in duplicate and all fittings and safety appliances of the most approved design. The working pressure of steam is 125 lbs. per square inch. A surface condenser of 800 H. P. capacity is provided, also a tubular feed-water heater of the same capacity to receive the exhaust steam from all engines and pumps located in the power house. Circulating water is provided by the compound duplex pump which returns the water from the settling ponds, this pump being located in a well outside of the boiler room but receiving steam from the main plant. It serves as supply pump and circulating pump at the same time.

The air compressor is designed to run 5 drills. It is a two-stage compressor and has a full equipment of drills, tunnel columns, pipe lines and air hose.

The electric light plant has a capacity for running 300 lights of 16 C. P. each, which are distributed through the mill, mine, offices and town. About 20,000 ft. of wires are used in the system, which is most complete in every respect.

Adjoining the power house are the machine shop, blacksmith and carpenter shops, each having a very complete equipment of machinery and hand tools. A reserve engine of 150 H. P. is provided to run the workshops, electric light and half of the mill in case the main engine should be out of commission for any reason. This reserve engine is also a Fraser & Chalmers' tandem engine and can be run condensing or non-condensing as may be desired.

Outside of the mill in the same well with the supply pump is located a powerful fire pump connected to a complete system of pipes extending to all buildings and provided with a number of fire plugs. Stationary and portable hose reels with interchangeable hose sections are distributed all over the plant. This fire system is also connected with a large water tank placed on the hill high above the mill and supplying natural pressure for the fire system. A second very complete system of pipes, connected with a large water tank is provided to distribute water to rolls, screens, jigs and slime concentrators. As much water as possible is saved and returned from the settling ponds, so that only a fraction of the water necessary for the concentrator has to be fresh water to make up for evaporation and other losses.

The accompanying engravings show a plan and a sectional elevation of this mill.

AN IMPROVED HYDRAULIC PRESS.

The accompanying illustration, for which we are indebted to the "Scientific American" of New York, shows an arrangement devised by Mr. Alexander Roy, which may be found very useful. The mechanical engineer, and especially the mining engineer, is often in need of a hydraulic press for the purpose of testing materials, for making briquettes or for similar purposes. The engraving shows a very simple hydraulic press which can be made by any one who has a hydraulic jack. Two wrought-iron plates 12 in. square and 2 in. thick are bored to receive upright rods, one at each corner. These rods may be of any desired length up to 5 ft., and should be about 2 in. in diameter. The height should be regulated by the size of the jack, and the class of work which is to be accomplished with the aid of the press. By the use of blocks of wrought-iron or steel it is possible to regulate with great ease the distance through which the pressure is exerted. The hydraulic jack may be provided with a gauge which indicates pressures varying from 2,000 to 4,000 lbs. to the square inch. It would be possible to make the top and bottom plates of cast iron, provided they were reinforced by diagonal ribs.

MINERAL COLLECTORS' AND PROSPECTORS' COLUMN.

(We shall be pleased to receive specimens of ores and minerals, and to describe and classify them, as far as possible. We shall be pleased to receive descriptions of minerals and correspondence relating to them. Photographs of unusual specimens, crystals, nuggets and the like will be reproduced whenever possible. Specimens should be of moderate size and should be sent prepaid. We cannot undertake to return them. If analyses are wanted we will turn specimens over to a competent assayer, should our correspondent instruct us to do so and send the necessary money.—Editor E. & M. J.)

64.—W. C. W.—Quartz.—The colorless or slightly colored little crystals you send are quartz. They are determined by their hardness and crystalline form, mostly double six-sided pyramids. Their luster is higher than that of many varieties of quartz. Such crystals, when clear, and of larger size, are sold as "Brazil diamonds," Lake George diamonds, etc.

65.—Allanite.—At a recent meeting of the New York Mineralogical Club, Mr. H. Ries described the occurrence of this coally-looking mineral in pegmatite veins on the northwest side of the Yosemite Valley. The rock forming the walls of the Yosemite is a grano-diorite. Traversing this in many directions are veins of pegmatite, sometimes straight and unbroken, sometimes curved, branched, or even broken into. These veins are very prominent on the face of El Capitan, and in the rock forming Eagle Peak. It was in the talus at the foot of the latter that the allanite was found, and while the mineral was at times abundant in the pegmatite blocks, still none of it was noticed in the grano-diorite. In only one instance was a distinctly bounded individual found, and on this a combination of orthopinacoid and base were recognizable. The other specimens were irregularly bounded grains that varied from a sixteenth to a quarter of an inch in diameter. In addition to the quartz, muscovite and orthoclase present in the pegmatite, there were a number of radiating masses of epidote, which were evidently of primary origin; but in two instances the epidote occurred as a coating on hornblende and then seemed to be secondary. None was found in association with the allanite. It is interesting to find that allanite is evidently not the rare mineral that it was formerly considered to be, and that a careful watch is beginning to show its presence at many localities in the United States.

72. Native Copper.—There was recently found near Michigan City, Indiana, a boulder of native copper, the core of which was a mass of white calcite. The boulder was almost egg shaped and worn smooth on its surface, showing glacial action. Small boulders and nuggets of

native copper have been found distributed among the sands along the shore of Lake Michigan in Northern Indiana.

73. Celestite.—Put-in-Bay, Ohio, has been producing some choice specimens of celestite lately which several mineral dealers are marketing.

74. Anglesite.—Good anglesite specimens appear to be scarce at present. Australia has always produced the finest anglesite specimens, but of late but few have been received of much value by the American mineral dealers.

75. Native Gold.—Fine gold specimens, in which the gold appears in limestone, are being taken from the Blackhawk Mine in San Bernardino County, Cal.

76. —E. J. T.—Arkose.—The white and yellow rock you send is a sandstone with a kaolin-like cement. The quartz grains show on the weathered surface. The rock would probably be classified as an arkose. The yellow stains which are more marked in depth are apparently oxide of iron.

77. E. H.—Copper Sulphide.—The two specimens of copper ore you send are sulphides of somewhat uncertain composition. No. 1, the yellowish mineral, apparently contains both pyrite and chalcopryite; No. 2 is apparently a mixture of chalcopryite and chalcocite.

78. Rare Minerals for Sale.—A correspondent, H. W., writes us that he wishes to dispose of the following specimens: (1) A large specimen showing marshite, iodide of copper, deposited with crystals of cerussite on copper oxide; (2) A large specimen of iodyrite, iodide of silver on manganese oxide; (3) Iodide of copper with sphalerite on anglesite; (4) Stolzite, tungstate of lead on manganese ore; (5) Very pretty specimens of native antimony in calcite. We shall be pleased to furnish H. W.'s address to inquirers.

QUESTIONS AND ANSWERS.

(Queries should relate to matters within our special province, such as mining, metallurgy, chemistry, geology, etc.; preference will be given to topics which seem to be of interest to others besides the inquirer. We cannot give professional advice, which should be obtained from a consulting expert. Nor can we give advice about mining companies or mining stock. Brief replies to questions will be welcomed from correspondents. While names will not be published, all inquirers must send their names and addresses. Preference will, of course, always be given to questions submitted by subscribers.—Editor E. & M. J.)

Cost Per Horse-Power Year.—Are there any standard tables showing average cost per horse-power per year for steam engine power? I want to work out a comparison with water-power.—P. H. W.

Answer.—The most complete and carefully worked out table of the kind is one prepared by the late Dr. Charles E. Emery, which was compiled from experiment and thorough research. A summary of his results is given below, based on 500 net horse-power delivered for 10 hours a day, 308 days in the year. The power is supposed to be derived from a single engine working continuously at its normal capacity. The figures give the cost per horse-power per year with different engines:

Kind of engine.	Coal \$2 per ton.	Coal \$3 per ton.	Coal \$4 per ton.	Coal \$5 per ton.
Simple, high speed.....	\$29.81	\$36.17	\$42.54	\$48.90
Simple, low speed.....	28.46	34.20	39.94	45.67
Simple, low speed, condensing.....	22.82	26.77	30.73	34.69
Compound condensing, low speed.....	21.97	25.53	29.09	32.65
Triple-expansion condensing, low speed	22.35	25.32	28.28	31.25

These results would be exceeded in practice, since very few engines are worked steadily and uniformly at their full load. They would also be exceeded with smaller engines. You would have, for 50 to 100 horse-power, with variable loads, to allow costs from 50 to 75 per cent. in excess of the table. It is best to make a liberal allowance also, because engines are apt to be a little below their best condition.

You should extend your comparative figures to take in gas engines also. These engines have been run in practice, using producer gas, at an average consumption of 1 pound of coal per horse-power hour. This is far less than the best engines. Moreover, there is much less difference in economy between large and small motors with the gas engine than with the steam engine.

Molybdenum.—Can you give me any information in regard to the price of molybdenum or molybdenite, either in the crude or refined state. I am told that it is very valuable, quoted at \$120 per ounce. Is this a fact or not? I am desirous of knowing the true value, if possible, as I have an unlimited quantity here, one vein being 1 ft. wide, and another 8 ft. wide.—M. C. B.

Answer.—The statement of value which you have obtained is a very exaggerated one. Our latest quotations for metallic molybdenum are 20c. per gram in a fused states, or \$2.62 per kilogram in powder. The only

use at present is in making steel, and for that purpose the alloy generally used is ferro-molybdenum in the manufacture of which the molybdenite ore is generally used. The quotation given above is from the German makers. A recent quotation from American manufacturers gives a rate of \$1.45 per pound for molybdenum metal and \$1.05 for ferro-molybdenum carrying 50 per cent. molybdenum. The quantity required is at present very small, and the introduction of new supplies would hardly be profitable, unless some new uses could be found for the metal. The quantity produced in the United States in 1898 was 9,500 lbs. molybdenum, and 2,100 lbs. ferro-molybdenum; in 1899 the production was about the same.

See the "Engineering and Mining Journal," July 9th, August 13th, October 8th and November 5th, 1898; June 3d, 1899, and January 27th, 1900.

See also "The Mineral Industry," Volume VI., pages 485 and 486, and Volume VII., pages 514 and 517.

Wire for Power Transmission Lines.—Can you tell me what is the best material for wire for a line to transmit electric power a distance of about 11 miles? I presume strength, cost and conductive capacity must be taken into account.—D. C. W.

Answer.—Dr. Bell, in his "Electric Transmission of Power," pages 372-373, says: "At present the best grades of standard copper wire have a conductivity of fully 98 per cent. that of the chemically pure metal, and even this figure is frequently exceeded. On account of the comparatively low tensile strength of copper—ordinarily about 35,000 lbs. per square inch—efforts have been made to exploit various alloys of copper on the theory that their greater strength would more than counterbalance the lessened conductivity and increased cost, by enabling less frequent supports to be used. Aluminum bronze, silicon bronze and phosphor bronze have been tried, together with some other alloys of a similar nature. . . . Copper which is hard-drawn has a greater tensile strength than any so-called bronze of similar conductivity—from 60,000 to 70,000 lbs. per square inch—with a resistance less than 5 per cent. in excess of that of ordinary copper. The following table gives the conductivities and tensile strengths of some of the various materials used or proposed for live wires, pure copper being taken as the standard at 100 per cent. conductivity:

Material.	Conductivity.	Tensile Strength, lbs.
Commercial copper wire.....	98 to 99	35,000
Good hand-drawn copper.....	96 to 97	60,000 to 65,000
1. Silicon bronze.....	97	63,200
2. Silicon bronze.....	80	76,000
3. Silicon bronze.....	45	110,000
Phosphor bronze.....	26	101,000
Iron annealed wire.....	14	55,000
High carbon steel wire.....	10 to 12	120,000 to 130,000

"It is evident that where the best combinations of strength and conductivity is wanted, hard-drawn copper wire is unexcelled. For all ordinary line work good annealed copper wire is amply strong; it is, besides, easier to manipulate than wire of greater hardness. Occasionally, where it is desirable to use extra long spans, or excessive wind pressure is to be encountered, the hard-drawn wire is preferable."

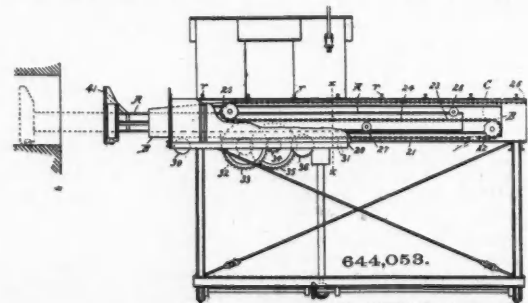
PATENTS RELATING TO MINING AND METALLURGY.

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 February 27th, 1900.

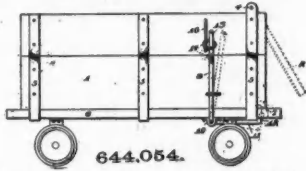
- 644,050. MANUFACTURE OF LEAD PEROXIDE AND ITS APPLICATION TO ELECTRICAL STORAGE BATTERIES. Hermann Beckmann, Witten, Germany. A process for producing lead peroxide as a coating for the electrodes of storage batteries, which consists in introducing metallic lead into a solution of free sulphurous acid as a positive electrode and subjecting it to the action of an electric current.
- 644,053. COKE PUSHER. Alexander E. Brown, Cleveland, Ohio. The combination of a frame or supporting structure, and a pusher bar or ram composed of sectional members, one of which members rests and is movable horizontally upon said frame or supporting structure, upon or against rollers or similar rotating supports or bearings provided for the purpose, and the other of which members rests upon the first named of said members, upon or against like rollers or rotating supports or bearings; sheaves or similar appliances, at the rear and forward portions respectively of said first-named member, and chains, or like devices, fastened to the rear portion of said second-named member, and, respectively, to the



ings provided for the purpose, and the other of which members rests upon the first named of said members, upon or against like rollers or rotating supports or bearings; sheaves or similar appliances, at the rear and forward portions respectively of said first-named member, and chains, or like devices, fastened to the rear portion of said second-named member, and, respectively, to the

rear and forward portions of said frame or structure, which chains, in one case, pass over said sheave or sheaves at said rear portion, and, in the other case, pass over said sheave or sheaves at said forward portion of said first-named member, together with suitable means for actuating said first-named member horizontally forward and back on said frame or supporting structure.

- 644,054. **FASTENING FOR END GATES FOR PIT CARS.** James H. Brown, Edward Bell and John Shaw, Youghiogheny, Pa. The combination with a car, of a rod or bar having its lower portion bent at an angle to the remaining portion, means for pivotally connecting the lower portion of the underneath face of the car, a pair of horizon-

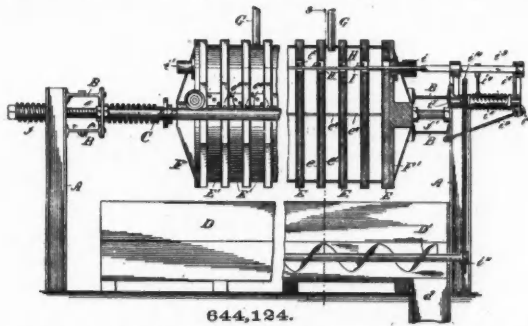


644,054.

tally-extending retaining arms formed integral with said lower portion, having the free ends thereof bent upwardly and adapted to extend through the bottom of the car for retaining the end gate in position, and means for securing said rod or bar in a locked position.

- 644,067. **ROTARY KILN.** Charles L. Carman, Chicago, Ill., assignor to the Gates Iron Works, same place. The combination of a rotatable tubular portion provided with one or more discharge openings in the periphery thereof, a swinging gate for each discharge opening arranged to open and close the same, a circular guide or track made in sections and separated so as to automatically open and close the gate at its discharge opening during the rotary movements of the kiln.

- 644,124. **FILTER PRESS.** William E. Bradley, Frankfort, Ky. The combination of a series of cells, filtering plates intermediate said cells,

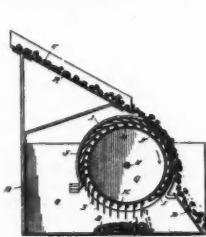


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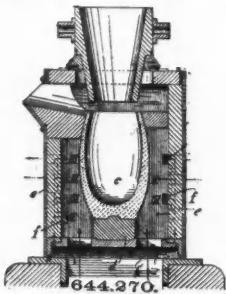
each of which is provided with an opening, and a plurality of supply pipes connected with said cells, said supply pipes having their discharge ends adjacent the openings in the filter plates of the cells to which they are connected.

- 644,162. **METALLURGICAL FURNACE.** John A. Drake, Ovenden, England. In a regenerative furnace, the combination, with an outer casing, and a series of longitudinal heating flues arranged one above the other and forming a tortuous passage for the products of combustion; of a series of transverse imperforate walls supporting the flues and forming a series of cold-air passages having no communication with each other, tiles arranged in the said passages so that the cold air is conducted around each heating flue, and a series of longitudinal air-inlet passages arranged under the said flues, each cold-air passage being provided with a separate inlet passage so that the air passing through each can be regulated separately.

- 644,177. **COAL AND SLATE SEPARATOR.** Martin J. Kerrigan, Stockton, Pa., assignor of one-half to Charles McDonald, Wilkesbarre, Pa. The combination of a rotative cylinder provided with parallel longitudinal pivoted blades, means for holding the blades in back-



644,177.



644,270.

ward tangential positions during part of each revolution, and a chute for dropping crushed coal and slate upon the edges of the blades, the blades forming the pockets adapted to receive the slate and carry the same past the point of discharge for the coal.

- 644,180 and 644,181. **APPARATUS FOR SEPARATING METAL FROM ROCK.** Charles H. Lane, Cleveland, Ohio. The combination of a series of crushing-rolls adapted to act successively upon the material to reduce it to a pulverized condition, a drier, mechanism for automatically conveying the crushed product of said rolls and delivering it into said heater, with an inclined air-separator tube.

- 644,190. **HOISTING-MACHINE.** John B. Simpson, Zincite, Mo., assignor of one-fourth to Willis T. Howerton, same place. The combination with a continuously revoluble drum shaft, of a drum loosely mounted upon said shaft and having opposite clutch members, driving gears fitted upon the shaft at opposite ends of the drum.

- 644,250. **COMPOSITION FOR WATERPROOFING.** William C. Kipling and Edward Arnold, Sudbury, England; said Kipling assignor to George Lancelot Andrews, same place. A wash for rendering material waterproof, containing tannate of alumina.

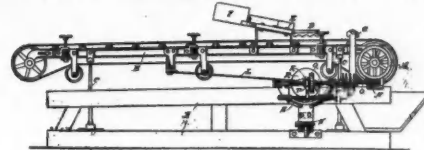
- 644,259. **RECEPTACLE FOR HOLDING AND STORING LIQUID AIR OR OTHER LIQUID GASES.** Oscar P. Ostergren, New York, N. Y. The combination of an interior vessel for holding the liquid, after an exterior porous casing surrounding same, a space being arranged between the interior vessel and the porous casing, and an orifice in the interior of the vessel opening into said space, the exterior of the said porous casing being exposed to the atmosphere.

- 644,270. **CRUCIBLE FURNACE.** Rudolph Baumann, Oerlikon, Switzerland. In combination in a crucible-furnace having a shaft rectangular in cross section, the grating at the lower part of the shaft, the cruci-

ble and the air passages in the corners of the shaft with horizontal tuyeres extending from the several corners in different directions.

- 644,280. **VALVE MECHANISM FOR GAS GENERATORS.** John Coyne, Pittsburg, Pa. The combination of two chambers having their lower ends connected to an air supply, a valve mechanism controlling the flow of air to the chambers, passages connecting the upper end of each chamber to the lower end of the other chamber, a valve mechanism controlling the flow of gas through said passages, pipes connecting the upper end of each chamber to a gas reservoir or conduit, a valve mechanism controlling the flow of gas to the reservoir or conduit and mechanism for operating said valve mechanisms simultaneously.

- 644,289. **CONCENTRATOR.** George Gates, Jackson, Colo. The combination with a belt and feeding devices, of a trough interposed between the same and constructed with connected channels from which the pulp successively overflows from one channel to the other, said channels provided with bottom discharges whereby the pulp is



644,289.

delivered directly upon the belt, at different points in the length thereof, depending on its gravity, said feeding devices connecting with the initial channel of the series.

- 644,294. **MACHINE FOR BENDING, FORGING, WELDING AND SHAPING METAL.** Martin Kennedy, Chicago, Ill. The combination with a bed plate and a reciprocating tool-carrying hammer operated by fluid under pressure, of a pair of die-blocks and a vertical flange on the bed plate at one side of die-blocks.

- 644,341. **OIL-WELL APPARATUS.** Joseph Tichborne, Glade Mills, Pa. The combination of a bull-wheel shaft, bull-wheels rigidly secured to said bull-wheel shaft, a power-driven bull-sheave connected by a bull-rope to one of said bull-wheels for driving said bull-wheel shaft, an auxiliary wheel loosely mounted on said bull-wheel shaft adapted to engage with said bull-rope with the rigid and loose bull-wheels.

- 644,369. **REGENERATIVE COKE OVEN.** Frederick W. C. Schiewind, Everett, Mass., assignor to the United Coke and Gas Company, Philadelphia, Pa., and Charleston, W. Va. In combination with a bank of coke ovens having regenerators for preheating the air and to support combustion by the waste heat of the furnaces used for heating the ovens, air supply conduits leading to each regenerator, a system of cooling-flues situated in the masonry beneath the ovens and furnaces, and means whereby the air is drawn through the cooling-flues into the supply-conduit.

- 644,367. **COMPOSITION OF MATERIAL FOR LINING VESSELS USED FOR STORING OR BOILING CORROSIVE LIQUIDS.** Romedius Panzl, Merrittton, Canada. A composition of matter for acid-proof lining of boilers, tanks and similar vessels, composed of hydraulic cement, chamotte, some silicious material, water and silicate of soda.

- 644,403. **EXPLOSIVE.** Emil Callenberg, Haltern, Germany, assignor to Alexander Johnston Brown, Matlock, England. An explosive composed of turpentine-oil, collodion cotton and nitroglycerin in the proportions substantially as described, the same heated to form a jelly and mixed with nitrate of potash, Epsom salts and soda.

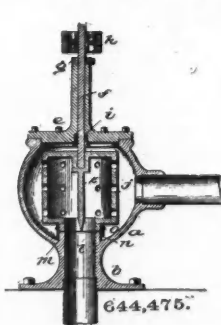
- 644,424. **FURNACE FOR DESULPHURIZING ORES.** Henry Guyer, Casapalca, Peru. An ore-desulphurizing furnace, provided with a hopper-shaped firebox consisting of a channel-iron bottom having a central opening, grate-bars set in the said channel-iron bottom and extending upwardly and outwardly, longitudinal binding bars and transverse anchor-rails for the upper ends of the said grate-bars, and a sheet-metal covering for the said firebox and having openings and flueboxes.

- 644,457. **DREDGER.** William B. Fless, San Francisco, Cal., assignor of one-half to P. F. Dundon, same place. In a dredge, a hull, a swinging boom, a suspended bucket, a counterbalance, a winding-drum, a chain or cable connecting the bucket and counterbalance, means for operating and reversing said drum, and a second chain or cable connecting said bucket and counterbalance, and having the same point of connection with the bucket as the first chain or cable.

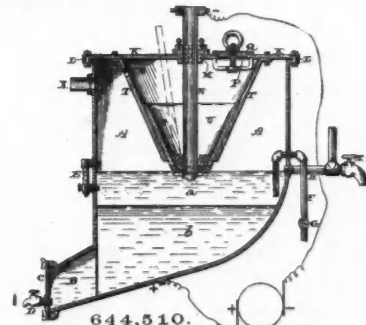
- 644,475. **CENTRIFUGAL PUMP.** William S. Sharpneck, Chicago, Ill., assignor of one-half to John D. Ross and Everett W. Brooks, same place. The combination of vertical casing, provided with an outlet base having a central opening, and a neck with a revolving perforated cylinder, having a neck and a partition extending into the neck.

- 644,490. **DUMPING-CAR.** John T. Argo, Poindexter, Ky., assignor of two-thirds to John Wigglesworth and Fred McCarty, same place. A dumping-car, comprising a wheeled truck or support adapted to serve as a platform-car, a body-platform detachably and rotatably mounted upon said truck, and tilting boxes pivoted at their bases to the opposite ends thereof and having handles at their outer ends whereby they may be tilted and the body-platform rotated.

- 644,510. **PROCESS OF ELECTRICAL REDUCTION.** Ellis F. Frost, Washington, D. C., assignor of one-half to Frederick A. Lehmann, same



644,475.



644,510.

place. The process of treating chemicals or non-conducting ores which consists in forming an electric arc between an electrode and an aqueous electrolyte, and mechanically passing said chemicals or ores into said arc.

- 644,521. **ROTARY DREDGING AND EXCAVATING MACHINE.** Dennis Jordan, San Francisco, Cal. The dredging-wheel having cutting and excavating devices on its periphery projecting forwardly at an angle in the direction of the rotation, and water-elevating devices of less projection than the excavating devices between the said excavating devices.

PERSONAL.

Mr. E. Robbing, of Denver, Colo., has been appointed manager of the Red Wing Mine at Bingham, Utah.

Mr. Jacobson, of Jacobson & Company, ore buyers of New York, spent last week in Leadville, Colo., looking over the zinc market there.

Mr. L. A. Gross, superintendent Centennial Mine, Drytown, Cal., has been visiting mining property in which he and associates are interested at Ewen, Ore.

Mr. Ernest R. Woakes, mining engineer of London, has sailed for Canada on his way to Nelson, B. C., which he will make his headquarters for the next few months.

Mr. Frank A. Rich, a graduate of the College of Mining of the University of California, has been named for the position of Professor of Mining at the University of Tasmania.

Mr. James A. Yerington, Nevada Commissioner at the Paris Exposition, has been appointed on the National Board of Awards in the Department of Mines and Metallurgy at that exposition.

Mr. H. J. Reiling, of Chicago, who is well known in connection with dredging work in Montana and elsewhere in the West, passed through New York this week on his way from Europe to Chicago.

Mr. A. L. Waters, who has been acting for several months as advisory metallurgist for the Val Verde Copper Company, is to act as metallurgist for the Whipsaw Copper Mining Company of Briggs, Ariz.

President W. C. Ralston, of the California Miners' Association, has appointed as delegates to the International Mining Congress at Milwaukee, Wis., Lieut.-Gov. J. H. Neff, W. S. Keyes, J. W. C. Maxwell and J. F. Halloran.

Mr. J. C. Wigginton, for years auditor at the Bimetallic Smelter at Leadville, has resigned to accept the position of general auditor of the Woods Investment Company at Cripple Creek. Mr. Chas. Hussy succeeds Mr. Wigginton as auditor.

Mr. B. F. Horn, lately of Antofogasta, Chile, is at present in New York City. Mr. Horn, who is an old Leadville man, plans to visit the Lake Superior copper mines, the Joplin zinc district and some of the Rocky Mountain camps during the next few months.

Mr. William Whyte, Mr. J. W. Troup, Mr. R. Maypole and several other prominent officials of the Canadian Pacific Railway Company, have been making a general inspection of the main line and spurs of the Canadian Pacific Railway in the Boundary District of British Columbia.

Mr. William S. McGowan, Jr., has resigned as treasurer of the Hancock Inspirator Company, of Boston, Mass., to become treasurer and general manager of the Portland Iron and Steel Company, of Portland, Me., a new company composed of a number of New England manufacturers and capitalists.

Mr. R. D. Gottlieb, of the engineering department of the Carnegie Steel Company, of Pittsburgh, Pa., recently resigned his position to become superintendent of construction of the Japanese Imperial Palace at Tokio. Mr. Gottlieb has already left for Japan and will be absent 3 years.

Among some of the prominent mining experts now in Butte, Mont., waiting for the opening of the suit brought by the Anaconda Mining Company against the Colusa-Parrot Company are: Prof. Rossiter W. Raymond; Prof. N. S. Shaler, of Harvard; Clarence King; D. W. Brunton, of Utah and Colorado, and Edwin Chase, of Colorado. For the defense W. S. Keyes, of California; O. A. Palmer, of Salt Lake, and James McFarlane are on hand.

OBITUARY.

James Martin, who died several months ago in South Australia, was born in the village of Foundry, Cornwall, Eng., in 1821. He went to South Australia in 1847 and settled at Gawler as a wheelwright. In time he became the foremost manufacturer of machinery in Australia. He began at Gawler with 1 man and at his death the works of Martin & Company covered 18 acres and gave employment to 700 men. He was a member of the English Institute of Mechanical Engineers and had wide reputation as an engineer and manufacturer.

Frederick M. Watson, the American mining engineer whose death at Cannes, France, we noted recently, was a native of Pennsylvania, where he was born only 34 years ago, and for so young a man he had a career of exceptional brilliance and success. He studied at the School of Mines, Columbia University, and after graduating there in 1885 filled various responsible

positions in Mexico, Peru and elsewhere in North and South America. In December, 1894, he went to South Africa at the instance, we believe, of Mr. John Hays Hammond, and in 1896 became general manager of the Simmer & Jack Proprietary Mines, the largest mining venture on the Witwatersrand gold-fields. This position he occupied until April, 1899, and under his management the Simmer & Jack became not only the largest individual producer of all the mines in South Africa, but began to earn substantial profits and to pay large dividends. The importance of Mr. Watson's work on this huge concern may be estimated when we state that he had under his control about 4,000 native workmen and 500 whites, and that the average output of bullion was over 20,000 oz. per month. It was during this period that Mr. Watson suffered from a very severe attack of typhoid fever from which his constitution seems never to have entirely recovered, and after he left the Simmer in April, 1899, and became one of the joint managers of the Consolidated Gold-Fields of South Africa his health again broke down. In the autumn of last year he left Africa in consequence of the outbreak of war, but he was already suffering from consumption and the disease made such rapid strides that his case was speedily seen to be hopeless, and he was sent to the south of France only to die. Mr. Watson was not only an exceptionally capable miner and engineer, but a kindly and genial man, who had a host of friends. He was one of the most popular men in Johannesburg, and his death is deplored by all who came in contact with him.

SOCIETIES AND TECHNICAL SCHOOLS.

Civil Engineers' Society of St. Paul.—At the regular meeting of the society on March 5th, 7 members and 10 visitors were present. Mr. Arthur Lipschutz read a paper on "Acetylene for Railway Station and Train Lighting," and Mr. Max Toltz cited some facts as to train lighting in general. Mr. C. Webster Raynor was elected to membership.

Engineers' Club of Cincinnati.—At the last meeting of the club, Mr. Wm. C. Green read a paper on "Steam Heating at and Below the Pressure of the Atmosphere," being a treatment of the subject in general and an exposition of the system of installation as practised by the Warren & Webster Company, of which Mr. Green is manager.

Stevens Institute.—A party of 25 students, under Professors J. E. Denton and A. F. Gautz, have been inspecting various Pennsylvania mills and manufacturing plants. One day was spent at the Pittsburg works of the Westinghouse Electric and Manufacturing Company; another at the Carnegie Steel Company's plants and the Montrose pumping station, and another at Altoona, where the Pennsylvania Railroad Company's shops were inspected. The remainder of the week was spent in and about Philadelphia.

Engineers' Club of Philadelphia.—At the meeting on March 3d, 75 members and visitors were present. Mr. William S. Vaux, Jr., presented the paper of the evening upon "The Canadian-Pacific Railway from Laggan to Revelstoke, B. C." He described the engineering features of that portion of the railway, and illustrated his remarks by a large collection of photographic views. He devoted special attention to an explanation of the snow-sheds and the structures built for deflecting avalanches to protect the tracks, and of the methods of filling-in and bridging the valleys. The subject was discussed by Messrs. L. Y. Schermerhorn, Walter L. Webb, James Christie and Edgar Marburg.

Dr. Henry Leffmann exhibited the section of a tree trunk, which he had described at the preceding meeting, on the bark of which the surveyor's initials could be discerned, while on the inner surface they were very plainly shown by the dark corky material which had filled up the original wound in the white wood.

American Chemical Society—New York Section.—At the meeting on March 9th, about 100 members and visitors were present. Messrs. G. W. Whipple and D. T. Jackson exhibited a map of Long Island, showing the amount of chlorine normal to the well waters in all parts of the island. Those waters not subject to the influence of the sea contain from 3 to 6 parts of chlorine per million. Those near the coast line run as high as 30 parts per million. Surface waters were not included in these figures on account of the limited number of surface supplies.

Prof. Raoul Pictet addressed the meeting in French, describing a method of using liquefied air to effect the "separation of oxygen, nitrogen and carbonic acid from the atmosphere at extraordinarily little cost" for industrial purposes. He explained that the method depends on the sharp separation of the gases which results when liquefied air is allowed to boil slowly, the nitrogen coming off first in a condition of considerable purity. An experimental outfit was illustrated, and liquefied air was shown by the 5-

gal. pailful process. A complete description of the process will soon appear.

The members and their friends participated informally in low temperature experiments.

INDUSTRIAL NOTES

The Berlin Iron Bridge Company, of East Berlin, Conn., opened an office in the Stephen Girard Building, Philadelphia, Pa., March 15th. The office will be in charge of Mr. L. H. Brumbaugh.

The Navy Department has placed an order with the New York Air Compressor Company, of New York City, for 2 duplex compound air compressors of large capacity for the Charlestown Navy Yard, Boston, Mass.

A dispatch from Cincinnati, O., says that the plants of the Columbus Sewer Pipe Company have been transferred to the American Clay Manufacturing Company. The consideration in the deed is \$55,000. A mortgage for \$2,500,000 has also been filed by the American Clay Company for record in Franklin County.

The Aetna-Standard Mill, which was purchased late in 1899 by the National Steel Company, has been transferred for \$5,000,000 to the American Steel Sheet Company, an increase of price over the original sum of over \$2,000,000. It is generally understood that John A. Topping, president of the Aetna-Standard, will act in the same official capacity for the new concern.

The Wabash Portland Cement Company has been organized at Stroh, Ind., with a capital of \$600,000. A factory with a capacity of 600 bbls. daily is to be built. The officers of the company are: President, A. L. Stephens; vice-president, James H. McMillan; secretary, Bethune Duffield; treasurer, M. G. Borgman, all of Detroit, with Emil Stroh of Helmer, Ind., as manager.

The National Wire Corporation has been organized at New Haven, Conn., it is stated, with a capital stock of \$1,000,000, divided into 40,000 shares. The stock is divided among Edwin W. Cates, Newton Mass., 39,907 shares, and Everett B. Webster, Beverly, Mass.; W. E. Hitchcock, New Haven, and William S. Pardee, attorney, New Haven, each one share. Mr. Hitchcock is secretary.

Oakleigh Thorne, President of the American Brick Company, has announced that this company will soon go out of business. The company was organized with a capitalization of \$15,000,000 about a year ago, and planned to control the output of brick in and about New York City. The scheme failed when several large individual owners of brickyards declined to come into the company. The company has never done any business.

At the annual meeting of the Tennessee Coal and Iron Company, the places of John G. Moore, deceased, Walter S. Gurnee, Jr., who is in Europe, and Augustine T. Smythe, of Charleston, S. C., retired, were filled by Col. Henry S. Manning, B. Y. Frost and Frank Witherbee. Among the resolutions adopted were those providing for the increase of the common stock by \$3,000,000 to retire the preferred stock and to pay for new properties.

A Cleveland, O., dispatch states that the Wellman-Seaver Engineering Company, of that city, has closed a contract with the Nickel Steel Company, of Hamilton, Ont., to design and build the largest steel and iron plant in Canada. The total capacity of the plant will be 2,400 tons per day. In addition to the steel plant there will also be constructed a blooming mill of the largest size, a billet mill, rail mill and two plate mills. The entire plant will cost nearly \$30,000,000.

The Empire Iron and Steel Company has practically concluded negotiations for the sale of its rolling mill at Oxford, N. J., which was purchased along with the Oxford furnace. The purchasers are Janson Brothers, owners of a large iron plant at Columbia, Pa. The transfer includes all the buildings and mill included in the rolling mill district, which cover about six acres. The plant has been lying idle for nearly 4 years, but when in running condition will employ from 200 to 300 hands, and will manufacture bar iron.

The Fred. M. Prescott Steam Pump Company of Milwaukee, Wis., is installing at the Penobscot iron mine at Hibburg, Minn., a 29 by 35 by 36 cross compound Corliss crank and fly wheel pumping engine. The station will be located about 200 ft. below the surface and steam will be supplied by 3 Wickes water tube boilers of an aggregate of 750 H. P. When completed the pumping plant will have a normal capacity of 5,000 gals. a minute. The new plant is to replace 6 compound direct acting duplex Prescott pumps. The pumping capacity of the new plant is the same as that of the old and the advantage of the new is found in the economy with which it can be operated. The new plant will handle the same amount of water for 50% less expense.

The Standard Chain Company, capitalized at \$3,000,000, and in addition having an authorized

bond issue of \$700,000, of which about \$600,000, it is understood, will be issued at present, is about organized. The properties to be taken over are the Garland Chain Company, Rankin Station, Pa.; Nes. Chain Manufacturing Company, York; J. C. Schmidt & Company, York; Fall City Chain Works, Jeffersonville, Ind.; Franz Krein Chain Company, St. Marys, O.; Franz Krein Manufacturing Company, Marion, O.; The Lebanon Chain Works Company, Lebanon; Baker Chain and Wagon Iron Manufacturing Company, Allegheny; P. Hayden Saddlery Hardware Company, including rolling mill, Columbus, O.; Bower & Mallory Company, Carlisle.

The combination represents 70% of machine-made chains produced in the United States. The main offices will be in Pittsburgh, Pa. The following officers have been elected: J. C. Schmidt, president; A. S. White, vice-president; J. T. Davis, general manager; Robert Rigney, treasurer; Robert Garland, secretary. Directors: A. S. White, C. R. Flint, H. W. Oliver, J. C. Schmidt, Chas. L. Nes, J. P. Davis, C. H. Hayden, Peter Wertz, F. F. Culver, Franz Krein, Eli Attwood, Robert Garland and O. L. Gubelman.

TRADE CATALOGUES.

The Superior gasoline motor, which is especially intended for launches and small pleasure craft, is illustrated in an 18-page catalogue published by the Lake Shore Engine Works of Marquette, Mich.

"Modern Methods of Handling Merchandise" is an illustrated 12-page pamphlet which shows how manual labor may be saved in mills and warehouses by the use of elevators and conveyors manufactured by the Link-Belt Manufacturing Company of Chicago, Ill.

The Stattler-Bischoff Company, of Chicago, Ill., issues an 8-page pamphlet describing its patent tubing. The firm manufactures both joint and double seam tubing, the latter being recommended for mining and irrigation purposes; also clinched pipe, structural tubing and cement lined steel pipe for underground conduits.

The Goheen Manufacturing Company, of Canton, O., publishes a 24-page pamphlet on the "Preservation of Wood, Steel and Galvanized Surfaces." The pamphlet gives useful information about the composition and uses of ordinary paints and pigments, and sets forth incidentally the merits of the Goheen Company's carbonizing compound.

"Modern Pumping Machinery" is the title of a little pamphlet issued by the Deming Pump Company, of Salem, O. The triplex power pumps described are for operation by steam, gas, gasoline or oil engines, and electric motors. They are intended for a great variety of purposes and show a wide range in types. The general service electric triplex pump is recommended as a very handy type for many kinds of mine work, while the triplex gasoline pumping engine is stated to require little attendance and to have a low working cost.

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 of any kind, and shall be pleased to furnish them information, catalogues, etc.

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, and have no pecuniary interest in buying and selling goods of any kind.

GENERAL MINING NEWS.

February Pipe Line Returns.—The total pipe line returns of the Pennsylvania and Trenton rock oil fields per day averaged 134,474 bbls. in February, and the shipments 145,856 bbls.; the January figures were: Runs, 137,963 bbls.; shipments, 139,156 bbls. The net stocks are now 23,543,948 bbls., compared with 23,709,746 bbls. on December 31st.

Oil Exports.—In February the United States exported 9,471,193 gals. crude oil, 2,549,670 gals. naphthas, 45,151,618 gals. illuminating, 6,476,409 gals. lubricating and paraffin, 642,516 gals. residuum; total, 64,291,406 gals., against 51,759,280 gals. in February, 1899, showing an increase of 12,532,126 gals., or 19%. This increase was credited principally to crude illuminating oil.

Oil Production in February.—There were fewer wells completed in the Pennsylvania and Lima oil fields, says the Oil City Derrick, than in any month since February, 1899. In the upper and older sections of the field, little really desirable territory remains to be drilled. Most of it has been drilled over 3 and 4 times. The prospects for the discovery of future Elk Fork and Scio pools, to say nothing of Sistersville and McDonalds, appear exceeding dim. Wolf Summit

in Harrison County and the Camden development in Lewis County, W. Va., are the only sections that present any possibilities. The future of the petroleum industry appears to lie in the deep sand territory of West Virginia and the Berea grit sections of Eastern Ohio. The great petroleum reservoirs of Pennsylvania and New York have given up the greater portion of their supplies, and neither is very likely to furnish another new pool of any magnitude.

There were 918 wells completed in February, 145 were dug and the new production amounted to 13,050 bbls. for the last day of the month. This is a decline from the January record of 127 wells completed, 1,738 bbls. new production and 37 dry holes. The count at the close of February showed a total of 655 rigs and 1,081 wells drilling under way, which was a decrease of 16 rigs and a gain of 60 wells drilling, making a net increase of 44 in active operations over the report of the preceding month.

ARIZONA.

Yavapai County.

Black Hills Copper Company.—Two miles east of Jerome this company of Los Angeles capitalists has 15 men at work. An incline of 160 ft. has been run and a vertical shaft 90 ft. deep has been sunk. Thos. H. Brown is in charge.

Jerome Electric Power Company.—This company, capitalized at \$400,000, purposes to take water out of Oak Creek, to flume it to the edge of a bluff 260 ft. high, and then manufacture and transmit electric power to whoever wants it. Among the incorporators are H. J. Allen, of the United Verde Co., D. J. Shea, J. F. Mullin and E. J. Parkinson.

Jerome Mining and Smelting Company.—This company, in the Black Hills district, 8 miles southeast of Jerome, is sinking a shaft. A steam hoist has been ordered. The property is in charge of Doane Merrill.

Verde Queen Copper Mining Company.—New York parties are interested in this company, which controls 24 claims, some of which lie almost within Jerome, and others, under the hill below the town. Some of the claims were located in 1896, and the remainder in 1899. They were originally staked many years ago, but never recorded. From the Columbia a car-load shipped to the El Paso smelter gave returns of 26% copper. The company is capitalized at \$1,000,000, with Col. D. P. Bosworth at the head. A smelter is to be brought in and put up within 3 months. It will be connected with the mines by a tramway. Forty men are employed.

CALIFORNIA.

Amador County.

(From Our Special Correspondent.)

Central Eureka.—A contract for a 10-stamp mill to be erected at this mine, $\frac{1}{4}$ mile south from Sutter Creek, has been let. Although a steam plant will be put in, the power will be obtained from the Standard Electrical Company as soon as their new plant has been completed.

Kirkwood Gold Mining Company.—This company has been incorporated with a capital stock of \$150,000. The directors are J. E. Dye, A. M. Gall, S. G. Spagnoli, G. A. Kirkwood and D. Boro. The mine is on the Kirkwood Ranch south of and adjoining the Peerless Mine.

Nevada County.

The Grass Valley Miners' Union has elected the following officers for the ensuing year: Martin Wallace, president; William Brockingham, vice-president; M. M. Mitchell, financial secretary; Richard Guyas, recording secretary; W. H. Bawden, treasurer; Edwin Jewell, conductor; Oscar Pattison, warden; Richard White, inside guard; J. J. Ryan, William Scandling and J. T. Leatham, Finance Committee; Seth Allen, Simon Crase and Thomas Hogan, trustees.

White Swan Mines Company.—This company has been incorporated by Letson Balliet, James E. Henry, of Truckee; R. A. Coleman, of San Francisco; W. W. Woodward, Will B. Barstow and George Wambach, of Iowa, and A. C. Humelbaugh, of Salt Lake City. The capital stock is \$1,250,000, of which \$1,037,000 has been subscribed.

(From Our Special Correspondent.)

Belle.—At this mine in the Willow Valley district, a 2-ft. ledge of good ore has been uncovered. This property was bonded by J. L. Postelwait to an Eastern syndicate.

Riverside County.

(From Our Special Correspondent.)

Indian Queen.—The shaft at this mine, $\frac{1}{2}$ miles west from Ferris, is now down 115 ft. and some high-grade ore has been taken out. Seven men are employed at present. A 5-stamp mill is on the property.

San Bernardino County.

(From Our Special Correspondent.)

Gold Crown Mining and Milling Company.—This company has been organized to work 8 claims on the Colorado River, in the Pichaco Mining District. The directors are R. L. Craig, B. W. Lee, D. W. Field of Los Angeles, and W. H. Holcomb of San Bernardino. A. J. Smith,

who has been appointed general manager, will begin active work at once. Orders for machinery have been placed.

Shasta County.

(From Our Special Correspondent.)

At Baird, about 22 miles from Redding, on the McCloud River, a large electric power plant is to be erected; 50,000 in. of water has been appropriated and a canal 12 miles long is to be constructed. The electrical engineers in the employ of the projectors are C. M. Walker and Sidney Sprout. The enterprise is said to be backed by ample capital, and will start with contracts amounting to 5,000 H. P., supplying the city of Redding and the large smelters and mines in the district with electric power and light.

Meier & Kahny.—This firm has begun development work on a promising gold bearing ledge in the South Fork district near Igo.

Mountain Copper Company, Limited.—The management has been completely exonerated by a coroner's jury from any blame in the recent fall of ground in the mine. Five bodies have been recovered from the caved-in workings. The general manager is Lewis T. Wright, and the mine superintendent is T. C. Archer.

Siskiyou County.

(From Our Special Correspondent.)

Downey & Meyers.—At this property on Ash Creek, $\frac{1}{2}$ miles from the American Bar mine, at Klamath River, a rich pocket has been struck which may develop into a permanent ledge. The find was made in a tunnel run below the upper works.

Gold Run.—The 10-stamp mill at this mine on Knownothing Creek, is running on ore from the 1,100 ft. level, where a station has been cut and a double hoist installed. Sinking continues, with the intention of going 500 ft. deeper as the veins have been improving with depth. Water under a pressure of 600 ft. furnishes power to run the mill day and night, and also the air compressor.

Johnny Bull.—This drift and placer mine on McAdams Creek, $\frac{1}{2}$ miles north from Fort Jones, is being explored under bond by a San Francisco company. An incline down the foot wall has been extended 150 ft., and although the face of the incline is under the Round Valley reservoir, no trouble has been experienced from water. The erection of a mill and a cyanide plant are contemplated.

Solano County.

(From Our Special Correspondent.)

St. John Quicksilver.—At this old mine, 5 miles from Vallejo, the old timbers and debris have been cleared away and new timbers have been put in the tunnel for a distance of 1,100 ft. In repairing the old works under the superintendency of Alfred Tregidgo, it is said that rich ore has been found in all the drifts and crosscuts. Regular ore extraction will begin in a few days.

Tuolumne County.

(From Our Special Correspondent.)

Fleming & Intervenor.—These claims south from Big Oak Flat, adjoining the McAlpine, have been bonded by W. R. Dorr. The latter claim has been developed by a 100-ft. tunnel, an 85-ft. shaft and several crosscuts, all of which show good ore. The vein will average 7 ft., assaying about \$8 per ton free gold besides 1% of high grade sulphurets. The croppings on the Fleming look well.

Gerrymander.—At this mine, near Sonora, machine drills are used on the 200-ft. level. The vein is not very large, but the ore is high grade. There is a 10-stamp mill on the ground.

Knownothing.—At this mine on Knownothing Creek, 8 miles southeast from Fork of Salmon, the shaft is down 450 ft. on a 4-ft. vein of \$40 ore. A crosscut tunnel is being run to cut the ledge 350 ft. below the present workings. The mill, which is being remodeled, is located at the entrance of this tunnel. A large force of men are employed. G. W. Grayson of Oakland holds the bond on the property.

Postlewait Dredging Company.—It is reported that this company has bonded about 10 miles of the Klamath River with the intention of soon building a large dredger to work the bed of the river and recover the gold.

Stockton Gravel Mining Company.—On the property of this company, 15 miles northeast from Columbia, in the Philadelphia Diggings, some Giants are used with about 500 in. of water. The claims contain about 700 acres, which will all be worked to bedrock. A large amount of money has been expended by the company on ditches, dams and other improvements.

COLORADO.

Boulder County.

Eldora Milling Company.—A new company, the Boston Mining and Smelting Company, has been formed, of which W. B. Bailey of Eldora is president, A. J. Bailey vice-president, and J. S. Warden secretary and treasurer. This company is

to pay the outstanding claims, and supply all the funds necessary for making improvements in the plant and for starting work. The new company will make some necessary changes in construction and erect a sampling plant. As soon as this preliminary work is finished the mill will commence treating ore. The mill has a capacity at present of 60 tons per day and this amount can be secured without difficulty.

Lake County.

(From Our Special Correspondent.)

Ore Output.—March opened auspiciously, the first 10 days showing an average of 2,500 tons per day, all classes of ore, an increase of 2,000 tons a day over 1 year ago.

A Y and Minnie.—The lessees shipped 1,500 tons of crude ore and concentrates during February. The lead sulphide bodies improve and a heavy tonnage is promised for March.

Black Iron.—In this property on Sugar Loaf Hill, in a new shaft at less than 100 ft., F. M. Myrick has opened ore that covers the bottom of the shaft and assays from 45 to 115 oz. silver to the ton.

Fidelia Mining Company.—A strike has been made in the company's Best Friend shaft that assays 200 oz. silver and 2 to 4 oz. gold; another body of ore opened up shows 40 oz. silver and some gold.

Ibex Mining Company.—About 300 tons a day are shipped and much new development work is under way, while 500 men are employed. At the annual meeting the old board of directors and officers were re-elected. The officers are A. V. Hunter, president and treasurer; Chas. Cavender, secretary; John F. Campion, general manager; S. W. Mudd, manager. These gentlemen, with the exception of Mr. Mudd, are directors in addition to Eben Smith, J. J. Brown, W. B. Page, and A. R. Meyer.

Magneta.—In this property in Granite District, an 8-in. streak of gold is reported opened assaying \$280 to the ton. The streak has been followed 35 ft.

Maid & Henriett.—Reynolds & Company, lessees, are making the heaviest production in the history of its various lessees. The February output was over 4,000 tons, and March production will be over 5,000 tons of oxidized iron, carbonate sulphide and zinc ores. There are 28 sets of lessees working under the main lessee.

Red Hook.—Lessees have recently opened up an ore body at 120 ft. on Sugar Loaf Hill, of fine silver ore, from which 5 tons a day are shipped. Some assays show 800 oz. silver to the ton.

Resurrection Gold Mining Company.—The rumor that this company's 150 acres of patented ground in Evans Gulch has been sold to an English syndicate for \$3,500,000 is flatly denied by General Manager C. T. Carnahan. The company is shipping 150 to 200 tons a day; \$50,000 worth of new machinery has just been put in.

Westport Mining Company.—The annual report shows capital stock, \$20,000; stock unissued, \$10,000. Total indebtedness, \$1,000. The company owns the Capital, Clipper, Castle and Congress claims.

Yax Mining, Milling and Tunneling Company.—The annual report shows total stock, \$1,000,000; amount of stock unissued, \$301,327; total indebtedness, \$96,008. This is one of the greatest propositions in the camp, and the tunnel is now in over 8,000 ft.

La Plata County.

(From Our Special Correspondent.)

Champion No. 2.—Patterson & Johnson are running a drift on an 18-in. streak of good gray copper ore. About 200 ft. of stoping ground is open and shipments will begin shortly.

La Sal Tunnel.—An air compressor is in place and the tunnel is in 400 ft. The company intends to erect a plant for the treatment of its ores with the opening of spring.

Montrose Belle.—Work is progressing rapidly and several streaks of high grade copper-silver ore are being developed.

Robert Bonner.—Judge C. L. Abbot is driving a 200-ft. crosscut to connect the Bonner and Abbot tunnels.

Sinbad District.—Ray & Regal and the Wilkinson Brothers are developing several claims, which give encouraging returns in silver and copper.

San Miguel County.

(From Our Special Correspondent.)

Ross Tunnel.—Work is pushed, and the tunnel is in about 2,000 ft., its objective point being the famous Silver Pick vein.

San Juan Gold and Silver Recovery Company.—About January 1st this company completed a 100-ton cyanide plant on the Gold Run placer, 1 mile above Telluride, and it is now understood that it will make arrangements to increase the capacity to 200 tons daily. The tailings are mostly from the Smuggler-Union Mill and have been settling on the placer for the past 10 or 15 years, and in some places are 10 ft. deep. Tests made before the placer was sold showed them to carry

from \$5 to \$6 per ton in gold and silver, and it is calculated that at least 75% can be recovered. It is estimated that the placer contains between 200,000 and 300,000 tons of tailings.

Summit.—Several contractors are opening up ground for future development. No ore will be shipped until the contracts now under way are completed.

Teller County—Cripple Creek.

(From Our Special Correspondent.)

Acacia Gold Mining Company.—Very good reports continue to come from this company's property. The property is now being worked under lease, both on the Burns and the Morning Star claims. The output for the month of February was about \$34,000 from the various leases. Both the McGill and the Wrockloff leases on the Burns are shipping, as also is the Bankers lease on the Morning Star. About 9 tons of ore recently shipped from this lease netted the lessees nearly \$9,000. The Burns claim adjoins the Pharmacist, and the Morning Star is near the Pinnacle properties. Dr. Chambers of Cripple Creek is manager for the company.

Cripple Creek Consolidated Mining Company.—This company has sold the Geneva and May Queen lodes, the former on Gold Hill and the latter crossing Poverty Gulch and Womac Hill. The purchaser is not known. The price was \$300,000, which gave the treasury a considerable sum and the directors have declared an 8c dividend, amounting to \$160,000. This leaves \$40,000 in the treasury, and it is understood that work on the property is to be pushed. The Geneva claim has produced a large amount of ore and the May Queen some.

Independence Town and Mining Company.—A decision in the case of this company and the Wilson Creek Consolidated Company has been given by Judge Bailey of Canon City, holding that the Minnie Bell of the Wilson Creek Company had no right to the ground in conflict between it and the Hull City Placer of this company. The Minnie Bell was a valid location, but had forfeited its rights by not advertising the Hull City placer at the proper time. A new trial was refused the Wilson Creek Company, who, it is understood, will appeal.

Ironclad Mining and Milling Company.—At the annual meeting in Denver the following directors were elected: J. H. Smith, C. D. Hayt, J. H. Blood, W. C. Frost and John Mathews. Mr. Smith was later chosen president, Mr. Frost vice-president and Mr. Mathews secretary and treasurer. The company's property is on Ironclad Hill and has produced considerable ore.

John A. Logan.—A large number of rumors as to whether this mine, which belongs to Mr. W. S. Stratton, has any amount of ore or not have been floating round. This week it is learned on good authority that a good-sized shipment was made to the Taylor and Brunton sampler.

Mable M.—Nearly 900,000 shares out of 1,000,000 issued passed to the Woods Investment Company, of Victor, and all the property of the Aequa townsite held by Bennett and Meyers of Denver, about 75 acres, was also turned over. The consideration is said to have been about \$500,000. The property is on Beacon Hill, near the Elkton Mine.

Nugget Mining and Milling Company.—The preliminary hearing for a permanent injunction was heard in the district court this week and the case dismissed. This enables the Doctor to continue extracting rich ore from within the side lines of the Elizabeth Cooper claim of the Nugget Company. Just what the Nugget will do is not known.

FLORIDA.

Citrus County.

The failure of E. J. Hassard, the phosphate miner at Juliette, has been followed by the temporary suspension of the phosphate mining firm of Hood & Hubbard at Dunnellen.

(From Our Special Correspondent.)

Central Phosphate Company.—Prospecting on the Marion Company's lands in this county have so far progressed nicely, and it is said that the Central company has concluded to erect 2 plants. The company's headquarters are in Ocala.

Illinois Phosphate Company.—This company is arranging to erect a plant near Hartshorn.

Messrs. J. Butgenbach & Company will shortly erect another plant on the leased Holder property.

IDAHO.

Owyhee County.

De Lamar Mining Company.—The January report of Manager Huntley states that the mill tunnel was driven 402 ft. during the month. The ore treated at the mill was 4,267 tons, assaying \$10.27 gold and \$88 silver, the tailings assaying \$1.96 gold and \$0.46 silver. The total estimated income was \$38,567; the expenses were \$36,195, leaving a profit of \$2,372.

Shoshone County.

Alhambra Mining Company.—This company has 10 or 12 claims near the summit of the St. Joe Mountains a short distance east from Wardner. Work has been in progress over a year, a 4-drill compressor having been put in last spring. The tunnel starts well down on Elk Creek and will run approximately 1,700 ft. before cutting the main vein, which runs through the group.

Ruth Mining Company.—This company is to commence work on its claims up Nine Mile Creek near the Atlantic, and presumably having the same vein as the Monarch, which shipped considerable ore 8 or 10 years ago. A tunnel is to crosscut a short distance and then run into the hill on the vein. The Monarch, California and Black Cloud in the same neighborhood have shipped small quantities of ore.

(From an Occasional Correspondent.)

Chloride Queen.—This company is pushing work on its tunnel, drifting on the ledge and following the footwall. The development work at present consists of a 150-ft. crosscut tunnel and a 475-ft. drift. The officers of the company are composed of business men of Wallace and Spokane, as follows: H. A. Steinke, president; W. C. Clark, secretary; L. S. Wood, vice-president; A. L. Nichols, W. T. Roach, Dr. Yalb and J. E. Argo, trustees.

Paragon Mining Company.—This company, incorporated under the laws of Minnesota, has purchased the Paragon Mine, 6 miles east of Murray, on Prichard Creek. It has a showing of Galena ore, about 50 tons taken from a 35-ft. shaft running up to 76% lead, 6 oz. silver, and expects to make a test shipment soon. It has let a contract to run a 100-ft. tunnel to tap the vein under the shaft. The officers are Dr. G. Sandberg, president; Geo. S. Monson, vice-president; F. O. Hammer, secretary and treasurer, of St. Paul, Minn.

MICHIGAN.

Copper.

Allouez Mining Company.—At the annual meeting in Boston on March 14th, the old directors were re-elected as follows: H. F. Fay, Jesse Lewisohn, John Stanton, Herbert A. Tucker, Godfrey Morse, Stanton R. Dow, John C. Watson, W. B. Mosman, James Chynoweth. The number of shares represented was 51,857 out of 80,000 outstanding.

Osceola Mining Company.—At the recent annual meeting in Boston stockholders authorized the sale of 1½ acres of the company's lands situated in Houghton County to the Centennial Mining Company, and authorized the exchange of ores and minerals underlying 13 38-100 acres of the company's land in Houghton County for the ores and minerals underlying an equal area belonging to the Wolverine Company. Mr. Bigelow stated that the territory now comprising the South Kearsarge he bought for \$62,500 from the St. Mary's Canal Mineral Land Company, and turned it into the Osceola Consolidation at the price he paid for it.

Iron—Marquette Range.

Brotherton.—This mine, near Swanzy, on the same range as the Princeton, has been secured by the American Steel and Wire Company and the work of reopening the property, which has lain idle many years, will be pushed.

Michigamme.—The Cleveland-Cliffs Company, which is reopening this magnetite mine at Michigamme, has the shaft unwatered for over 400 ft. Thirteen Rand "Little Giant" drills have been purchased for work in the levels and stopes. Extensive surface improvements are under way and the large crusher will soon be in place.

Webster.—At this limonite mine adjoining the Imperial, south of Michigamme, the Cleveland-Cliffs Company is preparing to resume work.

Winthrop Iron Company.—About 25 men are putting in the large Gates crusher at No. 3 pit at the Winthrop location near Ishpeming.

Bay County.

Saginaw Valley Mining Company.—This company at West Bay City, Mich., has explored 300 acres of coal land in Frankenlust township and the shaft will be started within 60 days. The stockholders are T. R. Shaver, J. H. Metcalf, Jay Thompson and Ira Hiller, of West Bay City; Michael Christian, of Romeo; John G. Weggel, of Frankenlust, and the estate of William G. Pierce, of Watertown, N. Y., together with Paul Wampler and John McIntosh.

MINNESOTA.

(From Our Special Correspondent.)

Railroad companies are beginning to hire train crews, and in a few weeks will be starting their ore schedules. Stockpiles at many mines cover all available ground, so there is need of shipping at the earliest possible moment. Stocks at nearly all underground mines on the Vermilion and Mesabi ranges are almost as large as in any preceding year at the opening of navigation, and when navigation opens will probably be the largest on record. There is no hope that Lake navigation will open earlier than usual, and the

first ore cargoes will hardly pass the Sault before April 25th.

Iron—Mesabi Range.

(From Our Special Correspondent.)

Messrs. Hawkins and Wallace are exploring on what are known as the Hedderly lands, in the northwest of the southwest of section 4, T. 58, R. 17. There are 25 acres in the tract, and ore is known to exist around it.

Auburn Iron Company.—This company has started exploration on the C. N. Nelson lands in section 4, near Virginia, where ore indications are good.

Chandler Iron Company.—This company is exploring in T. 58, R. 20, west of the Mountain Iron mines. Six drills are sinking in sections 22, 23 and 24, in the last of which the company has a 160-acre tract under option.

Fay Mining Company.—This company has begun work on a second working shaft and states that it proposes to ship ore this year over the Duluth and Iron Range Road. The first work was done less than 3 months ago. The company has five 40 acre tracts.

Republic Iron and Steel Company.—This company has an option on the Jones 40, and on which ore was shown up some time ago. It will probably be added to the Republic's holdings.

Wyoming Iron Company.—This company, in exploring the north 40 of the townsite of Virginia, is down 145 ft. in good ore after penetrating 35 ft. of surface. The property lies south of and adjoins the Sauntry, and east of the Oliver. It was one of the original unsuccessful explorations of the range.

Iron—Vermilion Range.

(From Our Special Correspondent.)

After 10 years of litigation the United States courts have decided title to a homestead in Cook County to rest with R. H. Dowman, and not Miss Carrie Moss, a school teacher, who claimed under the homestead act. The case is the most notable that ever passed through the land courts originating in this district, except only the noted "section 30" matter. Miss Moss bought the relinquishment of the original entryman, and fled it at the Duluth land office, at the same instant filing her own homestead claim. She asserted that no time intervened between the relinquishment and her own filing. Dowman, meantime, had squatted on the land, and he asserted that there must have been an appreciable interval, and that his rights under the squatter's rulings attached during that interval. The identical point was a prominent one in part of the "section 30" case.

G. H. Warren, of Minneapolis, is arranging to begin explorations in the northwest part of T. 63, R. 9, about 15 miles slightly north of Ely.

Robinson lake lands to the extent of some 800 acres have been acquired by J. M. Underwood, and he is in court to secure more. Explorations in sections 7, 8, 18 and 17, T. 62, R. 13, have resulted in more or less ore.

Minnesota Iron Company.—This company has leased lands in the east side of T. 62, R. 14, adjoining its Armstrong Mine, and will explore at once. At the Armstrong ore has been found.

Oliver Mining Company.—This company is putting exploring crews on lands in section 12, T. 62, R. 14, close to the Armstrong.

Robinson Lake Iron Company.—This company has been sued by J. M. Underwood of Duluth, to enforce a lease for which he claims the option on lands in sections 17 and 18, T. 62 R. 13. He claims a 50-year lease for 12½¢ a ton, and states that he has struck a narrow vein. He has also begun suit against H. V. Goetchius and others to enforce a leasehold right on lands in section 7, T. 62 R. 13, close by, on which is also a royalty of 12½¢ and a minimum output of 25,000 tons annually. It has been currently reported on the range that he was working for J. J. Hill and the Great Northern road, but this is incorrect.

MISSOURI.

Jasper County.

(From Our Special Correspondent.)

Joplin Ore Market.—Fair weather increased the output as well as the shipments, but there is still a large amount of ore in the bins which has been sold but not yet loaded. The highest price paid was for the ore of the Old Colony Zinc Company at Neck City, of which 140,000 lbs. was sold but not loaded. The price was \$32.50 per ton. The Carthage ore sold at the same price. Outside of this the top was \$32, and a large part of the high grade ore, including that at Oronogo, sold at \$31, or \$1 less than last week. Lead was unchanged, selling for \$27.50 per 1,000 lbs.

During the corresponding week last year, top grade zinc ore sold for \$43 per ton and lead at \$25.50 per 1,000. The shipments of lead were less than this year by 17,860 lbs.; the zinc sales were greater by 1,149,720 lbs., and on account of the ruling high prices, the value was greater by \$77,316.

For the first 10 weeks last year the sales were less than this year by 1,891,390 lbs. of zinc and 1,633,650 lbs. of lead, but the value was greater by \$102,784. As compared with the previous week the sales of lead were less by 12,960 lbs., but the zinc sales were greater by 531,330 lbs. and the value was greater by \$4,474. Following is the turn-in by camps:

	Zinc, lbs.	Lead, lbs.	Value.
Joplin.....	2,820,170	394,330	\$52,866
Galena-Empire.....	2,434,360	233,880	43,543
Cartersville.....	1,040,540	206,660	21,291
Webb City.....	590,830	48,750	9,908
Oronogo.....	648,570	.....	9,651
Aurora.....	395,000	18,640	16,028
Central City.....	221,790	17,700	3,707
Belleville.....	236,800	10,560	3,961
South Jackson.....	126,960	27,480	2,597
Cave Springs.....	87,930	11,020	1,578
Stotts City.....	313,330	.....	5,013
Duenweg.....	386,750	20,910	5,275
Carthage.....	116,940	.....	1,775
Granby.....	321,000	21,000	4,800
Lehigh.....	86,770	.....	1,345
Alba.....	43,260	.....	649
District total.....	10,891,900	1,060,930	\$184,058
Total 9 weeks....	93,368,470	10,270,800	\$1,666,233

Mining Land Sales.—The Twenty Nine Mine

on the land of the Missouri Lead and Zinc Company was sold last week to S. W. Nettleton and other Toledo parties for \$20,000. The owners were Jesse G. Starr, the buyer for the Lanyon Zinc Company, Thomas Gary and Charles Lawyer. With hand jigs only, the mine has made an average profit of \$220 for the last 5 weeks. Geo. W. Williams has sold his 263 acre farm, ½ mile east of Galesburg, for \$15,780. Mr. Williams reinvested a part of the money he received for it in the Wetzel and O'Donnell farm of 273 acres on Jones Creek, 6 miles southeast of Carthage for which he paid \$8,500. The Williams farm will be prospected this spring. Boston parties, represented by Charles Berry, who is included in the company, have purchased the plant of the Summers Mining Company on the Southside ground for \$10,000, and will start the plant as soon as the repairs are made. Moss & Company, on the north end of the Davey & Sons lease at Cartersville, have sold a mine adjoining the Cordell Lead and Zinc Company's ground to that company, who will build a tramway and run the dirt to their mill to be cleaned. The price is reported to be \$3,000. Hiram Phillips and W. J. Hopkins of Carthage have purchased the Buckeye Mine at Central City for \$5,000 and will organize as the Little Mark Mining Company, to work the ground. W. E. Hall of Carthage has purchased of W. E. Ford a 6th interest in the Shawmut property at Center Valley for \$6,000. The Frazier Mine, mill and lease of 4 lots on the South Side Mining Company's ground at Galena has been sold by D. A. Gault to Cleveland, O., parties for \$60,000. The lease was the property of G. W. Ash & Company, and the mill has only been in operation about 5 months, but during that time has paid very handsome dividends. John D. Cameron has sold the Postel mill and lease of 3 lots on the ground of the Missouri Lead and Zinc Company, to J. C. Davis of Somerset, Mass., for \$4,000. John D. Cameron has purchased of Dr. J. A. House of Omaha the Kathleen mill and lease of 3 lots on the Bruce land at Belleville, paying \$8,000 for the property. The San Juan lease between Joplin and Webb City has been sold to Eastern parties for \$7,500.

Consolidated Zinc and Lead Company.—A deep strike of zinc ore is reported on the Mizpah lease in Cooper Hollow, where A. B. Wilgus, in putting down an 8-in. drill hole for water, struck high grade zinc at 261 ft. and again at 281 ft., continuing to 300 ft. The company will put down a series of deep drill holes to test the lower ore levels.

MONTANA.

Deer Lodge County.

(From Our Special Correspondent.)

International.—But little activity is shown on this property. The compressor has been sold and moved to the Red Cloud.

Lead King.—Messrs. Goodness & Salsbury are shipping some high-grade lead ore from their lease on the west end of this mine.

Nancy Hanks.—Sam. Ritchie of Garnet intends to place this group into a stock company with ample capital to sink 300 ft. deeper and thoroughly explore the deep working. Some \$250,000 has been produced from the mines.

Red Cloud.—The vein in the upper tunnel has been reached. The property is owned and worked by Dr. Mussigbrod. It is claimed there are 18,000 tons of shipping ore in sight. A compressor will be installed for the use of both this mine and the Lead King.

Shamrock.—The main shaft on this Garnet property is still going down. A new find of shipping ore has been encountered in the upper levels and stoping is going on. Shipments will resume as soon as roads are passable.

Jefferson County.

(From Our Special Correspondent.)

Basin and Bay State.—Judge Parker, of the District Court at Boulder, acting on a petition

of James and Alexander Glass of Basin, has appointed F. C. Berends cashier of the Boulder Bank, receiver of the entire property of this corporation.

Bell.—The ore in No. 2 tunnel has opened out to 2 ft. Shipments are being made from both No. 1 and No. 2 tunnels.

Columbus.—This property, 1½ miles from Basin, owned by Griffith & Reill, is being examined by Helena parties with a view of acquiring it on bond and lease.

Gray Eagle.—A winze is being sunk from No. 3 tunnel. The first 100 ft. will be sunk with a windlass. A boiler and sinking pump will be used to handle the water. In the meantime shipments are being made from surface ore. J. J. Holmes, of Boulder, is in charge.

Ramona.—This property, 7 miles east of Alhambra, is producing a fair grade galena ore from the tunnel. Sutton, Church & Settles are operating it, having taken up the bond.

West Rumley.—The present lessees have shipped \$19,000 worth of ore the past 5 months. As the lease will expire in April, the production will be crowded as much as possible.

Lewis and Clarke County.

(From Our Special Correspondent.)

Buckeye.—This mine, 9 miles above Remini, belonging to the Rial Estate, has been operated by the Buckeye Mining Company, composed of Helena parties under a bond and lease for \$60,000. It is now idle, owing to some difficulty regarding an extension of the option.

Drum-Lummon.—A rich strike of ore is reported on the 800-ft. level of this property, owned by the Montana Mining Company.

East Helena Smelter.—Extensive improvements are being made which will greatly increase the capacity. The blast furnaces will be enlarged. A dam is being constructed just above the smeltery on Prickly Pear Creek by means of a slag embankment. Extensions will be made to the roasters by adding Bruckners and other improvements, which will cost upward of \$100,000.

Madison County.

Madisonian.—J. H. Conrad reports the sale of this mine near Norris to L. B. Leiter of Chicago. The sale embraces the 15 claims and the 40-ton cyanide mill. The price is not made public.

Park County.

Montana Coal & Coke Company.—This company, with mines at Horr and Aldridge, is making extensive improvements. One hundred additional ovens will be constructed, and a coal bunker with a capacity of 1,000 tons of coal per day is now nearing completion. A well equipped machine shop has recently been completed, and a new power house for the electric line between Horr and Aldrich is now under way.

Silver Bow County.

Butte & Boston.—A Helena dispatch says: The Supreme Court has handed down a decision ordering Receiver Wilson to desist from operating the Snohomish and the Tramway mines until that court has heard and determined the appeal of the Butte & Boston Company from the action of District Judge Clancy in appointing a receiver therefor. The appellant company must furnish a \$100,000 bond. The Court's action prevents, at least for the present, the anticipated clash between the State and Federal courts over the appointment of rival receivers for the Snohomish and Tramway mines. Several months ago John L. Harris was appointed receiver of one-half of the Snohomish and two-thirds of the Tramway. He is now operating those interests under supervision of the United States Court. Several days ago the case of Larkin & O'Connor against the Butte & Boston and others was begun in the State Court at Butte, application being made for the appointment of a receiver for the Snohomish and Tramway. Judge Clancy appointed E. H. Wilson receiver, but before he could take possession the Butte & Boston secured a temporary restraining order enjoining him from taking charge. Arguments were made before the Supreme Court to have the writ made permanent or pending appeal from such order, that resulted in the above-mentioned ruling. Application has been made also to Judge Knowles to extend Receiver Harris's jurisdiction over the properties.

NEVADA.

Esmeralda County.

(From Our Special Correspondent.)

Holmes Mining Company.—It is reported that this company has sold 800,000 tons of tailings in the dump at Belleville to M. L. Elliott of Santa Rosa, Cal., the company to receive \$1 per ton of tailings worked. This dump is said to average \$7 per ton in gold and silver besides a large amount of quicksilver which can be saved. A 100-ton plant is to be in operation within 6 months. The suit of W. C. Hoffman against the Holmes Mining Company to prevent a consolidation with mining companies in the same district has been settled amicably and the suit withdrawn.

Storey County—Comstock Lode.

The semi-annual election of the Virginia Miners' Union at Virginia City, on March 3d, resulted in the re-election of John F. McDonell as recording and financial secretary. Judge Charles E. Mack and W. A. Burns were the successful candidates for delegates to the Denver Convention. The following are the officers-elect: President, W. A. Burns; vice-president, E. P. A. Pyne; secretary, John F. McDonell; treasurer, John L. Finnegan; conductor, Ed Klaus; warden, Timothy Duffy; finance committee, Joseph E. Eckley, W. J. Feily, D. A. McDonell; delegates to Denver Convention, Chas. E. Mack, W. A. Burns; alternate delegates, J. L. Finnegan, F. S. Fallon.

Yellow Jacket Mining Company.—At the annual meeting, held at the office in Gold Hill, on March 5th, 105,000 shares of the capital stock of 120,000 shares were represented and the following board of directors was elected: J. W. Eckley, W. E. Sharon, G. A. Morgan, W. G. Morrow and P. Ennis. The following officers were elected: President, J. W. Eckley; vice-president, W. G. Morrow; secretary, W. H. Blauvelt. W. E. Sharon was re-elected superintendent.

OREGON.

Baker County.

Ibex.—Col. S. W. Ray, of Port Arthur, Ont., has allowed his option for \$300,000 on this mine, 6 miles from Sumpter, to fail. The owners of the mine are Arthur Hill, of Michigan, and Simcoe Chapman, of Sumpter. It is stated that Col. Ray, who had paid \$10,000 down on the option, intended to float a company in London, but his plans were frustrated by the Boer war.

PENNSYLVANIA.

Bituminous Coal.

(From Our Special Correspondent.)

Connellsville District.—Mine Inspector Bernard Callaghan has just completed his report for the Ninth Bituminous District for 1899. The report throughout gives evidence of the immense boom in the coal and coke trades throughout Westmoreland and Fayette counties during the year. The Ninth District includes the coal and coke plants along the Mt. Pleasant branch of the Baltimore & Ohio, the plants down the Pittsburgh, McKeesport & Youghiogheny, and a few along the Southwest Railroad between Scottsdale and Connellsville. The total production of coal was 7,897,490 short tons, a gain of 1,289,760 tons over 1898, and a gain of 2,823,105 tons over 1897. The production of coke was 2,535,141 tons, a gain of 506,964 tons over 1898. The gain in coke production was not as great as in 1898, because the plants were working well up to their full capacity when 1899 opened. The total shipments of coal in 1899 amounted to 3,957,697 tons, showing that more than 1/2 of the coal mined is made into coke. The number of persons employed was 8,393, of which 5,920 were employed inside and 2,478 outside of the mines. The number of employees in 1898 was 8,128. There were 21,003 kegs of powder used during the year for blasting, compared with 10,425 kegs in 1898, the increase being one of the features of the report.

The dynamite used was 13,183 lbs. in 1899 and 12,629 lbs. in 1898. The number of horses and mules employed increased from 669 in 1898 to 933 in 1899. Steam boilers increased from 167 in 1898 to 186 in 1899. There are 10 electric locomotives and one air locomotive at work. The number of fatal accidents decreased, notwithstanding the increased production, being 23 in 1899 and 28 in 1898. The non-fatal accidents were 43 and 28 respectively. The classification of the accidents for 1899 is: Explosion of gas and dust, 2 fatal; explosion of powder, 1 fatal and 6 non-fatal; falls of slate and roof, 16 fatal and 24 non-fatal; deaths caused by mine cars, machinery, etc., 2 fatal and 10 non-fatal; deaths caused by men falling down shafts, 2.

SOUTH DAKOTA.

Lawrence County.

(From Our Special Correspondent.)

Dakota Mining and Milling Company.—S. V. Noble, of Deadwood, has been elected president and given entire charge of the property, about 400 acres of mining ground in Portland and Squaw Creek districts, and a 25-ton cyanide plant at Central City, now in operation. The plant will, it is said, be enlarged to 100 tons daily capacity this spring.

Detroit & Deadwood Gold Mining Company.—At the annual meeting at Detroit, Mich., on March 5th, the following officers were elected: Malcolm McCallum, of Chicago, president; Ludwig Nissen, of New York, and A. F. Peck, of Detroit, vice-presidents; Robert H. Murray and Frank C. Andrews, of Detroit, secretary and treasurer, respectively; Homer Warren and John Downie, of Detroit; Rod A. Murray, of Deadwood; Hugo Reid, of New York; G. M. Williamson, of Sparkill, N. Y., and Wm. H. Day, of Peoria, Ill., directors. Amendments to the articles of incorporation were adopted by which the company's name is changed to Detroit & Deadwood Mining Company; offices permitted in

New York, Boston and Chicago, as well as Detroit; the scope, purposes and objects of the corporation materially enlarged, and the capital stock reduced from \$2,000,000 to \$1,000,000. The erection of a chemical reduction plant was decided on.

Pennington County.

(From Our Special Correspondent.)

Anita Mining Company.—This company, recently organized, has begun a shaft on one of 4 claims 4 miles west of Dumont. The shaft is down 40 ft., and one shoot of ore has been penetrated. The ore resembles the Ragged Top ore. The company has purchased a whim and other machinery from the North Star Mine, in Custer County. The officers are: President and treasurer, J. C. Voorhees, Anita, Ia.; vice-president, W. J. Davenport, Council Bluffs, Ia.; secretary, John P. Bleeg, Sioux City, Ia. The capitalization is \$50,000.

Big Hit Mining Company.—The large concentrating plant of 200 tons' daily capacity, put in for a trial by an Eastern company, has never worked successfully.

Clover Leaf Mining Company.—This company is still sinking the shaft at the Uncle Sam Mine, on Elk Creek.

Eldorado.—The New York parties who bonded this gold mine, near Hill City, have purchased the old J. R. stamp mill, 4 miles east of there, and repairs will be made on the 10 stamps. The steam hoist is at work.

Rochford District.—J. T. Cooper and W. Mendenhall are mining and milling 15 tons of ore daily from the Benedict Mine. The Grady & Dibble mill is running at the source of Smith Gulch.

TEXAS.

Brewster County.

Quicksilver Deposits.—The deposits of quicksilver in the great bend of the Rio Grande River about 75 miles southwest of the Southern Pacific Railway, which have been known to exist for some years, are now attracting much attention. The veins, which occur in limestone and sandstone, are narrow but rich. A San Antonio company, which has been running a crude smelting plant with 4 retorts, is said on good authority to have 800 tons of ore on the dump that will average 2 1/4% in quicksilver. Ore as low as 0.5% has been worked in California. The veins are from a few inches to 1 ft. wide, but contain spots where quicksilver runs out of the ore on blasting. The veins occur in an area about 10 miles long by 3 wide. No volcanic rocks are said to be near. The mining camp is Teluqua, which has already nearly 2,000 inhabitants. Another find of ore is reported at Adobe Wells, 23 miles from Teluqua and nearer the railroad.

Navarro County.

Corsicana Oil Field.—A report of operations in the field during February shows: Wells complete, 31; producing wells, 24; dry holes, 5; gas wells, 2; wells abandoned during the month as unprofitable, 16, leaving the number of producers, 8; well drilling, 8; rigs in place, 6.

The February production of the field showed little change, but a new strike was reported about 6 miles east of Corsicana. The oil is found at 700 ft. and is a heavy oil, being in an entirely different formation from the Corsicana field proper. According to the Oil City "Derrick" there were 31 wells completed during February, 24 were oil producers, 2 gassers and 5 dusters. During the month there were 16 wells abandoned, and at its close there were 8 wells drilling and 6 rigs. The grand total of completed and abandoned wells on March 1st was 704, of which number 451 are producing, 131 are dusters, 13 are gassers and 109 have been abandoned.

UTAH.

(From Our Special Correspondent.)

Bullion and Ore Shipments.—During the week ending March 10th there were sent forward from the different smelters 24 cars, or 953,351 lbs. lead-silver bullion; 6 cars, or 356,508 lbs. copper bullion; 1 car, or 60,000 lbs. copper matte. In the same week there were shipped 73 cars, or 5,376,495 lbs. lead-silver to smelters outside of the State.

Summit County.

(From Our Special Correspondent.)

February Smelter Products.—During February the shipping mines marketed the following totals through the Mackintosh sampler: Silver King, crude, 4,711,000 lbs.; concentrates, 690,885 lbs.; Daly-West, crude, 2,079,235 lbs.; concentrates, 1,406,160 lbs.; Ontario, crude, 1,738,800 lbs.; Anchor, concentrates, 1,141,935 lbs.; Apex, crude, 85,660 lbs.; concentrates, 67,290 lbs.; Valeo, crude, 33,630 lbs.; or in all, 11,954,595 lbs. In February, 1899, the total smelting products shipped out was 6,413,275, showing an increase of 5,541,320 lbs.

WEST VIRGINIA.

Kanawha County.

(From Our Special Correspondent.)

Cedar Grove Colliery Company.—This company is building a bank of 20 beehive coke ovens at the mine at Cedar Grove,

Tyler County.

Chester Oil Company.—This company has recently acquired the Eastern and Paova Oil Companies' properties in the Elk Fork pool, consisting of 325 acres on leases of territory, on which are 19 oil and 2 gas wells. The two properties have a production of 125 bbls. a day and the price paid was \$80,000. The same company has purchased D. H. Cox & Son's holdings, leases on 700 acres of territory in the Conway District, on which are 13 producing and 1 drilling well, for which it paid \$70,000. In the same district, 2 small wells and 100 acres of territory were purchased from E. H. Jennings & Brothers for \$4,000.

FOREIGN MINING NEWS.

ASIA.

China.

It is reported that arrangements have been made for the shipment of iron ores from the province of Shansi to Japan, where they are to be used in the extensive steel works which the Japanese Government is building.

AUSTRALASIA.

New South Wales.

Broken Hill Proprietary Company.—This company reports that for the four weeks ending February 2d, the output of the refinery works was 2,215 tons lead, 51 tons hard or antimonial lead, 259,295 oz. silver and 934 oz. gold. The gold and silver returns are in fine metal.

Victoria.

A report has been prepared for the Mines Department which shows that coal mining in Victoria has steadily progressed during the year just closed. The total output of Victoria coal for 1899 was 262,380 tons, the value of which at the mines is computed by the Department at £113,522, or 8s. 8d. (\$2.08) per ton. Compared with the output for 1898, there was an increase of 19,521 tons. During the year two companies paid dividends amounting to £11,603.

Western Australia.

The gold exports for February are reported at 117,849 oz., crude. For the two months ending February 28th, the total was 261,669 oz., which compares with 210,655 oz. in 1899, showing an increase this year of 51,014 oz., or 24.2%. The total for the two months this year was equal to 234,138 oz. fine gold, or \$4,839,131.

CANADA.

British Columbia—West Kootenay District.

(From Our Special Correspondent.)

Rosland Ore Shipments.—The shipments of ore from January 1st to March 7th from Rosland Mines amounted to 32,300 tons, valued at \$560,000 gross.

Ontario—Rainy Lake District.

(From Our Special Correspondent.)

Jackfish Section.—The ore bodies of Empress and Ursa Major are large and considerable development is going on at the latter mines and at a number of prospects.

Mutual Gold Development Company.—This company has a crew sinking 60 ft. on one of its locations south of Bad Vermilion Lake. The shaft is down 18 ft. and remains in the vein. C. L. Lewis is president of this company.

Sultana.—This mine, now under the control of the new British Company, is running its 30-stamp mill only for testing purposes, in its development, and is turning out no bullion. The idea seems to be to get a lot of development ahead before starting the mill again, and the mill is used to show just what the underground work is bringing to light. As a consequence, the monthly output of gold has materially fallen off.

Zenith.—This zinc mine has resumed work after a shutdown of nearly the entire winter, and a small crew of miners is now getting out about 15 tons of 50% zinc daily, for shipment to the Canadian Pacific Railway and the European market. Five teams haul the mineral to the railway, 14 miles distant. Summer operations are expensive on account of this haul.

EUROPE.

Great Britain.

St. David's Gold and Copper Mines, Limited.—This company has just started a mill with 30 stamps, 1,050 lbs. each, on its property, about midway between Barmouth and Dolgelly in Wales. The London "Statist" says: "We understand from official information that a large amount of exploratory and development work was effected before the company acquired its mining area, which is represented to be about a mile square, and that since the company made a start additional development work has been done. It is represented that an adit has been driven into the hill a distance of some 3,000 ft., where it encounters the reef, the dip being at a steep angle. The reef, we learn, has been also followed by a shaft from outcrop along the dip to where it intersects the adit, a distance of some 400 ft. There are parallel reefs, of which

three are stated to be well defined. The main one first struck in the adit is reported to average about 6 to 7 ft. thick in parts, running up to 12 ft.; the second reef beyond, and a third one still beyond, are said to average about 5 ft. thick each. A specimen sample of the ore at the London office showed nuggetty particles of gold embedded in the quartz, mixed with bismuth. But the expectation of the directors is that from milling an average of from 10 to 15 dwts. is to be secured when work commences. The royalty is £4 per £100 gross proceeds of gold obtained. It will be interesting to see what will be secured from this first mill on any decent scale in Wales, and we trust the directors will take steps to secure the publication of results setting out the number of tons crushed, say monthly, with the yield of gold from the milling. The capital of the company is £60,000 in £1 shares, all issued except about 1,500, and some of the shares sold to provide working capital were issued at the price of £2 each.

SOUTH AMERICA.

British Guiana.

The completed returns give the total output of gold at 112,944 oz. crude in 1899, against 113,070 oz. in 1898 and 122,702 oz. in 1897. The total last year was equal to 97,663 oz. fine, or \$2,018,693. The number of men throughout the colony to work in the gold fields last year was 23,100, the number at the various centers being: Georgetown, 14,805; Potaro, 132; Bartica, 2,624; Arakaka, 1,457; Baramanni, 1,019; Massawini, 63. This would indicate an average return of only \$100 per man; but probably a large part of those registered worked only a small part of the year.

COAL TRADE REVIEW.

New York.

March 16.

Anthracite.

So far March has been a seasonable month from the standpoint of the coal dealer and retail buying at present is of very fair volume at both eastern and western points. What buying there is by dealers in the East is strictly of the hand-to-mouth order, and there is considerable pressure to sell. Reports coming in from Chicago, Milwaukee and other upper lake ports indicate that to March 1st consumption of anthracite was 20% less than last winter. A feature of the trade in western New York that bids fair to make a considerable difference in anthracite consumption another winter, has been the fall in natural gas pressure and the consequent purchases of coal by parties who have relied on gas for domestic uses for 15 or 20 years past. As the final exhaustion of the gas wells is practically in sight, there will undoubtedly be a decided increase in the use of anthracite in natural gas territory within the next few years.

It is said that the outlook for a very early opening of navigation on the Lakes is poor and that no boats are likely to get through the Sault before May 1st. Lake freights are 50c. offered from Buffalo to Duluth and 90c. wanted. It is likely that matters will be compromised at about 75c.

In the East the market is dull. The large companies are offering coal at less than stated prices without securing many buyers. It is stated that the estimated output for March is 2,750,000 tons, and that the companies realize that production must be held down to keep the market from demoralization. Chestnut size is on a parity with stove, and egg size continues in least demand. The steam sizes are badly wanted and none of the companies has any to offer.

Prices at New York are easy. We quote as follows for free burning white ash: Broken, \$3.30; egg, \$3.40; stove, \$3.85@4; chestnut, \$3.85@4. Outside concerns are reported to have stove coal to sell for as low as \$3.65.

Bituminous.

There has been little change in Atlantic seaboard bituminous trade during the week. Speculative dealers find their position no easier while the big concerns that produce standard coals find a ready market for what they can get to tidewater. It is reported that certain grades of Clearfield are freely offered at \$2.10@2.15 New York City. The standard coals, however, are not offered at these figures.

Labor troubles are threatened in several fields. The troubles are not over the rate of wages, which is bound to be the highest in years, but over the recognition of the unions by the operators.

Trade in the far East is of fair volume and along Long Island it is good. At New York Harbor and in the all-rail trade consumption is steady and a large tonnage is called for. Producers still show little anxiety to close contracts for the coming season, while consumers are evidently in many cases getting very anxious. There is a good chance for an increased consumption of Nova Scotia coal at points east of Cape Cod.

Transportation from mines to tide is unsatisfactory and car supply is below demands. In the coastwise vessels market vessels are in light demand and ocean freights are easier.

It is stated that the price of Clearfield coal,

dating from April 1st, will be \$2.70 at South Amboy, and \$2.65 at Philadelphia.

Birmingham, Ala. March 12.

(From Our Special Correspondent.)

Steady work and immense outputs of coal is the report that is given from the numbers of coal mines in operation in this State. State Mine Inspector J. de B. Hooper receives occasional reports from the various mines, and they indicate that there is no time being lost at a single place.

The output for the first two months of the year show a gain over that of the first two months of last year, though no figures have been compiled as yet.

President George Young, of the Alabama District No. 20, United Mine Workers of America, stated last Saturday that he did not believe there would be any labor troubles to amount to anything in this State during the present year. He expressed the opinion that when June came around and a new contract was to be signed with the operators there would be no disagreement.

Chicago. March 13.

(From Our Special Correspondent.)

Anthracite Coal.—Favored by the weather and by general conditions, the market for anthracite has been good. Stocks are low, last week's great snow storm having blocked traffic for a number of days. There is also some good buying, due to the possibility that there will be no decrease in prices, as is usual with the opening of spring trade each year. The demand at present is not only local, but from the outside, and hard coal will continue to move in quantity for some days to come. Prices remain for egg and stove, \$5.75, and chestnut, \$6. Chestnut continues to be in heavy demand, with supply still limited.

Bituminous coal is in fair demand, considering the lessened activity among the machinery manufacturers and others, due to labor troubles. Many manufacturing concerns have been forced to run on materially reduced output, and in consequence soft coal has not been in such demand as might have been expected. However, there is a good aggregate quantity moving, and should the labor troubles be settled there will doubtless be a great run on soft coal. The storm having blocked the railroads, the shipments of soft coal to town have been greatly delayed, and in consequence the supply of coal has been lessened during the week. This has had a tendency to stiffen prices, and for the time being there will be no decrease.

Coke continues in active demand, and through scarcity of the article prices continue high.

Cleveland, O. March 15.

(From Our Special Correspondent.)

The situation, in so far as vessel charters for coal carrying are concerned, continues practically a deadlock, but the dock interests are making progress in the preparation of the docks to care for a heavy business from the opening of navigation. Conferences have been held here this week between the dock managers and the officers of the 'Longshoremen's Union, which embraces in its membership the coal handlers employed to load vessels. A marked increase in wages was demanded by the coal handlers over last year's scale of wages, but a compromise was finally effected. Occasional charters of coal cargoes are reported. One of the most recent was that of the steamer "Inter-Ocean," which was chartered for the season a few days ago to carry coal from Ohio ports to Escanaba at the rate of 60c. per ton. There is plenty of coal offering for the head of the lakes at the rate of 50c. per ton, at which quite a little chartering has already been done, but the vesselmen do not seem to be in any hurry to cover it, although there are fleets of boats with an aggregate capacity running up into millions of tons, which have not as yet made a single charter for coal carrying. All of the boats are well supplied with ore cargoes, and it looks as if a number of the carriers intend to force the coal shippers to pay their terms. Estimates made by the coal shippers indicate that 1,500,000 tons of soft coal have been contracted for movement to the head of the Lakes, and probably 350,000 tons more to Lake Michigan ports, but the vesselmen claim that these figures are too high. Practically no coal charters to Milwaukee have been made. Meanwhile, plans for handling the coal go actively forward. Several new loading plants are under way at the loading ports on Lake Erie, and reports to the Cleveland operators' offices from the head of the Lakes indicate that the capacity there will be heavily increased. At West Superior the Philadelphia & Reading Company is figuring on erecting three new unloading towers, and the Lehigh Valley Coal Company will make repairs to the dock which it leases. These are to be made, it is reported, with the understanding that the company will re-lease the dock in May.

Pittsburg March 14.

(From Our Special Correspondent.)

Coal.—The deadwork wage scale for the coal miners of this district has not yet been arranged, and until this matter is decided there will be no change in the situation. No large contracts

will be taken until the actual cost of production is known. The joint conference of committees representing the two coal combinations and the miners' organization has been in progress for over a week, and no announcement has yet been made as to the indications of a settlement. About 3,000,000 bus. of coal were shipped to Southern ports during the week.

Connellsville Coke.—The shipments increased during the week, and coke continues to be in great demand, and prices are firm. Furnace coke is selling at \$3.75@4, and foundry brings \$4.25@4.50 a ton. Out of the 20,071 ovens in the region but 474 are idle. The production for the week was 216,728 tons. The shipments aggregated 11,505 cars, distributed as follows: To Pittsburg and river points, 3,248 cars; to points west of Pittsburg, 5,784 cars; to points east of Connellsville, 2,509 cars. This is an increase of 305 cars compared with the previous week.

SLATE TRADE REVIEW.

New York.

Mar. 16.

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.	Bangor	Bangor Ribbon.	Alb'n. or Jackson Bangor.	Lehigh.	Peach Bottom.	Sea Gr'n.	Unf'd & Green.	Red.
24 x 14	6.10	3.50	3.00	3.25	3.10	5.10	3.15		
24 x 12	6.80	3.50	3.00	3.25	3.10	5.25	3.15	3.75	
22 x 12	6.60	3.50	3.25	3.50	3.25	5.25	3.15	3.75	
22 x 11	6.50	3.75	3.25	3.50	3.25	5.25	3.15	4.00	
20 x 12	6.90	3.75		3.50	3.25	5.25	3.15	3.75	
20 x 11	6.80			3.75	3.50	5.25	3.15		
20 x 10	6.80	4.50	3.50	3.75	3.50	5.35	3.15	4.25	11.00
18 x 12	6.80	3.75		3.50	3.25	5.25	3.15	3.50	
18 x 11	7.00						3.15	3.75	
18 x 10	7.20	4.50	3.50	3.75	3.50	5.35	3.15	4.00	11.00
18 x 9	7.10	4.50	3.50	3.75	3.50	5.35	3.15	4.25	11.00
16 x 12	6.80	3.75		3.50	3.50		2.95	3.50	
16 x 10	7.10	4.25	3.50	3.75	3.50	5.25	2.95	4.00	11.00
16 x 9	7.00	4.25		3.75		5.35	2.95	4.25	11.00
16 x 8	7.20	4.50	3.50	3.75	3.10	5.35	2.95	4.25	11.00
14 x 10	6.60	3.75	3.25	3.25		5.25	2.85	3.75	11.00
14 x 9	6.50						2.85	3.75	11.00
14 x 8	6.60	3.75	3.25	3.25	3.10	5.10	2.85	4.25	11.00
14 x 7	6.40	3.75	3.25	3.25	3.10	5.10	2.60	4.25	11.00
12 x 10	5.80						2.60	3.25	
12 x 9	5.60						2.60	3.25	
12 x 8	5.50	3.50		3.00	2.80	4.85	2.60	3.50	9.50
12 x 7	5.00	3.25		3.00	2.80	4.85	2.50	3.50	9.50
12 x 6	4.80	3.25		3.00	2.80	4.75	2.50	3.50	9.50

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 Bangor are 50c. extra when full 3-16 in.

The milder weather promises an early resumption of work at many of the large quarries, and already they are cleaning up their banks. The spring trade begins to attract attention, but orders are coming in rather slowly.

In Tennessee the Blount County deposits are to be worked on an extensive scale.

The shipments of slate in February from Slattington and Walnutoport, Pa., were as below, comparison being made with the same month last year:

	1899.	1900.	Changes.
Roofing, squares.....	7,979	6,168	D. 1,811
School, cases.....	1,046	1,601	I. 555
Blackboards, crates.....	940	864	D. 76

As compared with January, 1900, the movement in February shows a decrease of 2,524 squares of roofing slate, 579 cases school slates and 776 crates of blackboards.

In export trade further orders have been received by some Pen Argyll, Pa., quarrymen from Germany and England, which, it is said, will keep them busy all this season.

Freight rates are still very firm at about 15s. to London and corresponding rates to other ports.

IRON MARKET REVIEW.

NEW YORK, Mar. 16, 1900

Pig Iron Production and Furnaces in Blast.

Fuel used	Week ending				From Jan., '99.	From Jan., '00.
	Mar. 17, 1899	Mar. 16, 1900	F'ces.	Tons.		
An'racite & Coke.	175	224,950	264	286,350	2,527,809	3,098,677
Charcoal.	16	4,625	29	7,175	57,267	83,997
Totals.	191	229,575	293	293,525	2,585,076	3,182,674

The feature of the market during the present week has been the sale of a considerable quantity of Bessemer pig in Pittsburg, at the full price fixed by the Bessemer Association of \$24 at Valley Furnace, or \$24.90 Pittsburg. All of this is for delivery before July, and it indicates very plainly that there will be no shading in prices before that time. The position in steel billets is very much the same, and the maintenance of present quotations for the first half of the year is fairly certain. For the third quarter there is a good deal of bargaining, but sellers' views are very stiff, and no business has been concluded.

But little business has been done in foundry iron, and large buyers are generally pretty well supplied. Here, also, makers are not inclined to grant any concessions, feeling certain that the demand will justify an adherence to their quotations. There has been quite a demand for forge iron and basic pig, with very little to sell.

In finished material business continues active, and some very large contracts are under discussion, as will be seen by our local letters. It is understood that negotiations have already been opened in New York for the material for the Rapid Transit tunnel. The quantity required will be somewhere between 70,000 and 80,000 tons, with deliveries extending over two or three years.

Export inquiries are numerous and pressing enough to justify sellers both of raw and finished material in refusing to make concessions.

The Alabama Iron Committee reports shipments of pig iron from Alabama and Tennessee furnaces at 112,595 tons in February, and 231,544 tons for the two months ending February 28th. Iron pipe shipments were 3,187 tons and 5,520 tons respectively. From the Birmingham District alone the pig iron shipments were 73,014 tons in February, and 146,435 tons for the two months; these figures are included in the totals above. Export shipments for the two months included 16,637 tons of pig iron and 1,448 tons of iron pipe. The total shipments show an increase of nearly 25% over last year.

Birmingham, Ala. March 12.

(From Our Special Correspondent.)

There is not an abundance of pig iron in this section of the country, and the production for the last fortnight has been far from being steady. The scarcity of raw material has been the cause of decreased production in this part of the country. The Tennessee Coal, Iron and Railroad Company will shortly have 200 more coke ovens in blast in the Pratt Mines division, and there will be about 100 more in other parts of the district to go in blast within the next few weeks. The ore supply is being increased just as rapidly as labor can be secured. Good weather is setting in, and it is believed that the production from labor performed mostly out doors will be sufficient to meet all demands.

The quotations hold their own: No. 1 foundry is quoted at \$18.50, and gray forge is scarce at \$16; No. 2 foundry iron, which has been in active demand for some time now, is still very scarce, and the furnaces do not seem to be producing as much of this grade as might be desired.

Williamson Furnace, located in the city, is ready for operation. Orders have been given for a full supply of raw material, but it is hard to get, and consequently the furnace cannot get into blast until the stock houses have been filled. Mary Pratt Furnace, belonging to the Alabama Consolidated Coal and Iron Company, located just outside the city limits, is being worked on now, and it is believed that within four months it will be ready for blast. The company will be able almost to supply its own needs in raw material. There has been an unusual inquiry received from foreign buyers. So far no large orders have been placed for shipments abroad. The local furnacemen do not seem to be very anxious to accept business from the foreigners.

The following are the quotations given for the product: No. 1 foundry, \$18.50; No. 2 foundry, \$17.50; No. 3 foundry, \$16.50@16.75; No. 4 foundry, \$16@16.50; gray forge, \$16; No. 1 soft, \$18.50; No. 2 soft, \$17.50.

The rolling mills, foundries, machine shops and other smaller industries are running in full blast, and are using no small quantities of pig iron. The steel wire and rod mill at Ensley is turning out a small quantity of its product, using from 7 to 10 tons of steel billets from the steel plant now daily. It is proposed to continue in operation and by degrees increase the amount of steel used, as the machinery gets into shape, until the entire plant is in full operation, using 300 tons of steel per day. All machinery is in place, but alignment and oiling has to be done yet, which will take but a few weeks.

Chicago. March 13.

(From Our Special Correspondent.)

Pig Iron.—Sales of pig iron during the past week were small, business for the time being influenced somewhat by labor troubles. No large sales are reported. There is some inquiry coming in from various concerns, foundries predominating. Outside trade continues fairly good, the strikes not having as yet gone outside of this city. The Southern furnaces are firm in prices, though a few of the smaller concerns continue to elude quoted prices. The Northern furnaces continue very firm, and although the present situation looks somewhat gloomy it is hoped that the labor troubles will soon be settled and business will be of such a nature as to guarantee the upholding of present prices. Quotations are as follows: Lake Superior charcoal, \$25.50@26; local coke, foundry No. 1, \$24.50@25; No. 2, \$23.50@24; No. 3, \$22.50@23; local Scotch No. 1, \$25@25.50; Ohio strong softeners No. 1, \$24.50@25.50; Southern silvery, according to silicon, \$25.50@27; Southern coke No. 1, \$22.85@

\$23.35; No. 2, \$21.85@22.35; No. 3, \$20.85@21.30; No. 1 soft, \$22.85@23.35; No. 2 soft, \$21.85@22.85; malleable Bessemer, \$25@26; foundry forge, \$20.80.

Cleveland, O. March 15.

(From Our Special Correspondent.)

Iron Ore.—Vessels and ore shippers have almost given up hope of moving ore cargoes late in April, which was the plan a few weeks ago. More than two weeks of almost uninterrupted cold weather, which has been general throughout the entire Lake region, has made it evident that in all probability it will be May before the first ore cargoes arrive at Lake Erie ports. Sales of ore during the past week have amounted to practically nothing, the whole market waiting upon an activity in Bessemer pig. The transportation situation has not been much more active. The surprise of the week was occasioned by the refusal of the management of the Rockefeller fleet to make season charters at the rates which have prevailed. When John D. Rockefeller made heavy purchases and charters of ore-carrying vessels last fall he secured tonnage the aggregate carrying capacity of which, together with that of the boats previously in his possession, is close to 6,500,000 tons. This is fully 2,000,000 tons in excess of the requirements to which he has thus far bound himself. It has been generally supposed all along that this additional tonnage would be placed on the market and chartered at a rate possibly slightly in excess of \$1.25, but when shippers who have ore to come from the head of the Lakes made overtures for boats to the Rockefeller interest a few days ago, they were met with a refusal to let any of the tonnage go at this time. Inasmuch as there is fully 300,000 tons of ore for movement from the head of the Lakes still uncontracted, the situation begins to look a trifle serious for the shippers, and it would not be surprising to see the "wild" rate spring to a pretty high figure early in the season. All the owners of "wild" tonnage seem to be following the Rockefeller lead and holding off. It is likely that the end of the present week will see the settlement of the question of the wages of the men employed in unloading ore on Lake Erie docks, which has been a source of worry to everybody in iron circles for some time past. A rate of 14c. per ton for shoveling ore has been agreed upon, this being an advance of from 3 to 3½c. over the rate at the opening of the season last year. On this basis the cost to vessels for unloading ore will be 20c. per ton. Even a more serious matter for adjustment is that of the number of hours which are to constitute a day's work. The workmen demand that the work day be reduced from 12 to 10 hours, a change which would very seriously affect the iron interests, inasmuch as it would often necessitate a large vessel remaining in port two days, whereas under the old plan she could get out in one day. On iron ore we quote: No. 1 specular and magnetic, \$6@6.50; No. 1 specular and magnetic, non-Bessemer quality, \$5@5.25; red hematite, Bessemer, \$5.25@5.50; red hematite, non-Bessemer, \$4@4.50. Season vessel charters for ore carrying: From the head of the Lakes, \$1.25; from Marquette, \$1.10; from Escanaba, \$1.

Pig Iron.—The combination of cold weather and scarcity of coke seriously crippled many furnaces in this section of the country during the past few weeks. The severity of the weather almost suspended work at the Lake Erie docks and for at a time only a few carloads of ore were forwarded to furnaces. The coke supply shows very little improvement, and to add to the other problems a number of the railroads are very far from satisfying demands in the matter of car supply. The week has been devoid of great activity, so far as sales are concerned. There is scattered buying in Bessemer, but active transactions for the third quarter still hold off. Very much the same is true of all the foundry grades. Forge and Southern irons are firm at the prices which have ruled for several weeks, but the supply of the latter shows a depletion. The quotations: Bessemer, \$25; No. 1 foundry, \$23; No. 2 foundry, \$22.50; gray forge, \$21.50; Lake Superior charcoal on Lake Erie docks, \$25.50.

Plates.—In the finished material market the most interesting developments of the week have been found in plates. The American Ship Building Company, the newly formed trust of Lake yards, has been asked for bids on two new passenger steamers to cost upward of \$1,000,000 each. The inquiry recently made for plate was for the new revenue cutter for Lake service, which will likely be built by an Atlantic coast firm. The local office of the Carnegie Company closed contracts for about 1,000 tons of universal plate, and there have been several inquiries for good-sized lots. The market is very slightly, if any, improved as to prices, sales being made at 2.20c. and under.

Scrap.—Prices are gradually dropping in some grades, and the buying is proportionately freer. Prices, No. 1 wrought, \$22; No. 1 cast, \$16.25; steel melting stock, \$21; car wheels, \$23; turnings, \$13; borings, \$11.

Philadelphia. March 14.

(From Our Special Correspondent.)

Pig Iron.—The market continues quiet, despite rumors of large transactions likely to occur in

forge and foundry. Bessemer is strong and active, and production is sold far ahead. This is also found true of basic. Low phosphorus is also high and sold far ahead. Quotations for No. 1 foundry are \$24@24.50; No. 2, \$22.50@23.25; gray forge standard, \$19@20.

Muck Bars.—A moderate business has been done in muck bars at \$30@30.50.

Billets.—Billets have been sold in small lots at \$35. There are offers for large lots at \$34. It is intimated to-day that some big business will likely be done upon buyers' views, but the agents of mill men say there is no ground for such a statement.

Merchant Iron.—The merchant bar mills are all busy. Mills through the Schuylkill Valley have been booking a goodly number of orders for early summer delivery. It is intimated that slight concessions have been made, and while no positive denial is made as to some shading, general quotations remain at 2.15@2.20c. for refined. Common, 2.10c.

Skelp Iron.—Skelp iron is under inquiry from Western makers, who have secured large orders and are anxious to see what skelp can be had for here.

Sheet Iron.—No change has been made in the sheet iron market. No. 10 to 14 is 2.60c.; No. 17, 3.10c.; No. 28, 3.30@3.40c.

Merchant Steel.—There is a willingness to make purchases, provided sharp concessions can be made, but agents say there will be no concessions.

Plate Iron.—Three or four considerable orders were placed for plate iron within 48 hours. The prices are unknown. It is presumed that the orders were booked at a slight concession. The disposition of manufacturers is to get all the business they can, and this means a shading of prices.

Structural Material.—The greatest activity prevails in structural material, and during the past week or ten days very large orders have been placed, aggregating 40,444 tons, although only a portion of this has come to our Eastern concerns. There are inquiries on the market for 30,000 or 40,000 tons more. Quotations are unchanged. Channels and beams, 2.40@2.50c.

Steel Rails.—Contracts have been placed within a short time for 30,000 to 40,000 tons of steel rails, although the particulars are not mentioned. It is known that there is a good deal of inquiry for light rails, and some sales have been made at \$40@42. There are also inquiries in hand for spring deliveries of rails for trolley line purposes, and the representatives of this business say that a good business will undoubtedly be done.

Old Rails.—Old rails are quiet and firm. Quotations, \$24@26.

Scrap.—All lines of scrap are so scarce that it is hardly worth while quoting. Iron axles could sell promptly at \$27, and steel axles at \$26; castings are quoted at \$15, and cast borings at \$14; old car wheels, \$23.

Pittsburg. March 14.

(From Our Special Correspondent.)

During the week there were offers for more Bessemer pig iron than could be furnished, and this, it is believed, disposes of the idea that some iron was contracted for merely for speculation. The sales this week about complete the capacity of the furnaces now in operation. All sales were made at the full association price of \$24. Valley. A small sale was made from a furnace outside of the association at a price not given, but supposed to be lower. This, however, has no bearing on the market. One of the furnaces east of Pittsburg, which has been on foundry iron, goes on Bessemer pig iron tomorrow. This indicates a slight weakening in foundry iron. The strike at the three furnaces at New Castle has been settled, the men agreeing to return to work at the former wages. The furnaces will be in blast again tomorrow if nothing further interferes. One of the leading steel concerns of this district was completely out of pig iron last Monday, but the Bessemer Association immediately shipped a sufficient amount to meet the requirements. This concern is not selling any billets, as it has use for all the steel made. There does not seem to be any Bessemer pig iron available until after July 1st. The demand for Bessemer steel billets is somewhat improved, but there is no change in price. There were more inquiries for billets this week than last. There is but little change in the structural material market. The steel concerns in this section are not apparently making any strong effort to get the contract for furnishing 17,000 tons of structural steel for the Wanamaker building in Philadelphia, and it will likely go to the Pencoyd Iron Works. The plate market continues to be disturbed by the efforts of two leading concerns to secure business. These companies are said to be responsible for the low price. The sheet market is strong, and higher prices are likely to prevail before the close of the month.

Pig Iron.—Sales aggregating 16,000 tons were made during the week at the full price of \$24

in the Valleys, and \$24.90 delivered in Pittsburg. It is for delivery during the first half. No sales have yet been made for delivery beyond July 1st. Foundry iron is not as strong this week, and No. 2 is quoted at \$22.50, a drop of 50c. during the week. Gray forge is still quoted at \$21 delivered in Pittsburg.

Steel.—The Bessemer steel billet market shows some sign of improvement. While there is a fair number of inquiries, sales this week did not exceed 1,000 tons. The price quoted remains at \$35. Steel bars are in fairly good demand and are quoted at 2.85c. at the mill. The structural steel market is strong and some large orders have been placed lately. The demand for plates is good, and prices for tank plates range from 2 to 2.25c. Sheet bars are still quoted nominally at \$26 at the mill.

Sheets.—There is no change in the sheet market. Buyers seem to be delaying in the hope that the consolidation may fall and lower prices rule. The committee having charge of the new combination assert that the American Steel Sheet Company, the name of the combination, will be doing business before the close of the month. The minimum price of 3.10c. is quoted for Nos. 27 and 28 gauge, but no sales are recorded below 3.20c.

Ferro-manganese.—The price remains at \$125, with a continued good demand.

Cartagena, Spain. March 6.

(Special Report of Barrington & Holt.)

Iron and Manganiferous Ores.—During February 15 cargoes of iron ore have been cleared from this port, 6 being for the United States and 9 for the United Kingdom. Of these cargoes 12 were of dry ore and 3 of manganiferous ore. The market for every class of iron ore remains extremely firm and a further increase of 10% on donkey transport was imposed from February 1st. The local producers are now quoting one peseta per ton higher at their deposits for ordinary iron ore than they were doing a month ago, and they further insist selling the ore "as mined" without giving any guarantee or basis of iron. Iron mines in the Cabezo Gordo District, situated about 15 miles from Cartagena, have just been started. This must be considered an entirely new district, although some 20 or 30 years ago a sample cargo was brought from these mines, but nothing has since been done there. The quality of the ore is very pure and the analysis from the surface workings are as follows: Combined water, 15.3%; silica, 2.35%; ferric oxide, 65.4%; iron, 45.78 % manganese oxide, 0.82%; lime, 15.35%; magnesia, 0.25%; sulphur, 0.06%, and phosphoric acid, 0.02%. The first cargo of this ore is going to be shipped to the Glasgow Iron Company. Freight rates are very firm all round and tonnage is difficult to secure.

We quote iron ore per ton f. o. b. Cartagena or Portman, as follows: Ordinary 50% Portman, 7s. 6d. @ 8s.; special low phosphorus, 7s. 10d. @ 8s. 2d.; extra quality low phosphorus, 8s. 6d.; special iron ore, 9s.; specular, 11s. For manganiferous ore we quote f. o. b. Cartagena, 15s. 6d. for No. 1 containing 20% iron and 20% manganese; 12s. 6d. for No. 1 B, 25% iron and 17% manganese; 12s. for No. 2, 30% iron and 15% manganese, and 10s. for No. 3, containing 35% iron and 12% manganese. Any new tax that may be levied by the Government to be paid by the buyers.

New York. March 16.

As yet there is no change in local conditions in the iron trade; there is a fair volume of business and a firm tone to the market. In export trade we note shipments of \$53,000 worth of pipe, \$35,000 worth of bridge material; \$35,000 worth of cut nails and \$25,000 worth of manufactured iron to Japan, continued shipments of tools and good orders for agricultural machinery from France; shipments of \$50,000 worth of mining machinery, \$30,000 worth of manufactured iron and \$35,000 worth of hardware; a shipment of 1,000 tons of steel rails to South Africa; a consignment of \$63,000 worth of locomotives and \$18,000 of power cranes to England and good shipments of railroad material and machinery to Russia.

Pig Iron.—The stand-off between buyers and consumers continues. Considerable iron is changing hands to supply immediate wants, but the market is generally quiet. We quote for delivery to July, Northern brands, tidewater delivery: No. 1 X foundry, \$24@24.75; No. 2, \$22.50 @ \$23.25; No. 2 plain, \$21.75 @ \$22.50; Southern brands, New York delivery: No. 1 foundry, \$22.50 @ \$23; No. 2 foundry, \$21.50 @ \$22; No. 1 soft, \$21.50 @ \$23.25; No. 2 soft, \$21.50 @ \$22; No. 3 foundry, \$21.25.

Warrant iron shows no fluctuations, dealings have got about to the vanishing point. No. 2 Alabama foundry, \$16.50; No. 3, \$15.25; No. 4, \$15; gray forge, \$15.

Bar Iron and Steel.—Trade shows little change and is of very fair volume. We quote refined iron at 2.30c. on dock, and common up to 2.15c. Soft steel bars, 2.45c.

Plates.—The market is easy. We quote for large lots at tidewater: Tank, 3/4-in. and heavier, 2.30c.; tank, 3/16-in., 2.40c.; shell, 2.50c.; flange, 2.60c.; marine, 2.80c.; firebox, 2.80c.; universals, 2.40c.

Steel Rails and Rail Fastenings.—Domestic business is light; there is some inquiry for export. We quote for standard sections \$35 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, \$36, with the usual advance for small orders. We quote angle bars, 2.35c.; fish plates, 2.30c.; spikes, 2.70c.

Structural Material.—The aggregate volume of material called for is considerable, but there are reports that a considerable number of large buildings which were projected may not be started at once. We quote in large lots at tidewater: Beams, 2.45c.; channels, 2.45c.

METAL MARKET.

NEW YORK, March 16, 1900.

Gold and Silver.

Gold and Silver Exports and Imports

At all United States ports in February and year.

Metal.	February.		Year.	
	1899.	1900.	1899.	1900.
GOLD.				
Exports	\$ 567,962	\$1,408,658	\$2,323,413	\$7,094,948
Imports	5,148,906	1,899,378	11,541,250	3,887,650
Excess	I. \$4,580,944	I. \$495,720	I. \$9,217,837	E. \$3,207,298
SILVER.				
Exports	4,319,074	4,952,644	9,679,880	9,551,843
Imports	1,427,027	2,786,095	4,556,879	4,916,430
Excess	E. \$2,892,047	E. \$2,166,549	E. \$5,144,001	E. \$4,635,411

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 March 15th, 1900, and for years from January 1st, 1900, 1899, 1898, 1897.

Period.	Gold.		Silver.		Total Excess, Exp. or Imp.
	Exports.	Imports.	Exports.	Imports.	
We'k	\$23,070	\$39,994	\$950,040	\$159,767	E. \$773,349
1900.	2,396,206	1,029,283	8,485,219	963,599	E. 8,888,543
1899.	872,429	4,034,483	6,236,400	502,559	E. 2,481,787
1898.	3,533,536	15,900,819	8,551,555	566,877	E. 4,382,605
1897.	1,033,811	981,078	8,506,745	477,902	E. 447,902

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

The United States Assay Office in New York reports the total receipts of silver at 103,000 oz. for the week. Total since January 1st, 1,235,000 oz.

Prices of Foreign Coins.

	Bid.	Asked
Mexican dollars.....	\$.47 1/2	\$.49
Peruvian soles and Chilean pesos.....	.44	.46
Victoria sovereigns.....	4.86	4.88
Twenty francs.....	3.86	4.88
Twenty marks.....	4.75	4.88
Spanish 25 pesetas.....	4.78	4.82

Average Prices of Silver per oz. Troy.

Month	1900.		1899.		1898.	
	London Pence.	N. Y. Cents.	London Pence.	N. Y. Cents.	London Pence.	N. Y. Cents.
January...	27.30	59.30	27.42	59.36	26.29	56.77
February...	27.49	59.76	27.44	59.42	25.89	56.07
March...	27.48	59.64	27.48	59.64	25.47	54.90
April...	27.65	60.10	27.65	60.10	25.95	56.02
May...	28.15	61.23	28.15	61.23	26.31	56.98
June...	27.77	60.43	27.77	60.43	27.09	58.61
July...	27.71	60.26	27.71	60.26	27.32	59.06
August...	27.62	60.00	27.62	60.00	27.48	59.54
September...	27.15	58.89	27.15	58.89	28.05	60.08
October...	26.70	57.98	26.70	57.98	27.90	60.42
November...	27.02	58.67	27.02	58.67	27.93	60.60
December...	27.21	58.99	27.21	58.99	27.45	59.42
Year...	27.44	59.58	27.76	58.26	26.78	58.26

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.	
	1900.	1899.	1900.	1899.	1900.	1899.	1900.	1899.
Jan.....	15.58	14.26	27.07	22.48	4.68	4.18	4.65	5.34
Feb.....	15.78	17.02	30.58	24.20	4.675	4.49	4.64	6.28
March...	16.35	16.35	23.82	23.82	4.37	4.37	4.61	6.31
April...	17.13	17.13	24.98	24.98	4.31	4.31	4.67	6.67
May...	17.20	17.20	25.76	25.76	4.44	4.44	4.68	6.88
June...	16.89	16.89	25.85	25.85	4.43	4.43	4.68	6.88
July...	17.10	17.10	26.63	26.63	4.52	4.52	4.68	6.88
August...	17.42	17.42	31.53	31.53	4.57	4.57	4.68	6.88
Sept...	17.31	17.31	32.74	32.74	4.58	4.58	4.68	6.88
October...	16.94	16.94	31.99	31.99	4.575	4.575	4.68	6.88
Nov.....	16.49	16.49	28.51	28.51	4.575	4.575	4.64	6.84
Dec.....	15.85	15.85	25.88	25.88	4.64	4.64	4.66	6.86
Year.....	16.67	16.67	25.12	25.12	4.47	4.47	4.75	5.75

Commencing with March 17th, the prices given in the table for copper are the averages for electrolytic copper; this is the case for both 1899 and 1900. The average price for Lake copper for the year 1899 was 17.61c. For January, 1900, the average price of Lake copper was 16.33c.; for February, 16.08c.

Imports and Exports of Metals.

Port.	Week, Mar. 14.		Year 1900.	
	Expts.	Impts.	Expts.	Impts.
*New York.				
Aluminum..... long tons	8		13	19
Antimony ore..... "		1130		533
" regulus..... "		119		128
Chrome ore..... "				81
Copper, fine..... "	3,578	875	21,418	4,669
" matte..... "			281	
" ore..... "				640
" ash..... "				15
Ferro-Chrome..... "				10
Ferro-mangan'ese..... "				90
Iron ore..... "		2,794		7,824
" pig, bar, rod..... "	45		1,256	1,166
" pipe..... "	39		2,403	124
" plates, sheets..... "			284	
" pyrites..... "		12,700		2,700
Lead..... "	200	400	19,348	11,256
" ore..... "				2,100
" dross..... "			24	
Manganese, ore..... "				1,961
Metals, old, scrap..... "	22	161	422	1,835
Composition..... "			794	
Nails..... "	942		6,849	
Nickel..... "	100	15	402	45
" ore, matte..... "				2,821
" Rail'd material..... "			190	808
" Rails, old..... "			161	518
" Spiegeleisen..... "			105	15
" Steel bars, plates..... "			435	4,353
" wire..... "	1,979		9,130	18
" not spec'd..... "	665		2,937	
Tin..... "		226	1,338	669
" dross or ashes..... "		880		5,688
" and black plates..... "			3	
Zinc..... "		1,304		7,429
" dross..... "				31
" ashes, skim..... "	2		144	50
" ore..... "	121		357	10
†Baltimore.				
Antimony regulus..... casks				2,930
Chrome ore..... long tons				1,733
Copper, fine..... "	1,081		10,604	
" matte..... "				87
" pipe..... "				7,681
Ferro-manganese..... "			1,191	130,075
Ferro-silicon..... "			11,145	5,780
Iron pig, bar, etc..... "			11,895	50,385
" ore..... "				251
" pyrites..... "				541
Manganese ore..... "				1,684
Metals, old & Rails..... "				251
Nails..... "				561
Pipe, iron & steel..... "				1,684
Spiegeleisen..... "				103
Steel, bars, pl'es..... "	3,709		5,614	25
" rails..... "			284	
" not specified..... "	621		17,587	
Tin..... "				556
" and blackplates..... "				
" other..... "				
Zinc..... "				
" dross, skim..... "				
" oxide..... "				
*Philadelphia.				
Antimony..... long tons				
Chrome ore..... "				
Copper, fine..... "	175		737	
" ore..... "				6,872
" old..... "				
Ferro-manganese..... "				
Ferro-silicon..... "				2,124
Iron, pig..... "				61,680
" ore..... "				
" pyrites..... "				11,900
Manganese ore..... "				
Steel sheets..... "				3,570
Spiegeleisen..... "				90
Tin..... "				1,367
" and black plates..... "			349	
Zinc dust..... "				

Total United States.

Articles.	Jan., 1900.		Year 1899.	
	Expts.	Impts.	Expts.	Impts.
Antimony..... long tons		86	8	1,411
" ore..... "		342		1,778
Copper fine..... "	12,889	4,313	111,572	31,904
" ore & matte..... "	375	2,122	5,219	31,637
Iron, pig & bar..... "	9,995	6,877	239,891	60,163
" ore..... "		89,715	40,690	674,098
Iron & steel plates..... "	1,988	1,171	56,981	7,044
Iron & steel rails..... "	16,206	287	177,714	2,134
" wire..... "	6,292	137	116,332	2,363
Lead, pigs, bars..... "	30	11	54	215
Lead in ore, etc..... "	4,727	4,291	66,720	84,442
Manganese ore..... "				25
" and oxide..... "		35,256		188,349
Nicke' ore & matte..... "	131		2,294	
Nails, cut..... "	835		9,974	
" wire..... "	4,195			

Financial Notes of the Week.

Trade continues active, as the demand for money from interior points shows very clearly. Money in New York is higher, and a further drawing in of loans by the banks is going on, which has affected speculation considerably. That there is still enough for business and for investment is shown by the fact that considerable amounts have been remitted to London for investment in the new war loan which the British Government is about to issue. This is a curious reversal of former conditions.

The event of the week has been the adoption of the conference report on the new currency, or gold standard, bill, which passed both houses of Congress, and promptly received the President's signature, thus becoming law. Opinions differ as to its immediate effect, but they will probably be hardly perceptible at present.

Exports of merchandise from the United States in February continued large, amounting to \$119,765,762, or \$2,168,632 more than in January. For the eight months of the fiscal year from July 1st to February 28th the statement is as follows:

	1899	1900.
Exports.....	\$843,433,266	\$919,873,086
Imports.....	427,201,533	553,069,617
Excess, exports.....	\$416,231,433	\$366,803,469
Add excess of exports, silver.....		14,575,750
Total.....		\$379,329,219
Deduct excess of imports, gold.....		6,918,352
Apparent balance.....		\$372,410,867

The gold and silver movement in detail will be found in the usual place, at the head of this column.

The statement of the New York banks—including the 63 banks represented in the Clearing House—for the week ending March 10th, gives the following totals, comparison being made with the corresponding weeks in 1899 and 1898:

	1898.	1899.	1900.
Loans and discounts.....	\$517,864,000	\$777,545,700	\$763,203,100
Deposits.....	695,481,900	906,653,200	829,425,700
Circulation.....	13,795,700	14,469,500	18,931,900
Reserve:			
Specie.....	124,064,600	136,200,100	152,729,600
Legal tenders.....	72,527,300	53,666,700	60,303,200
Total reserve.....	\$196,591,900	\$249,866,800	\$213,032,800
Legal requirements.....	173,870,475	226,663,800	207,356,425
Balance, surplus.....	\$22,721,425	\$23,203,000	\$5,676,375

Changes for the week, this year, were increases of \$8,127,000 in loans and discounts, and \$357,600 in circulation; decreases of \$491,300 in deposits, \$5,448,300 in specie; \$2,639,700 in legal tenders, and \$7,965,175 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 at the corresponding date last year:

Banks.	1899		1900	
	Gold.	Silver.	Gold.	Silver.
N.Y. Ass'n.....	\$196,200,100		\$152,729,600	
England.....	165,720,260		177,469,690	
France.....	361,084,775	\$239,915,295	384,538,645	\$228,183,380
Germany.....	145,655,000	75,550,000	145,365,000	74,890,000
Spain.....	58,190,000	51,280,000	68,170,000	75,970,000
Aus. Ban.....	149,665,000	52,065,000	189,215,000	45,885,000
Neth'ld's.....	21,560,000	34,275,000	24,280,000	30,140,000
Belgium.....	16,185,000	8,090,000	14,930,000	7,465,000
Italy.....	77,250,000	11,920,000	77,080,000	7,975,000
Russia.....	496,635,000	22,965,000	418,755,000	30,745,000

The returns of the Associated Banks of New York are of date March 10th, and the others are of date of March 8th, 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.

Shipments of silver from London to the East for the year up to March 1st, 1900, are reported by Messrs. Pixley & Abell's circular as follows:

	1899.	1900.	Changes
India.....	\$201,000	\$264,727	I. £263,727
China.....	239,080	71,200	D. 167,880
The Straits.....	5,000	12,250	I. 7,250
Totals.....	\$245,080	\$248,177	I. £103,097

Arrivals for the week, this year, were £179,000 in bar silver from New York, £30,000 from the West Indies, and £3,500 from Chile; total, £212,500. Shipments were £100,200 in bar silver to China, £126,000 to Bombay, £70,000 to Calcutta, and £8,950 to the Straits Settlements; total, £305,150.

Indian exchange remains fairly steady, the Council bills offered in London having been taken at an average of 16.06d. per rupee. It is believed in London that the large expenditures for famine relief will oblige the Indian Government to buy more silver for coinage into rupees soon; but no announcement to that effect has been made yet.

Other Metals.

Daily Prices of Metals in New York.

March.	Sterling Exchange.	Silver.			Copper.				Tin, cts. @ lb.	Lead, cts. @ lb.	Spelter, cts. @ lb.
		Fine oz. Cts.	Lon. don. Pence	Lake cts. @ lb.	Electro-lytic @ lb.	London standard @ ton.	Electro-lytic @ ton.	Electro-lytic @ ton.			
17	4.86	59 3/4	27 1/2	16 1/4	16 1/4	.....	35	4.67 1/2	4.65		
12	4.83	59 1/2	27 1/2	16 1/4	16 1/4	79 10 0	33 1/2	4.67 1/2	4.62 1/2		
13	4.86	59 3/4	27 1/2	16 1/4	16 1/4	78 15 0	32 1/2	4.67 1/2	4.60		
14	4.85 1/2	59 3/4	27 1/2	16 1/4	16 1/4	77 10 0	33	4.67 1/2	4.60		
15	4.85 1/2	59 3/4	27 1/2	16 1/4	16 1/4	77 10 0	33 1/2	4.67 1/2	4.60		
16	4.85 1/2	60	27 1/2	16 1/4	16 1/4	78 2 6	33 1/2	4.67 1/2	4.60		

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.

Messrs. Lewisohn Brothers, of New York, have issued the following circular, dated New York, March 10th: "We beg to inform you that the metal business heretofore carried on by us has been transferred to the United Metals Selling Company, who will carry out existing contracts which have been entered into by us. We trust you will give to the new company the confidence you have placed in us. Our offices, from March 19th, will be removed from 81 and 83 Fulton Street to offices at 11 Broadway (adjoining those of the United Metals Selling Company), where all communications to us should be addressed."

The United Metals Selling Company issues the following under the same date: "Referring to the annexed notice, we beg to inform you that the United Metals Selling Company has been formed for the purpose of taking over and continuing the metal business heretofore carried on by Lewisohn Brothers, and will carry out all unfulfilled metal contracts that have been entered into by Lewisohn Brothers. This business will be entrusted to the same general management which has heretofore conducted that of Lewisohn Brothers. Messrs. C. S. Henry & Company, 12 Leadenhall Street, London, have been appointed our European Agents."

Copper.—The market is firm and active. The increased demand foreshadowed in our report of last week has already made itself felt and much business has been done both here and abroad. Manufacturers are exceedingly busy and the refiners have difficulty in meeting their obligations. Consumers abroad have for some time past been holding aloof, hoping that lower prices would be established, but we learn that during the last few days they have been buying liberally, both for near-by and future deliveries. We quote Lake at 16 1/2c., electrolytic in cakes, wirebars and ingots at 16 1/4@16 3/4c., in cathodes at 16@16 1/2c., and casting copper at 16 1/4c.

The London market, which closed last week at £78 10s. for spot and £75 for three months, opened at £79 10s. for spot and £76 for three months. On Wednesday it declined to £77 10s. for spot and £74 10s. for three months, and closes at £78 2s. 6d. for spot, £75 5s. for three months. Refined and manufactured sorts we quote: English tough, £78 10s.@£79; best selected, £79 10s.@£80; strong sheets, £83; yellow metal, 7d.

Copper production, as reported by Mr. John Stanton, who acts as statistician for the producing companies, was as follows, for February and the two months ending February 28th, stated in long tons (2,240 lbs.) of fine copper:

	February.		Two months.	
	1899.	1900.	1899.	1900.
U. S., reporting mines.....	17,899	17,497	34,673	35,110
U. S., outside sources.....	2,000	3,400	3,850	6,800
Total United States.....	19,899	20,897	38,523	41,910
Foreign, reporting mines.....	7,399	.....	13,251	.....
Total.....	27,298	.....	51,774	.....
Exports, United States.....	8,391	12,749	17,595	26,784

The production of the foreign reporting mines has not yet been received. The United States production for the two months shows an increase of 3,387 tons, or 8.8%, over 1899; of this gain 437 tons only was from the reporting mines, 2,950 tons being from the outside sources. The exports have been large this year, showing an increase of 9,189 tons, or 52.1%, over last year.

Tin.—A large business has been done in this metal during the present week, and the demand, especially for early shipment, is very great. Arrivals have been small and stocks here are almost totally depleted. In consequence, spot tin continues to command a premium. The range of prices this week was lower, in sympathy with the decline in London, and prompt metal has sold as low as 32 1/2c., but on Thursday 33 1/2c. was realized, and at the close we quote 33 1/2c. for spot, while next month delivery is offered at 32 1/2c.

The London market, which closed last week at £151 for spot and £142 for three months, opened at £148 5s. for spot and £139 15s. for three months. On Tuesday it was almost £8 lower, being £140 10s. for spot and £137 10s. for three months. On Thursday, however, it recovered to £143 10s. for spot and £142 15s. for three months and closes at £143 15s. for spot, £143 for three months.

It will be noticed that the backwardation, which, for a long time past, has been very great, is now only 15s.

Lead.—The market remains quiet and we quote 4.56@4.70c. New York, 4.55c. St. Louis.

The foreign market is steady, Spanish lead being quoted at 16 13s. 9d.; English lead at £16 17s. 6d.

St. Louis Lead Market.—The John Wahl Commission Company telegraphs us as follows: There is no change in lead, and no one expects any in the near future. Trading continues from hand to mouth only. Prices of ordinary Missouri are 4.57 1/2c., and argentiferous brands, 4.65c.

Spanish Lead Market.—We are advised by Messrs. Barrington & Holt, of Cartagena, that the average price of lead in February was 86.75 reales per qtl. (£15 2s. 2d. per long ton) f. o. b. here, on an average exchange of 32.47 pesetas to £1. Silver averaged 14.25 reales per oz. Exports of pig lead in February were 2,289,423 kg. to Marseilles, 614,144 kg. to Newcastle, and 595,950 kg. to London; total, 3,499,517 kg. Other exports were 7,400,000 kg. zinc blende to Antwerp.

Spelter.—A fair business has been done and prices remain unchanged, New York being 4.60 @4.62 1/2c.; St. Louis, 4.45c.

The foreign market is cabled as £21 15s. for good ordinaries and £21 17s. 6d. for specials.

Antimony.—We quote 10 1/2@11c. for Cookson's; 9 3/4@9 1/2c. for Hallett's; 9 1/2@9 1/4c. for U. S. Star.

Nickel continues 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, 68c. per gram, and for smaller quantities, 70c. per gram; unmanufactured platinum will be supplied in same quantities at 2c. less per gram.

Quicksilver.—Quotations remain unchanged at \$51 per flask for large lots, New York. For small orders the prices are \$52.50@54. The London price continues at £9 12s. 6d., with the same figure named for second hands.

San Francisco quotations are \$51.50@52 per flask for local deliveries, and \$46.50@47 for export.

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

Aluminum.	Per lb.	Bismuth.....	Per lb.
No. 1, 90% ingots.....	33@37c.	Magnesium.....	\$2.75@3
No. 2, 90% ingots.....	31@34c.	Phosphorus.....	40@50c.
Roll sheets.....	42c. up	Tungsten.....	70c.
Alum.-bronzes.....	26@23c.	Ferro-tungsten, 60%.	60c.
Nickel-alum.....	33@39c.		

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

LATE NEWS.

The figures of tin-plate production in the United States, as collected by the Treasury Department for the fiscal year ending June 30th, 1899, show a total output of 791,391,488 lbs. of finished tin-plate by domestic mills during that period. This is a gain of 109,695,460 lbsf over the production of the preceding fiscal year. The American production of tin-plate by fiscal years from the start of the industry has been officially estimated as follows, in pounds: 1891-92, 13,646,719; 1892-93, 99,819,202; 1893-94, 139,223,467; 1894-95, 193,801,073; 1895-96, 307,228,621; 1896-97, 446,982,063; 1897-98, 681,674,028; 1898-99, 791,371,488.

Gilpin County, Colorado.

(From Our Special Correspondent.)

Mining Deeds and Transfers.—A. Drake et al to W. H. Simons et al, Mingo lode, lease and bond, \$15,000; W. Spencer to F. Woody, 1/6 int. Galena lode; Frank Gutzman to G. M. Dempster, 1/2 int. Antonio Maceo and Charlotte lodes; Henry W. Lamb to T. H. Becker, Stub Tail lode.

East Notaway.—Ex-Sheriff Mitchell, the lessee, is installing a new hoisting plant and enlarging the shaft-building for increased shipments. G. W. Mabee, Central City, is agent.

Great Western Exploration and Reduction Company.—This company, with capital stock of \$1,500,000, purposes to operate in Gilpin, Boulder, Routt and Arapahoe counties, with directors S. N. Wilkins of Crestone, Ia., W. J. Davenport, Council Bluffs, Ia., and John N. Williams of Boulder.

Kansas Burroughs Consolidated Mining Company.—During the past month the shipments to mills and concentrators were 3,750 tons, a very small percentage of which was smelting ore. P. McCann, Central City, Colo., is manager.

Petersen Mill.—This 15-slow drop stamp mill at Gilpin has been leased by Jenkins, Lightbourne & Company, of the Gold Dirt Mine, and is handling about 25 tons per day. James Bowden, Gilpin, Colo., is manager.

CHEMICALS AND MINERALS.

(For further prices of chemicals, minerals and rare elements, see page 350.)

New York. March 16.

Heavy Chemicals.—Soda ash is strong, and prices for immediate shipment are higher, as jobbers control the market just now. Further contracts for 1901 delivery have been booked at \$1.85@1.90 per 100 lbs. for domestic high test caustic soda f. o. b. works, and at 85@87½c. for alkali. Prime Liverpool bleaching powder is easier, while German has been offered freely at \$2 per 100 lbs., and Continental at \$1.80@1.87½, and some sold at \$2. Sal soda is firm. Chlorate of potash is unchanged. We quote per 100 lbs. as below:

Articles.	Domestic.		Foreign.
	F.o.b. Works.	In New York.	In New York.
Alkali. 58%.	85@90	95@1.10	\$.92½@95
48%.	90@95	1.00@1.15	1.02½@1.07½
Caustic Soda, high test.	\$2.25@2.37½	\$2.37½@2.50	\$2.50@2.60
powd. 60%.	.....	2.75@2.87½	.....
70@74%.	.....	3.00@3.25	.....
98%.	.....	3.67½@4.00	3.75@4.00
Sol Soda.	70@80.	.....	67½@72½
" conc.	1.45@1.75	.....	1.80@1.65
Bicarb Soda.	1.25@1.37½	.....	1.75@2.00
" extra.	3.25@3.50	.....	.....
Bleach. Pdr.	.....	.....	2.25@2.50
Eng. prime.	.....	.....	1.80 @2.00
other br'nds.	.....	.....	9.50@9.75
Chl. Pot. Cryst.	.....	.....	10.00@10.50
powd.	.....	9.75@10.00	10.25@11.00

Acids.—Contract deliveries of acetic, muriatic and sulphuric acids have improved. Blue vitriol is stronger in sympathy with the copper market. A good export demand exists for blue vitriol. Carbolic acid, since the embargo has been lifted by the British Government, is easier, and sales are reported at 21@22c. per lb. for shipment, and 25c. from steamer.

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

Acetic, No 8 in lbs.	1.62½	Nitric, 36°	3.87½
Blue Vitriol, 5.00@5.12½	.....	Nitric, 38°	4.12½
Aqua Fortis, 38°	3.52½	Nitric, 40°	4.37½
Aqua Fortis, 38°	3.57½	Nitric, 42°	4.75
Aqua Fortis, 40°	4.12½	Oxalic	6.00@6.25
Aqua Fortis, 42°	4.50	Sulphuric, 66°	1.20
Muriatic, 15°	1.20	Sulphuric, 60°	1.05
Muriatic, 20°	1.35	" bulk 50° ton	14.00
Muriatic, 22°	1.50	Sulphuric, 100%	.....
		SO ₂ anhydrous	8.00@10.00

Tin Crystals.—Owing to the advance in the metal market, makers of these salts are asking 22½c. per lb. in barrels, 23c. in kegs and 24c. in jars, all f. o. b. New York.

Brimstone.—Arrivals at this port amounted to 2,325 tons, most of which will be delivered on contract. Best unmixed seconds on spot have sold at \$21.75@22 per ton, while shipments are quoted at \$21.25@21.50. Best thirds are worth \$18.75@19 per ton. In January the total exports from Sicily amounted to 42,360 long tons, showing an increase of 7,531 tons as compared with January, 1899. Of this amount, 13,940 tons were shipped to the United States, against 5,000 tons in 1899. Stocks on hand at the five ports in Sicily on January 31st aggregated 277,353 tons showing an increase of 32,757 tons as compared with 1899.

Pyrites.—Prices are firm, and contracts have been booked on the basis of the quotations as below: Mineral City, Va., lump ores, \$4.50 per long ton (basis 42%), and fines, \$4.20; Charlemont, Mass., lump, \$5.50, and fines, \$4.75; Pilley's Island, lump, nominally, \$6.50, and fines, \$4.50 per long ton, delivered in New York. Spanish pyrites, 13@15c. 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; American, 42% to 44%, and Pilley's Island, N. F., 50%.

Fertilizing Chemicals.—The market for leading ammoniates is quiet. Swift & Company, of Chicago, have bought the Eastman plant in New York, thus becoming an important factor in the Eastern market for slaughter house products. The Swift plant in the West produced last year nearly 47,000 long tons of fertilizers. The New York plant will doubtless produce a goodly amount of fertilizer material. The shipments of fertilizers from Charleston, S. C., for the five months ending January 31st amounted to 125,907 tons, as against 80,839 tons in the corresponding period last year. The February shipments were also larger than 1899. High grade Western blood sold at \$2.25 per unit, f. o. b. Chicago, while New York soft is worth \$2.35@2.40. High grade tankage is worth \$2 and \$2.10 per unit f. o. b. Chicago. Domestic steam ground bone is quoted at \$21 per ton, and Calcutta bonemeal at \$24@26. Regular bone black, \$20@21 per ton, and spent, \$15@16 per ton.

The shipments of sulphate of ammonia from the United Kingdom in 1899 amounted to 140,371 long tons, as against 136,936 tons in 1898, and 152,981 tons in 1897. Of these exports the United States received 8,215 tons in 1899, against 4,661 tons in 1898 and 8,864 tons in 1897. The larger importers in 1899 were Germany and

Belgium, receiving together 33,622 tons, as against 42,232 tons in 1898. The production in the United Kingdom in 1899 is estimated at 202,000 tons, distributed as follows: From gas works, 133,000 tons; shale works, 37,300 tons; iron works, 18,700 tons; coke and carbonizing works, 13,000 tons. This production compares with 196,500 tons in 1898, showing an increase of 5,500 tons in 1899, due to the larger output from the iron works. The consumption in Great Britain in 1899 is reported at 58,500 tons, and the stocks carried forward to 1900 are placed at 7,000 tons.

Nitrate of Soda.—The market is strengthened considerably, owing to the small supply of spot goods. Sales have been reported at \$2.20@2.25 per 100 lbs. for spot, apparently to small consumers, while shipments are quoted at \$1.70 and upward, according to position. On several previous occasions we have forecasted such an advance, and there is a likelihood that spot will sell at a higher price still. Of course it would be inexpedient to try and "corner" the market, as was attempted some months ago, when the "manipulators" were so badly hit. It is estimated that the arrivals by May will aggregate over 180,000 bags, much of which is under contract. Fortunately, a number of the larger consumers have already placed contracts for their supplies.

Messrs. Jackson Brothers, of Valparaiso, Chile, write us under date of January 27th that there has been a large demand for nitrate of soda, and sales of 95% for prompt delivery have been made at 4s. 10½d. @ 4s. 11d. (\$1.16@1.18); May-June, 4s. 11d.; August, 5s. ½d. (\$1.21); and season's at 5s., all alongside terms. Sales of refined have been made for this year's delivery at 5s. 1½d. @ 5s. 3d. alongside, the difference in price between this quality and the ordinary reaching 4½d. per qtl. We quote ordinary nitrate at 4s. 10½d. for February-March delivery; 4s. 11d. for April-June; 4s. 11½d. July; 5s., August; and 5s. 1½d. for September-December, all ordinary terms sellers. For 96% quality, any delivery from February to July, sellers ask 5s. 4d., alongside. The price of 4s. 10½d. with 30s. all round freight stands in 6s. 11d. (\$1.06) per cwt, net cost and freight without purchasing commission. Sales reported during the fortnight ending January 20th amounted to 1,525,200 qtls., making 1,896,200 qtls. (859,971 long tons) since January 1st, this year.

Salt-peter.—Arrivals in February are reported to have been 3,981 bags, against 2,917 bags in the same month last year, and the consumption was 4,004 bags, against 2,058 bags. Stocks on hand on March 1st are estimated at 6,550 bags, showing an increase of 4,570 bags over March 1st, 1899. Expected arrivals aggregate 13,104 bags, making the visible supply 19,654 bags, as against 18,644 bags last year. Prices are \$3.75@ \$3.87½ per 100 lbs. for crude, and \$4.50@4.55 for refined quality, according to quantity.

Phosphates.—In Florida about 100 hard rock plants are operating or ready for work, many of which are said to be small ones and likely to last only a few months. The total shipments of hard rock from all ports in January are reported by Auchincloss Brothers at 23,359 long tons, all foreign, as against 28,460 tons in 1899 and 11,682 tons in 1898. The February shipments from Fernandina amounted to 15,560 tons, as against 14,855 tons in 1899.

It is reported that owing to the failure of E. J. Hassard, the phosphate miner at Juliette, Fla., the firm of Hood & Hubbard, of Dunnellon suspended business temporarily. This firm sold heavily ahead last season on an advancing market, and subsequently lost, it is claimed, \$25,000 in making good their contracts. Lately they made new contracts at high prices, which their agents did not live up to. Tennessee phosphates are in fair request, though the shipments from Pensacola, Fla., in February only amounted to 7,763 tons, as against 16,342 tons in the month of January. Concerning the foreign market for Tennessee rock it is learned that some speculators who have sold short are quoting 6½d. per unit, c. i. f. United Kingdom, or North Sea ports, while they are at the same time trying to buy at 7½@7¾d. per unit, it is said. The shipments of phosphates from Bone, Algeria, in December, 1899, amounted to 22,502 tons, as against 21,800 tons in November.

Ocean freight rates from Florida ports are about as follows: To Baltic ports, \$4.50 per ton; Continental, \$4.92, and Mediterranean ports, \$4.75, while from Savannah, Ga., to the United Kingdom \$4 is asked. We quote as follows:

Phosphates.	F. o. b. Am. Shipping Port.	C. i. f. Un'd Kingdom or No Sea Ports.	
		Unit.	Long ton.
Fla. hard rock (77@80%)	\$3.00@3.50	8¼@8½d	\$12.87@13.25
Fla. land pebble (68@73%)	4.35.....	7d	9.80
Fla. Peace River (58@63%)	3.75@4.00	8¼@8½d	7.50@7.80
Tenn. rock..... (78@80%)	3.00@3.50	6@6¼d	9.48@10.17
Tenn. rock..... (65@75%)	2.50@3.00	.....	.....
So. Car. rock, crude.....	3.75@4.00	.....	.....
So. Car. rock, dried.....	4.50@5.00	.....	.....
Algerian, rock..... (63@70%)	.....	7d	9.30
Algerian, rock..... (58@63%)	.....	6¾d	8.18

Concentrated phosphates, 13@15%, average P₂O₅, 60c. per unit (\$8.40 per ton) at sellers' works. South Carolina acid phosphates, 14%, \$6.25 per ton in bulk f. o. b. Charleston. Tennessee acid phosphates, high grade, \$10 per short ton, and low grade, \$8 f. o. b. Nashville.

Liverpool. Feb. 20.

(Special Report of Joseph P. Brunner & Co.)

There is practically no fresh development to report as regards heavy chemicals, prices being well maintained, while business is rather less active, owing to limited spot supplies. On the twelve months' trading ending December 31st, 1899, the United Alkali Company has declared the usual full dividend on the 7% preference shares, carrying forward about \$35,000. There is no dividend for the holders of ordinary shares, which is no doubt disappointing; but, on the other hand, there is some consolation that the prospects for 1900 appear much more favorable than for many years past, even after taking into account the enhanced cost of fuel, labor, etc.

Soda ash is in light supply, but quotations are unchanged, varying according to export market. We quote spot range for tierces 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 firm at £3 2s. 6d. @ £3 5s. per ton, less 5% for barrels, or 7s. less for bags, with special quotations for a few favored markets. Caustic soda continues scarce, and quotations are well maintained as follows: 60%, £9 5s.; 70%, £10 5s.; 74%, £10 15s.; 76%, £11 @ £11 5s. per ton net cash.

Bleaching powder is without fresh feature, makers still quoting hardwood at from £7 5s. and upward, according to market.

Chlorate of potash is meeting with a good inquiry, without much actual business resulting, buyers being chary of paying the recent advance. Makers are firm at 4½d., while some resale parcels are offered at a shade less.

Bicarb. of soda is moving off at varying prices, according to market, ranging from £5 5s. @ £6 15s. per ton, less 2½% for the finest quality in 1-cwt. kegs, with usual allowances for larger packages.

Sulphate of ammonia is only offering sparingly, and rather more money is asked by holders, £12 7s. @ £12 10s. per ton, less 2½%, being now about nearest value for good gray 24@25% in double bags, f. o. b. here.

Nitrate of soda keeps firm at £9 @ £9 5s. per ton, less 2½% for spot parcels in double bags f. o. b. here, according to quantity and quality.

MINING STOCKS.

Complete quotations will be found on pages 337 and 338 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. Mar. 16.

In sympathy with a higher metal market the copper shares have been stronger. Amalgamated on large trading advanced from \$93½ to \$95¼, then receded to \$94, and is weaker at the close. Anaconda showed a good tone, rising from \$46½ to \$49½, but when offerings were freer around this figure the price fell to \$47. Union of North Carolina was depressed for a time, dropping from \$10 to \$6 on sales of several hundred shares. Later this stock was forced up to \$12 on sales, and on Wednesday \$10 was bid for 500 share lots, while holders ask \$20. British Columbia was reported sold at \$9.

Little Tiger of California is slumpy, selling down to 14c. from 25c. on curb. A sale of Quick-silver preferred was made on 'change at \$8.50—the first transaction in many weeks. Standard Consolidated was strong, selling up to \$3.30. Plymouth brought 18c.

In the Colorado section Elkton was sold at \$1.20 and is firm, having declared a 3c. quarterly dividend. Isabella has also announced a quarterly disbursement of 2c., and is strong at \$1.30. Anaconda Gold is 2c. off at 40c.; Work, 1c. lower at 36c., and Pharmacist is weaker at 13c. Creede & Cripple Creek sold at 12c. and Mollie Gibson is up 1c. at 27c. Adams Consolidated gained 2c. at 20c. Small Hopes made a sale at \$1.10, Breece at \$1.75 and Iron Silver at 70c.

Ontario of Utah is higher at \$8.87½, and Dead-wood-Terra of South Dakota sold at 70c. Alice of Montana brought 65c., and Moulton 30c. Kingston & Pembroke of Ontario made a sale at 65c. Arizona Lead of Arizona, which is called on curb, is reported sold at 12½c.

More was done in the Comstocks. Consolidated California & Virginia has announced a 20c. assessment; it sold at \$1.75@1.60, and Union, which levied a 15c. assessment, sold off at 25c. Sierra Nevada is weaker at 58c., while Ophir is higher at 90c. Mexican is up 6c. at 30c., and Chollar lower at 28c. Utah brought 12c. and Justice 10c. American Smelting and Refining common moved about as last week at \$39@39½, while the preferred is higher at \$91@91¼.

The Sloss-Sheffield Steel and Iron Company shares were in fair request. The first quarterly

dividend of 1 3/4% (\$114,000) has just been declared on the preferred stock, payable April 4th. The profits for the quarter ending February 28th amounted to \$369,560, and after deducting all charges, including this dividend, there still remains a surplus of \$194,500. The Shely Iron Company has also declared a dividend of 6%, payable April 16th.

Boston. March 14.

(From Our Special Correspondent.)

Sanguine souls this week were predicting the arrival of the long-expected boom, and the market really presented a lively appearance. Trading was active and prices rose for a time. It was wholly an inside market, however, and the public held back, so far as buying was concerned. The Boston & Montana report, showing large profits, was industriously used. A good many saw, however, that the facts which were not in the report, and especially its silence about the Butte law suits, were points which rather offset the profits which the high price of copper made possible.

If there was little buying by the public, the higher prices brought a flood of orders to sell, and to-day we had a dull market, with sharp reactions in prices. Boston & Montana, which was the feature of the trading, and sold up to \$315 on Monday, dropped to \$295, and nearly all the coppers went down with it. Osceola sold at \$68 1/2, after touching \$72. Butte & Boston closed at \$61; Parrot, \$45 1/2; Utah, \$29 1/2; Centennial, \$18, and Old Dominion, \$14. There was not much done in the other coppers. The gold stocks were not in evidence at all. New England Gas and Coke sold at \$19.

Copper prices had very little to do with the movement. The recent fluctuations of price in London and their connection with the big speculation in Rio Tintos are pretty well understood here.

The boom has been tried, but when the public failed to take hold on the second day its failure was clear. The opportunity has passed for the present.

A plan for reorganization of the Santa Ysabel Gold Mining Company is in process of formulation. It is possible that a receiver may have to be appointed. The company owes between \$60,000 and \$70,000. The mill is shut down and all work at the property has been suspended. It is said that a contribution from stockholders of at least \$1 per share will be necessary.

The directors of the United States Oil Company have declared a quarterly dividend of 50c. per share, payable April 2d. The last quarterly dividend was \$1.25 (75c regular and 50c. extra).

Salt Lake City. March 10.

(From Our Special Correspondent.)

Outside of a buoyant strengthening of Daly-West, backed by a good demand for the shares and an erratic spurt in Yankee Consolidated, there were no special features in Utah mining shares the past week. On the announcement of the regular Daly-West dividend, by the new directorate, there was considerable buying and the shares rapidly advanced. They close strong at \$15.50.

Bullion-Beck is seeming less strong. Centennial-Eureka holds about unchanged in spite of the enlarged production and continued excellent reports from the mines. Daisy's career is practically at an end, sales being made under 1/2c. The more hopeful reports from Geyser-Marion lend no strength to the shares. Horn silver has moved up a few points.

May Day has supplied a happy surprise in shipping ore of higher grade than was counted on, which caused an 8-point advance. Mercur fully holds the recent advance and there are fewer offerings. Swansea paid the regular \$5,000 dividend to-day. The shares rule strong and unchanged. Utah has moved up and there is a little inquiry for the shares. Yankee Consolidated hopped up to 14. The inside talent aver there is nothing new at the mines to warrant this advance, and some say they are those who are buying. To-day the tips are both pro and con.

San Francisco. March 10.

(From Our Special Correspondent.)

The expected crop of Comstock assessments came out this week, and six have been announced. Consolidated California & Virginia calls for 20c. a share—5c. less than usual—Gould & Curry, Mexican, Union Consolidated and Yellow Jacket for 15c. each, and Hale & Norcross for 10c. These announcements seemed to relieve the market, and prices have been stronger, with freer trading than for several weeks past.

Consolidated California & Virginia sold at \$1.55 @ \$1.60; Caledonia, 90c.; Ophir, 79c.; Sierra Nevada, 37@39c.; Hale & Norcross, 33c.; Chollar, 26c.; Potosi, 26c.; Mexican, 25c.

The test run of 1,002 tons of Consolidated California low grade ore in the Kinkead mill gave a gross return of \$5.07 per ton. Expenses for milling were \$2.32, showing a profit of \$2.75 a ton. The costs included only milling and hauling, the mining not being considered. The Gould & Curry Company has decided to build a mill for

treating its low grade ores. It will have a capacity of 50 tons a day, and will be on the same plan as that of the Kinkead mill.

This low grade ore business seems to me the most encouraging feature about the Comstock for a long time. That the ores will cover the cost of milling seems assured; the main point is whether they will provide for the cost of mining also. This seems doubtful, and at best the profit will be very small; but it is better than nothing.

A good deal of money is going down into Mexico, and one hears a great deal about mines in that country.

London. March 2.

Very little business has been done this week in the South African mining market, in spite of the relief of Kimberley, the surrender of Cronje and the relief of Ladysmith. The prices went up generally on the announcement of each happy event, but the desire to realize profit was so great that no permanent advance was sustained. As regards the news of the relief of Ladysmith, I do not think I ever saw the usual solemn city of London so frantically excited as it was on March 1st, 1900. The whole of the business of the city was suspended, and the reserved Englishman was seen in the streets actually shaking hands with people he did not know. Volumes could not say more. Although every one is delighted at the course of events, it is not thought a suitable time for speculation, and no boom in the Stock Exchange or in the flotation of new companies need be expected.

The position of South African gold mining companies is well reflected in the report of the Worcester Gold Mining Company for the half year ended December 31st last. This is one of the oldest dividend payers on the Rand, having paid regularly since 1888. Of course no dividend can now be paid, nor can any accounts be submitted. The Transvaal Government seized the September output and has forced the manager to continue operations for its benefit ever since. About 1,154 oz., valued at £4,045, was taken possession of early in October, representing the September output, while 970 oz. and 1,422 oz. respectively that were produced in October and November were similarly commandeered. No definite news as to output since then has been received. During the earlier part of this year dividends at the rate of 35% had been distributed, so, after all, the shareholders may consider themselves fortunate.

The West Australian section continues to absorb the greater part of the attention of mining speculators. The reported success of the Sulman-Teed bromo-cyanogen process at Hannan's Brownhill has been used as a strong bull point, and quotations have generally advanced. On the other hand, the uncertainty as to the state of the property of Associated Gold Mines casts a damper on the market. It appears that the manager has had to resign, and that a thorough examination of the property is to be made. In the meantime it is probable that operations will be suspended. I hear also that Lake View Consols has definitely decided to adopt the bromo-cyanogen process.

In the absence of opportunity for speculating in mines, the public turn their attention to home industries, and the shares in companies manufacturing war material and in companies operating coal and iron properties receive much attention. Of iron producers, Bolckow, Vaughan & Company, of Middlesbrough, are perhaps the most popular. The profit made by this company during 1899 has been unprecedentedly large, amounting to £466,000, after full allowance had been made for depreciation, etc. Out of this sum, interest on debentures and dividend on preference shares amounting to £28,500 was paid, while £220,000 was paid on ordinary shares, being at the rate of 8%. Besides this, £215,000 was paid out of last year's profits for the purchase of the Clay Lane Iron Company's properties, consisting of an ironstone mine and 6 blast furnaces, all adjoining the properties of Bolckow, Vaughan & Company. The total properties and stocks held by Bolckow, Vaughan & Company on December 31st last amounted in value to over £4,000,000, while there is a reserve fund of £250,000.

Paris. March 4.

(From Our Special Correspondent.)

The past week has been one of sufficient movement in the mining stock market. Of course, the great excitement was in the South African Gold Stocks. The British successes this week caused a general rise in prices, and many of our people here who have sold out seem to regret their course and to be even willing to repurchase some of the securities they had parted with. It must be said, however, that while London furnished ready buyers for all the stock offered for the last three months, they do not seem willing to sell, and are evidently holding for a considerable further advance. Naturally the relief of Kimberley was followed by a sharp rise in De Beers.

Next to the South African stocks, the copper shares attracted the most attention. The rise in prices of the metal in London was the motive for higher quotations for nearly all the shares. It is pretty well understood here that the cor-

nering of spot copper, and the consequent jump in prices, was intimately connected with the big speculation for the rise in Rio Tintos, which has been going on for some time past, and which has been very skillfully managed from Berlin. With visible stocks as light as they are at present, it is comparatively an easy matter to corner spot copper for a short time—long enough, at any rate, to serve a purpose like the present.

The zinc and lead shares have generally held their own, but without any special movement. Le Nickel shares are again higher, selling this week up to 465 fr. The reason for this is the anticipation of a large demand for the metal in making nickel steel armor plates required by our new naval programme.

The metallurgical shares have been very strong, also on the prospects of heavy contracts for the Navy. The Russian group, however, has been heavy and rather weak, with the exception of two or three favored companies, the chief of which are Czeladtz and Krivoi-Rog. A new stock in this group is Povbeslenko—a coal company in the Poland Basin, which has a moderate capital only, and whose mines are so far open that a production of some 8,000,000 poods is expected during the current year.

Our own coal troubles continue, and it is somewhat doubtful whether we are going to have sufficient coal and coke to carry us through this year, unless your American mines come to our aid. No European country has any surplus to spare this year. We are feeling this at home, for prices of coal in Paris are higher than in I can ever remember them.

Azote.

ANNUAL MEETINGS.

Name of Co.	Locat'n.	Date.	Place of Meeting.
Butte & Boston.	Mont.	Apr. 3.	30 Broad St., N. Y.
Champion.	Cal.	Apr. 13.	San Francisco, Cal.
Goleta.	Cal.	May 19.	San Francisco, Cal.
Mayflower.	Mich.	Mar. 21.	60 State St., Boston.
Sacramento.	Utah.	Mar. 27.	Salt Lake City, Utah.
South Swansea.	Utah.	Apr. 3.	Salt Lake City, Utah.
Tasmania Copper.	Colo.	Apr. 19.	Denver, Colo.
Union.	No. Car.	Mar. 22.	60 State St., Boston.
Washington.	Mich.	Mar. 27.	60 State St., Boston.

ASSESSMENTS.

NAME OF COMPANY.	Loca- tion.	No.	Delinq.	Sale.	Amt.
Alta.	Neu.	64	Feb. 26	Mar. 19	.05
Andes.	Neu.	50	Mar. 6	Mar. 26	.05
Bader.	Ore.	1	Apr. 2	May 2	.10
California Borax.	Cal.	2	Mar. 5	Apr. 2	.00
Caledonia.	Neu.	48	Mar. 12	Apr. 2	.15
Central Eureka.	Cal.	14	Mar. 17	Apr. 9	.03
Con. Cal. and Va.	Neu.	15	Apr. 10	May 1	.20
Con. Imperial.	Neu.	44	Feb. 27	Mar. 20	.01
Crown Point.	Neu.	78	Mar. 28	Apr. 19	.05
Excelsior Drift.	Cal.	1	Apr. 13	Apr. 19	.03
Exchequer.	Neu.	41	Feb. 26	Mar. 29	.03
Goleta Con.	Cal.	1	Mar. 1	Apr. 5	.06
Great Eastern.	Utah	3	May 10	Apr. 2	.00 1/2
Gould & Curry.	Neu.	89	Apr. 10	May 2	.15
Hale & Norcross.	Neu.	1	Apr. 9	.....	.10
Joe Bowers Ext.	Utah	6	Mar. 14	Apr. 4	.01
Little Chief.	Utah	3	Mar. 31	Apr. 18	.01
Lion Con.	Utah	2	Mar. 10	Mar. 27	.00 1/2
Marina Maricano.	Cal.	22	Feb. 27	Mar. 15	.03
Mariposa Com'l & Mg	Cal.	15	Mar. 12	Apr. 3	10.00
Martha Washington.	Utah	4	Mar. 19	Apr. 7	.01
New Klondike.	Utah	1	Mar. 7	Mar. 23	.00 1/2
New Erie.	Utah	3	Mar. 9	Mar. 26	.00 1/2
Omaha.	Utah	1	Apr. 2	Apr. 17	.02
Ophir.	Neu.	77	Mar. 8	Mar. 28	.20
Pacific.	Utah	2	Apr. 9	Apr. 21	.00 1/2
Reward.	Cal.	8	Mar. 3	Mar. 27	.02
Sierra Nevada.	Neu.	118	Mar. 13	Apr. 2	.15
Silver Park.	Utah	1	Mar. 10	Mar. 28	.04
Snow Flake.	Utah	1	Mar. 1	Mar. 31	.05
Star.	Utah	29	Feb. 29	Mar. 29	.10
Success.	Utah	8	Mar. 17	Apr. 14	.01
Union Con.	Neu.	59	Apr. 10	Apr. 30	.15
Yankee Con.	Utah	2	Mar. 31	Apr. 17	.01

DIVIDENDS.

NAME OF COMPANY.	Latest Dividend.			Total to date.
	Date	Per share.	Total.	
*Amazon, Colo.	Mar. 15	\$.05	\$30,000	\$62,000
†Am. St. & Wire com	Apr. 2	1.75	875,000	875,000
†Am. St. & Wire, pf.	Apr. 2	1.75	700,000	4,200,000
*Argonaut, Cal.	Mar. 26	.10	20,000	480,000
Arizona Copper.	Apr. 1	1.32	421,153	1,379,572
Calumet & Hecla, Mich	Mar. 30	20.00	2,000,000	68,850,000
*Con. Gold Mines.	Mar. 25	.01	10,000	40,000
Cripple Creek Con.	Mar. 24	.08	160,000	160,000
Croesus, Cal.	Mar. 8	.06	11,400	60,400
Daly West.	Mar. 22	.....	37,500	232,500
†Elkton, Colo.	Mar. 20	.03	37,500	754,431
†Federal Steel com.	Mar. 20	2.50	1,162,107	1,743,161
†Federal Steel, pf.	Apr. 20	1.75	1,597,830	6,391,320
*Gold Coin.	Mar. 25	.02	20,000	400,000
*Golden Cycle, Colo.	Mar. 18	.05	10,000	288,500
*Grass Valley Expl.	Mar. 20	.25	7,500	52,500
*Homestake.	Mar. 26	1.75	105,000	8,458,750
†International Sil., pf	Apr. 1	1.75	743,750	743,750
†Isabella, Colo.	Mar. 23	.02	45,000	385,000
*Lillie, Colo.	Mar. 1	.15	11,250	335,300
*N.Y. & Hond. Rosario	Mar. 17	.10	15,000	1,205,000
Pacific Coast Borax.	Dec. 29	5.00	100,000	522,500
†St. Joseph Lead, Mo.	Mar. 20	.50	37,500	2,972,000
*Strong.	Mar. 18	.01	25,000	925,000
*United Verde Copper	Mar. 15	.50	150,000	1,312,500
Wolverine, Mich	Apr. 2	2.00	120,000	390,000

* Monthly. † Quarterly.

STOCK QUOTATIONS.

NEW YORK.

BOSTON, MASS.

Table of stock quotations for New York, listing companies like Adams, Alice, Anaconda, and others with columns for location, par value, and various market prices.

Table of stock quotations for Boston, Mass., listing companies like Adventure, Aetna, Allouez, and others with columns for par value, no. of shares, and various market prices.

COAL AND INDUSTRIAL STOCKS

Table of coal and industrial stocks including Am. Sm. & Ref., Am. S. & W. Con., Am. Tin Plate, and others.

Official quotations Boston Stock Exchange.

Table of official quotations from the Boston Stock Exchange, listing various stocks and their prices.

SALT LAKE CITY, UTAH.

Table of stock quotations for Salt Lake City, Utah, listing companies like Ajax, Alice, and others.

PHILADELPHIA, PA.

Table of stock quotations for Philadelphia, Pa., listing companies like Am. Alkali, Bethlehem Iron, and others.

TORONTO, ONT.

Table of stock quotations for Toronto, Ontario, listing companies like Ontario, Alice, and others.

SAN FRANCISCO, CAL.

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

SPOKANE, WASH.

Table of stock quotations for Spokane, Washington, listing companies like Butte & Boston, Conjecture, and others.

CALIFORNIA OIL STOCKS.

Table of California oil stocks including Anaconda, Barker Ranch, Blue Goose, and others.

* California and Producers Oil Exchanges. Total sales, 2,100 shares.

STOCK QUOTATIONS.

COLORADO SPRINGS, COLO.

Table of stock quotations for Colorado Springs, Colo., listing various companies and their prices from Mar. 2 to Mar. 9.

Colorado Springs Mining Stock Exchange. Total sales, 2,192,679 shares.

MONTREAL, CANADA.

Table of stock quotations for Montreal, Canada, listing various companies and their prices.

Montreal Stock Exchange. Total sales, 62,850 shares.

MEXICO.

Table of stock quotations for Mexico, listing various companies and their prices.

DENVER, COLO.

Table of stock quotations for Denver, Colo., listing various companies and their prices from Mar. 2 to Mar. 9.

Official Quotations Denver Stock Exchange. Total sales, 244,200 shares.

PARIS.

Feb. 22.

Table of stock quotations for Paris, listing various companies, countries, products, and prices.

LONDON.

Mar. 3.

Table of stock quotations for London, listing various companies, countries, and prices.

DIVIDEND-PAYING MINES.

Table with columns: Name and Location of Company, Authorized Capital Stock, Shares Issued, Dividends (Paid, Total to Date, Latest), and Name and Location of Company, Authorized Capital Stock, Shares Issued, Dividends (Paid, Total to Date, Latest). The table lists numerous mining companies and their financial details.

G., Gold. S., Silver. L., Lead. C., Copper. Z., Zinc. This table is corrected up to Feb. 17. 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 Abrasives, Calcium, Manganese, and Rare Elements, 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 March 3d. 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 Reviews.