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CONTENTS.

Table listing various articles and their page numbers, including Copper Wild Cats, Wireless Telegraphy, The Michigan Mining Stock Bill, De Beers Dividends, Transvaal Mining Costs, The Colorado Smelter Situation, The Joplin Zinc Region, New Publications, Books Received, Correspondence, The Sterilization of Water by Ozone, The Onyx Deposits of Barren County, Kentucky, The Utilization of Blast Furnace Slag, Recent Decisions Affecting the Mining Industry, Native Metallurgy in the Philippines, Silicon and Copper-Silicide, Mica in the Province of Quebec, A Montana Crib Dam, Abstracts of Official Reports, First Aid to the Injured in Mines, A Russian Improvement in Blast Furnaces, 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, Iowa, Michigan, Minnesota, Missouri, Montana, Nevada, New York, Ohio, Oregon, Pennsylvania, South Dakota, Advertisers' Directory.

Apparently the Spensazuma Company is to have a rival, for we read in the press despatches of the organization of a company which has a property of 35 acres in Pima County in Arizona, on which is a "hill 225 feet high, which shows 3,500,000 cubic yards of rich copper, gold and silver ores, or about 8,000,000 tons." This company scorns anything so commonplace as a vein, and is satisfied with nothing less than a mountain of ore in sight. No wonder that it intends to "erect one of the largest milling and smelting plants in the country," according to the despatch. The name of this company is the Arizona United Copper Mining Company; its capital stock is \$10,000,000—too small by half for such a gorgeous prospect—and one Mark R. Chartrand is the chief promoter. Unless the despatches belie the concern, it will bear watching hereafter.

A correspondent suggests a solution for certain difficulties now attending the progress of the Chartered Company's plans in South Africa. Instead of negotiating with Germany for permission to run his Cape to Cairo telegraph through the strip of German territory in Central Africa, he thinks Mr. Cecil Rhodes should have tried the Marconi system of wireless telegraphy. This would do away with any diplomatic entanglements, for even the strictest advocate of German supremacy could hardly object to or stop the messages in their passage through the air. In this connection it occurs to us that Professor Marconi, in introducing his system, may have ultimate designs on the price of copper. If we are to need no telegraph wires, what will become of the demand for new wire? And how much old copper will be thrown on the market?

The bill which was recently passed by the Michigan Legislature to remove the limitation heretofore put by law on the capital stocks of mining companies in the State, was last week vetoed by Governor Pingree. The advocates of the bill could not muster votes enough to pass it over the veto, and the bill is dead for this year. The limit imposed by the law is \$2,500,000, and no mining company organized in the State can have a greater nominal par value on its stock than \$25 a share. The bill does not seem to be especially regretted by those who are really most interested. The larger companies, though the selling value of their stock is many times its par value, do not care to make any change, and most of the working companies are satisfied with the old law. The only parties who want any change are the promoters and the speculative companies who look for profit to the stock market and not to the mining properties they own. These people, of course, want as many shares—or counters—as possible. People generally, however, are quite satisfied that they should be limited.

We mentioned some time ago that the Calumet & Hecla Company last year was the largest dividend payer among the mining companies in America, and probably in the world, the total amount handed over to its stockholders last year having been \$7,000,000. It is, however, somewhat exceeded by the De Beers Consolidated Mines, which paid in dividends last year a total of \$7,687,300. In addition to this the De Beers Company paid during the year \$862,500 as interest on its debentures, and \$642,400 for retiring a portion of its bonded debt; making a total of \$1,504,400, and bring up the total payments in the nature of profits to \$9,192,200, or \$2,192,200 more than the Calumet & Hecla. The proportion of profits to the capital stock of the De Beers Company, however, was only 40 per cent., while that of the Calumet & Hecla was 280 per cent. It must be remembered, however, that the capital stock of the latter company is nominally very small.

The first comment which an economist would make on these facts is that the profit in producing an article of luxury and of wholly artificial value, like diamonds, is as great or greater than in furnishing a necessary metal like copper. It must be remembered, however, that the Calumet & Hecla, though an important factor in the copper market, is not by any means the only one; while the De Beers Company practically controls the diamond market of the world, and can regulate the supply by the demand and so maintain the prices; as can be done with hardly any other article of mineral production.

TRANSVAAL MINING COSTS.

The recently published reports of three of the newest mines on the Witwatersrand for 1898 enable us to give an interesting comparative statement illustrating the present costs of mining and milling gold ores in the Transvaal. The three mines—the Crown Deep, the Goldenhuis Deep and the Rose Deep—are among the first of the deep-level mines to come into the producing list. We have selected them as examples, not because they are deep-level mines, but because they are worked on a large scale—the mills varying from 150 to 200 stamps each—and the plants being new, may be taken to represent the latest improvements

Table listing Stock Quotations (New York, Philadelphia, Pittsburgh, Baltimore, St. Louis, Boston, Cleveland, Butte, Colo Springs, Denver, San Francisco, Rossland, B.C., Valparaiso, Salt Lake City, Spokane, Toronto, Mexico, Shanghai, London, Paris) and Mining Co.'s List of 731.

and the best practice in the district. The average results of operation per ton of ore mined and milled were as follows:

Averages per ton of ore.	Crown Deep.	Goldenhuis Deep.	Rose Deep.
Return from mill.....	\$5.52	\$6.31	\$6.31
Return from cyanide plant.....	4.54	3.34	4.20
Total	\$10.06	\$9.65	\$10.51
Expenses, mining	\$4.35	\$3.31	\$3.59
" milling	0.88	0.70	0.67
" cyaniding tailings.....	0.69	0.41	0.73
" slimes plant .....	..	0.18	..
General expenses	0.50	0.25	0.44
Total expenses	\$6.42	\$4.88	\$5.48
Net earnings	\$3.64	\$4.77	\$5.03
Total tons ore worked	263,816	313,340	243,740

The grade of the ore does not vary much in these three mines, but the proportions of gold recovered in the mill and from the tailings show a considerable variation. In the Crown Deep 54.9 per cent. of the values saved was from the mill; in the Goldenhuis 65.4 per cent., and in the Rose Deep 60 per cent. The smaller proportion of gold saved in the mill is a noticeable feature in the newer plants on the Witwatersrand. Two or three years ago the proportion of the total value obtained in the cyanide plants, where the tailings were treated, did not vary much from 30 per cent., but in these three mines we find it running from 34.6 up to 45.1 per cent. To judge from the current local discussion, the managers now pay much more attention to the improvement of the cyanide plants than to the mill practice, and rely more upon those plants for saving their valuables than formerly.

Considerable variation is shown in the proportion of expenses to earnings. The lowest ratio shown in the three mines being 50 per cent., while the others were 52 and 64 per cent. respectively. The mining expenses seem relatively higher than those of treatment, a result which the managers attribute to the high cost of explosives and other supplies resulting from the peculiar economic policy of the Transvaal. The general use of hand drilling and the employment of native labor may also have something to do with the result.

Taking the average of the three mines, we find that the cost of producing a fine ounce of gold was about \$11.40; leaving a profit upon which the companies were able to pay very satisfactory dividends to their stockholders.

THE COLORADO SMELTER SITUATION.

The following announcement which precipitated the closing of the Durango smelter, which was noted in our news columns last week, was posted at the works on the morning of June 1st:

"American Smelting and Refining Company. Notice to Employees.—First. On and after June 1st, 1899, the period of employment of all persons heretofore employed and paid by the day will be by the hour.

"Second. Workmen employed in smelters, or other industries for the reduction and refining of ore, or metals, will be at liberty to work more than 8 hours per day if they elect and will be paid for the number of hours of actual labor.

"Third. Except in cases of emergency, when life and property may be in imminent danger, no such laboring man will be required to labor more than 8 hours per day; a failure to work more than such number of hours shall not be deemed a cause justifying discharge from the services of the company.

"Fourth. This notice shall be the sole contract of employment for all working men so far as relates to the period of employment; no superintendent or other agent shall have authority to change or agree to the violation of any of the above provisions.

"Franklin Guiterman,
"Manager Durango Plant."

During May a move had been made to adjust the wage question before the 8-hour law becomes operative, on June 15th. The men appointed a committee, who had two or more meetings with Manager Guiterman, the men insisting on an 8-hour basis with the same pay as they had before received for 10 or 12 hours' work. Mr. Guiterman emphasized the fact that the treatment contracts with the mines were on the old schedule of hours and wages, and that if 8-hour shifts were substituted for 12-hour shifts it meant an increase of 50 per cent. in labor cost if the same wages were paid for the short shift as for 12 hours. However, the men were assured that in any arrangements made for the other Colorado smelters the Durango employees should receive such differential as they were entitled to, owing to Durango being a more costly place to live in than Pueblo or Denver.

On the morning this notice was posted the men formulated a demand for 10 and 12 hours' pay respectively, on the old schedule, for 8 hours' labor, and allowed but 5 hours for the management to accept or reject this ultimatum. It was rejected and on the hour designated the men walked out. Had they waited till June 15th it is highly probable that the whole matter would have been amicably arranged and this smeltery and the San Juan mines would have continued in operation throughout the season.

It is apparent that the smelters of the State propose to combat the constitutionality of the 8-hour law and will lose no time in making a test case to have it settled speedily. A willingness is manifested to pay

better wages by the announcement of an advance of 10 per cent. per hour above the wage schedule prior to June, but dividing the 24 hours into three shifts they insist will work an unnecessary hardship. In this move the mine owners operating mills will undoubtedly join, for 12-hour shifts are the rule, and it is said few complaints are made. Men employed at the smelters are urgently invited to break the 8-hour provision of the new law and are assured protection in every way. Utah has an 8-hour law and in this connection it is perhaps noteworthy that it has been through the ordeal of the courts and is pronounced a sound law.

This Durango strike, to which we referred last week, has quickly extended throughout the State and on June 15th the telegraph announces the closing of nearly all the smelting plants in the State, the conditions being the same as at Durango. The feeling seems very strong, and unless there is an early change, a long strike may follow.

Should this be the case and the smelting works remain closed there may be a large reduction in the Colorado output of the precious metals, lead and copper. There will also be serious embarrassment to the many shipping mines in the State. Most of these are working actively at present, and a stoppage for any length of time is much to be regretted.

THE JOPLIN ZINC REGION.

The sudden prominence into which the zinc and lead mining region, which extends over a considerable area of Southwest Missouri and Southeast Kansas, has been brought during the past year is an interesting development. For years past the Joplin Region—as it is often called after the name of its chief town—has been steadily growing in the extent of its production and in its good prosperity, without attracting outside attention. Only those who were in the region and part of it, or those who had watched its growth for some special reason, were aware how much progress had been made or of how great importance its mines had become. The "Engineering and Mining Journal" has followed their growth carefully, and has for years collected through its correspondents full statistics of the output, which were presented weekly in its news columns. In the volumes of "The Mineral Industry" also the value of the region has been fully accepted and much information about it has been given.

Several reasons may be assigned for the public neglect of the district. In the first place, zinc is not a metal which attracts much attention, and few outside of those directly engaged in the trade have been aware of the extent to which it is produced and used. Had the Joplin mines furnished gold, silver or copper, their reputation would have extended all over the world, and they would have attracted eager prospectors and buyers from all parts of the country. Again, the district has always been a region of small mines. It has been emphatically a "poor man's country," where exploitation could be carried on with very limited capital. There were very few or no large companies and the system of leases which prevailed, combined with that of weekly sales of ore in the open market, enabled partnership or association of men with little capital beyond their own labor, to work profitably; especially as ore was generally found at moderate depth, and expensive hoisting and pumping machinery was not needed.

The drawback to this state of affairs was that the peculiar organization of the district, and the necessities of the many small producers, who depended upon their weekly sales to meet their current expenses, put the miners very much at the mercy of the smelters of the district. They had capital and were practically the only buyers of ore, and by a little combination could regulate the prices to suit themselves. There were occasional differences, but practically there was for most of the time no competition, and the ores were sold at low prices, which kept down the profits of the miners. Nevertheless they did fairly well and the district continued to grow. The smelters, on their side, were careful not to boom the district, being quite satisfied with their profits and not anxious to share them with new comers. More recently they have received additional benefits from the natural gas-field which has been opened in Kansas, near the western limit of the zinc belt, and which supplies them with cheap and abundant fuel, well suited for their purposes.

The changes which have brought the district into such prominence began less than two years ago, and have been due to several causes. One of these was the rapid increase in the demand for spelter and the rise in prices which it shared with all the other metals of construction. This alone would have done much for the district, though it would not have brought the miners so large an appreciation in returns as they have actually secured. A more important reason is found in the discovery of a wider market for ores and the organization of the Missouri & Kansas Zinc Miners' Association, which represents the producers, and enables them to deal with the buyers as they never had done before.

The broadening of the market was largely due to one man in the dis-

tract. The great majority of the producers had never looked beyond the existing condition of affairs, and had neither the means nor the opportunity to study other markets. Mr. A. O. Ihseng, who had for some time been identified with the district, and who also knew the conditions ruling elsewhere, undertook to place some consignments of Joplin zinc ores with European smelters, and succeeded in doing so with little difficulty. The knowledge of this had an immediate effect. While the actual shipments were not very large, the fact that they had been made at a profit and could be increased acted upon the local market in an extraordinary way.

These causes resulted in an extraordinary rise in the prices of ores, which has been from time to time recorded in our columns. The formation of the Miners' Association also aided materially, as it served to represent the smaller producers and save them from the necessity of selling their ores to the first bidder. At the same time the knowledge that the foreign market was open gave the Association the power to fix and maintain its standard of prices. It is due to the Association to say that the basis it adopted is an entirely reasonable and proper one.

The combination of the causes recited with the general revival of interest in mining had not only drawn attention to the district, but has brought in large amounts of capital for investment in property. Companies have been formed and the ownership of large tracts of ore land acquired at high prices.

For the present, at least, the methods of working in the district will not be changed to any considerable extent. The new owners of lands apparently do not intend to work the mines themselves, but to continue the leasing system, which has always worked well. It has the further advantage of requiring no expenditure of capital for plant, and of bringing in an immediate return on that invested in lands.

As to the future of the region, it may be said that thus far the mining has been at a moderate depth only, but there is every reason to believe that ores will be found at lower levels, and that consequently production may extend over many years to come. On this point reference may be made to the articles published in the "Engineering and Mining Journal," June 10th, 1899, page 680; and March 18th, 1899, page 321.

As to the capitalization of properties, a word of caution may be needed, since the region presents too good an opportunity for the reckless promoter to miss. A correspondent, who is thoroughly familiar with the region, writes that the "reckless overstocking of zinc properties goes merrily on and properties that cost the original purchaser less than \$2,000,000 have been stocked for over \$10,000,000, an assurance that some investors in watered stocks will ultimately wish that they had never heard of zinc stocks. There are excellent opportunities still open for the profitable investment of capital there, but they do not exist in the reckless schemes of unscrupulous promoters who have flocked there since the attention of Eastern capital was called to the great profits in zinc mining. There are large bodies of undeveloped land that can still be purchased at very moderate figures and it costs comparatively little to demonstrate the presence or absence of ore with a steam drill. If ore is developed it is no trouble to sublease lots to experienced miners who will pay a liberal royalty and develop the ground at their own risk and expense. Those who contemplate investing in the Joplin zinc fields will find this one of the safest and surest ways of securing good returns on their money, and will avoid the losses that often arise from investing in property that has been worked off at at many times its real value."

A number of the companies recently organized are at fair capitalizations and are earning satisfactory profits, but there are others that are putting far too much water in their stock.

NEW PUBLICATIONS.

"Eighth Biennial Report of the Mine Inspectors of the State of Iowa to the Governor." James A. Campbell, James W. Miller and Morgan G. Thomas, Inspectors. Des Moines, Iowa; State Printer. Pages, 96.

The coal mines of Iowa, though extensively worked, are of somewhat less importance than those of some States in the East or the Central West. The larger part of the Iowa coal trade is local or with the railroads; nevertheless, the total production exceeds 7,000,000 tons a year, and employs over 12,000 men. It is by far the most important mining industry in the State, and naturally receives the principal attention of the authorities. The reports of the inspectors show that the larger mines are generally in good condition and have proper appliances for work; but some of the smaller mines and those which are worked intermittently for local trade only, are not well equipped, leaving room for the improvement which the mine inspectors are constantly laboring to enforce. The number of accidents in Iowa mines is rather large in proportion to the number of men employed; but we are told that constant efforts are being made to reduce the proportion of casualties. The report contains many interesting facts relating to the coal industry in Iowa.

"Michigan Engineers' Annual; 1899." Edited by F. Hodgman. Climax, Michigan; Published for the Society. Pages, 216.

This volume contains the proceedings of the Michigan Engineering Society during the year just closed. The convention which was last

held had a special interest as being the twentieth annual meeting of the society, which was first organized as the Michigan Association of Surveyors and Engineers, 20 years ago, and has for most of that time been an active and progressive body. The proceedings, which are included in the present volume, have several special and historical addresses which owe their motive to the anniversary, and which will be read with much interest by members and others. Besides these, however, there are several papers of value, including one on "Coal and Coal Mining in Michigan," by Mr. Charles Holmes, which presents many facts in relation to that Michigan coal basin which has been neglected until within the last year or two, but is now quite actively worked.

The papers in this volume show that the society fully maintains its standard, and is not losing ground, and we hope that another 20 years will see it still active and prosperous.

"Placer Gold: Where and How to Find It in the United States." By Alexander McDougall, Duluth, Minn.; Published for the Author. Pamphlet, pages 32. Price 12 cents.

This pamphlet gives Mr. McDougall's views as to the existence of placer gold over many large areas in the West and Northwest, and suggests as the best method of its recovery the use of dredging machines. Of the economy of these machines and their success in recovering gold, Mr. McDougall has much to say. He thinks the use of a dredge need not be confined to streams and rivers, but can be extended to almost any place where sufficient water can be secured to float the dredge in the first place. The pamphlet is illustrated by a number of views of dredges and of placer grounds. Mr. McDougall has his own ideas as to the best methods of dredging, and suggests many improvements, which, he thinks, will be of value in increasing the work of the dredge and the saving of fine gold. The loss of the latter, as is well known, is the principal drawback to the success of dredging operations in several parts of the Northwest, notably the Snake River in Idaho.

"Studio Sulle Condizioni dell' Industria Siderurgica in Lombardia." Roma, Italia; Tipografia Nazionale. Pamphlet, pages 48; with map.

This pamphlet contains a report made to the Italian Ministry of Agriculture, Industry and Commerce, on the present condition of the iron industry of the province of Lombardy, which was once flourishing, but of late years has been affected by the high cost of fuel. The deposits of iron ore in Lombardy have been of considerable importance, and were worked largely in charcoal furnaces. A map accompanying the report shows the location of these deposits, including those which are now worked and those which are abandoned; it also shows the location of the blast furnaces, comparatively few of which are now on the active list. Descriptions of a number of these are given in detail. From a table appended it appears that out of 21 furnaces—the largest number ever active at one time—only three are now running, and the production of pig iron, which has been over 13,000 tons in a year, had fallen in 1896 to 2,932 tons. This is largely due to the scarcity and increased price of charcoal, and the commission discusses at some length the probable cost of obtaining a supply of coke for the industry. Italy is not rich in mineral fuel, and this supply would have to be brought from elsewhere.

BOOKS RECEIVED.

In sending books for notice, will publishers, for their own sake and for that of book buyers, give the retail price? These notices do not supersede review on another page of the Journal.

"Pennsylvania Avenue Subway and Tunnel." Reprint of paper read before the Engineers' Club of Philadelphia, October 15th, 1898. By George S. Webster. Pamphlet. Pages, 32; with diagram and illustrations.

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.

Letter should be addressed to the MANAGING EDITOR.

We do not hold ourselves responsible for the opinions expressed by correspondents.

The Invention of the New Cement Burning Method.

Sir:—In the "Engineering and Mining Journal," May 13th, 1899, you published in your valuable paper a letter of mine in reference to the new method of manufacturing cement. Your types, however, made the date of the patent and the invention 1895, instead of 1885, as it should have been. Will you please correct the error, since, as it now stands, no priority of claim is established.

New York, June 8, 1899.

Henry Mathey.

(Mr. Mathey's United States patent for a "revolving furnace" is No. 325,259; date of application March 17th, 1885, and date of issue September 1st, 1885. Another patent for "manufacture of cement" is No. 339,673; date of application March 18th, 1885, and date of issue April 13th, 1886. The Ransom patent for "manufacturing cement," etc., is No. 340,357; date of application, January 18th, 1886, and date of issue, April 20th, 1886. This was patented in England May 2d, 1885, being No. 5,442 of that year.—Editor E. & M. J.)

Copper Prospects in Stonewall County, Texas.

Sir:—The occurrence of copper in sedimentary and horizontal measures over an area of four counties North and South, and two counties in width adjoining, in Texas, and continuing into the Indian Territory, has been known for many years and made the basis of speculation. These shales, sandstone, clays and lime-rock have been identified by the Texas Geological Survey as Permian, and as sandy shales of this age are occasionally mineralized in Germany and Russia and have produced much ore, the coincidence has been the cause of much scattered prospecting.

The surface of Stonewall County is largely mesa or level pasture land,

but in the breaks or dry washes of the Brazos River and its forks, the measures are slightly tilted from the horizontal and the sides occasionally contain sandy and argillaceous clays, showing impregnation of copper carbonates and silicates. The largest and most promising of these is a couple of miles south of Kiowa Peak, where an area of 270 ft. by 120 ft. is exposed on two sides, showing almost constant mineralization of from 1 to 8 ft. of sandy and argillaceous clays lying under a cap rock of gypsum lime-rock of 1 to 5 ft. in thickness and a cover of 5 to 25 ft. of shales and clays up to the mesa level.

The Texas Geological Survey—"Fourth Annual Report," page 234—says of this locality, that "the clays are mineralized throughout and carry from 3 per cent. to 10 per cent. copper." Accurate sampling of nine faces showed an average of 1.2 per cent copper. Fourteen samples of argillaceous clays with no sand, did not show more than a trace. The last included one sample of 18 in. from face of a drift driven 50 ft. into a heavy copper cover from an out-crop showing good mineralization, at a locality about two miles south of the above.

The cap rock does not anywhere show mineralization. The mineralization has apparently required two conditions: First, the presence of sufficient sand under the cap-rock to allow the circulation of mineral bearing solution. Second, vegetable or carbonaceous matter to cause precipitation. In places and under cover, the original precipitation is seen to have been chalcocite, bornite and chalcopyrite, in nodules and carbonaceous impregnations and concretions and the weathering and leaching of these is the source of the carbonates and silicates in the weathered clays below, and these cannot be considered ores to any extent.

All the exposures in twelve miles by two miles were visited and many other occurrences investigated, but all were found to be substantially similar to the above.

G. C. Hewett.

Aspen, Colo., May 31, 1899.

THE STERILIZATION OF WATER BY OZONE.*

By Emile Andreoli.

The sterilization of drinking water, which is by far the most important application of ozone, can only be effected when the following conditions are fulfilled:

1. The yield of ozone must be high and constant.
2. The apparatus must be such that it can work continuously without heating, getting out of order, or breaking down.
3. The cost of the purification of water must be as low as possible.

Recent reports of experiments made at Lille and at the Institut Pasteur in Paris have fully confirmed the importance of this use of ozone, and have also aided to establish the points above mentioned.

I am convinced that not much account, if any, must be taken of the quantity of ozone calculated in the milligrams per liter of air. This yield of ozone depends too often on the method adopted for its determination, and, as a matter of fact, it is immaterial whether the polluted waters are sterilized at a rate of 6, 5, or 4 milligrams of ozone. What municipal bodies, brewers, manufacturers of aerated waters care for, is the cost of this sterilization per cubic meter of 220 gallons.

This is why in the experiments of ozonization of water which I have been carrying out since three months at my laboratory, I have completely neglected the yield of ozone as a factor and adopted the calculation in watt-hours of the cost of ozonization of waters, differently and more or less contaminated.

What is the flow of water? What is its contamination? Does it take 1 watt or less to purify 1 gallon? How many watts per cubic meter (= 220 gallons)? This is what guided me in adopting the methods I have followed in my researches, and I think it the right one, and the most reliable.

My installation, which is more than modest, does not allow me treat more than 440 gallons (2 cubic meters or tons) of water per hour, which flows through five small tanks at the rate of 50 gallons in 7, 8 or 10 minutes. A Root blower forces the ozonized air under the perforated bottom of the first tank, wherefrom, mixed with the water, it circulates through the other tanks.

The ozonizer is rather small; on an average the volts in the primary circuit vary between 40 and 60, and the amperes between 3 and 5. The tension in the secondary does not exceed 3,500 volts. The water which I treated was artificially contaminated by addition of sewage or of cultures of resisting microbes; it, therefore, was much more difficult to purify, and generally contained a greater quantity of organisms than the usual river water.

My installation is very imperfect, because it has not been possible in such premises to erect the pump which is required for the purpose, and to have a large tank or a sufficient number of tanks where the contact of water and ozone would be intimate and regular, thus ensuring the absorption of ozone.

My object in making these experiments was not to sterilize a certain sort of water of a given degree of impurity, but to apply ozone to waters containing sometimes an enormous number of micro-organisms, and which resemble more diluted sewage effluent than drinking water.

The results I have obtained demonstrate the powerful action of ozone as a germicide, and they allow to calculate, according to the degree of impurity of water, the amount of electrical energy which has to be spent in order to completely destroy the germs which pollute it.

A table presented shows that water contaminated with sewage, and shown to have from 6,000 up to as high as 110,000 micro-organisms to the cubic centimeter was sterilized by the use of from 138 to 286 watts per cubic meter. After treatment the largest number of micro-organisms found were 40 to the cubic centimeter; in 11 trials out of 24 none at all were found, and in 10 other trials 10 to the cubic centimeter was the highest number.

The agitation of water—its bubbling with ozone—has been in most cases far from satisfactory, and this has often prevented the ozonization

from having its full efficiency. The passage of the water being rapid, a large proportion of the ozone, instead of being completely absorbed, escaped from the last tank. This means that the number of watts was considerably below the one shown in the trials. I do not think I spend on an average more than 140 watt-hours per cubic meter of water which is not too much polluted.

I feel convinced after this long series of careful experiments that, in a model installation on the Thames banks, at a place where the water is not too much charged with organic matters and micro-organisms, and with an improved system of tanks and pumps, which I need not describe here, it is possible to demonstrate on a practical scale that the purification and complete sterilization of water can be effected at the rate of 100 watt-hours and less per cubic meter (220 gallons) of water, or 2,200 gallons per kilowatt-hour.

There was a time, and that not many years ago, when wise men laughed scornfully at the dreamers whose researches had for object the electric lighting of large cities. The dream has become a reality, and so will soon be the destruction by ozone of the infectious germs which swarm in the water we drink.

COPPER SULPHATE IN FRANCE.—The agriculturalists in the wine-making districts of this country have united in a movement for the repeal of the tariff on sulphate of copper, which is extensively used to protect the grape vines against black rot and mildews. In periods of heavy rains, says the American consul at Lyons, the vines sometimes require five treatments, at an aggregate expense of from \$2 to \$2.50 per acre. Now that the use of copper has increased a further raise in the cost of blue vitriol will ensue; hence the movement for a reduction of the duty. The imports of copper sulphate into France from the United States in 1898 amounted to 31,468 metric tons, as against 30,909 tons in 1897, 34,539 tons in 1896, and 24,641 tons in 1895. The committee of the French Chamber of Deputies has reported adversely to a reduction of the customs duty, as France is not a producer of copper and would have to depend largely upon the United States for her supplies.

GLASS BUILDING STONE.—United States Consul Warner writes from Leipzig, April 26th, 1899: "Under the name of 'keramo,' a new building material, composed principally of glass and manufactured at Penzig, Silesia, has been placed on the market. As far as known, this material is made from powdered glass waste, which is hardened by a special devitrifying process and combined by means of strong pressure. In this way, the transparency, brittleness and fragility of the glass are destroyed, but other prominent properties—extraordinary hardness, stability against exposure to the weather, non-conduction of heat, non-inflammability, insensibility to oil, grease, acids, etc.—are retained in this new material. Keramo can be used with good results for wainscoting in the interior of buildings, for covering floors in houses, kitchens, washing rooms, verandas, balconies, etc., for rough casting of walls exposed to the weather, as well as for staircases which are to be fireproof. The color depends upon the color of the glass used in the manufacture."

A reference to the manufacture of this material, or a very similar one, in France, was given in the "Engineering and Mining Journal," March 11th, 1899, page 296.

GOLD MINING IN KOREA.—United States Consul-General H. N. Allen reports from Seoul, Korea, that during 1898 a concession was granted to an English syndicate for a mining district to be hereafter selected and to be worked for a period of 25 years upon terms somewhat similar to those of the American and German concessions—that is, upon a payment to the Korean Government of one-fourth of the net proceeds of such work.

The American gold mines in the northern province of Peng Yang are becoming promising, judging by the activity with which the work is prosecuted. This company employs nearly 40 Americans at its mines, which include the whole district of Woon San, some 1,000 square miles. The work at present is in rock, though the placers are good and will receive attention later. The company at present works only 20 stamps, but 40 stamps more, from the Union Iron Works, are being erected. Some 1,200 Koreans are employed in and about the mines in various capacities, and as miners they are considered excellent. The prospects are so good that the company is contemplating the enlargement of its facilities in various ways.

IRON IN THE OURALS.—United States Consul General Holloway, at St. Petersburg, says that the statistics concerning the production of pig iron in the Oural during 1898 and the estimates for the first half of 1899 have just been published. In 1898, 690,161 tons of pig iron were smelted—32,258 tons more than in 1897—and one hundred and fifteen blast furnaces were in action. There is no doubt that the metallurgical industry continues to develop, notwithstanding such unfavorable conditions as the lack of railroads and mineral fuel. The production has increased during the last five years 29 per cent.; the technical part—that is, the productiveness of the work of the blast furnaces—has increased 26 per cent., and the amount daily smelted by each furnace, 25 per cent. During the first half of the present year it is estimated that 380,645 tons of pig iron will be smelted. Taking into consideration the fact that six new furnaces are being constructed in the Oural, and six are being remodeled for a larger production, it is probable that during the second half of 1899 there will be a production of pig iron which will make the output for the whole year amount to 775,000 to 790,000 tons.

The beginning of the year was very animated. The demands for mines, especially of iron, manganese and chrome, were exceedingly large. Agents arrived from southern Russia, principally from Novorossisk. There are three principal reasons why the Oural is at present attracting universal attention: (1) The projected railroad from Chelabinsk to Tsaritsine; (2) the hope that southern Oural ore will be demanded by the Donetz basin; and (3) the expectation that Siberian coke will be brought to the Oural, which will cause the development of the metallurgical industry there.

*Abstract of paper in the London "Electrical Review", May 5th, 1899.

THE ONYX DEPOSITS OF BARREN COUNTY, KENTUCKY.

Written for the Engineering and Mining Journal by S. S. Gorby.

The onyx of commerce, technically known as "onyx marble," is an almost pure calcite, that is, crystallized carbonate of lime. Its delicate veining and vivid and varied colors are due to the presence of various mineral impurities, more or less oxydized subsequent to the period of deposition.

The onyx of Kentucky is, in composition, identical with that found in Mexico, Lower California, Arizona, Algiers and other localities. It is all crystallized carbonate of lime, containing, as stated, varied forms of mineral impurities to the presence of which is due the great variety of pleasing colors. The quality of it is determined by the texture of the stone, the vividness and variety of its colors and the size of blocks or slabs that may be obtained for commercial purposes.

In texture the onyx of this region is even and smooth, with a satin-like gloss that is not approached by the onyx from other regions. Besides, it is wholly free from the unsightly clay concretions and argillaceous blotches that are frequently seen marring the beauty of onyx. Aside from the green varieties, formerly found in limited areas in Mexico, all the colors imaginable may be obtained here, varying from the purest white to the deepest red, orange, amber, brown, drab, chocolate and all shades between. Besides, a large proportion of the stone shows these colors alternating in unique lines and stripes curving and zigzagging in every direction, and presenting in sawed and polished slabs a most beautiful and pleasing effect.

The one great feature in which the Kentucky field excels is in the size of sound blocks that may be obtained for commercial purposes.

In the Mexican quarries it is a rare thing to find a block of sound onyx from which a slab may be made as large as 3 by 3 ft., while the av-

representing several hundred acres, and sometimes they are quite numerous, as, for instance, on the Shaw farm, three miles west of Cave City, where there are more than 20 distinct deposits on a tract of 150 acres.

Sometimes the groups are small, embracing only three or four deposits, and occasionally single, isolated deposits are found. Intervals of barren spaces wholly devoid of onyx occur throughout the field, varying in extent from 2 to 15 miles.

The onyx deposits of Kentucky occur in a series of limestones known to geologists as the Sub-Carboniferous formation. It lies just below or underneath the coal measures, and just above the Devonian formation. The onyx deposits all occur near the top of the Sub-Carboniferous, and in the St. Louis group of limestones. The maximum thickness of this group, in Southern Kentucky, is some 700 or 800 ft.

The onyx deposits of Barren County occur in the extreme northwest corner of the county. The Louisville & Nashville Railroad crosses this corner of the county in a southwest direction, following the base of a series of high knobs that run in the same general direction, northeast and southwest, and lie north and west of the railroad. The whole of this corner of the county consists of high knobs, or ridges, separated from one another by deep gulches. The sides of these ridges and slopes of the knobs are, as a rule, covered with heavy accumulations of red, calcareous clay and detached masses of limestone. Occasionally, however, the sides of the ridges are rocky and precipitous. All the knobs and ridges are capped with massive sandstone strata and shales of the lower coal measures. There are no creeks nor small streams of any kind in the region. The water that falls on the surface of the ground runs off into large bowl-shaped depressions called sinks, or sink-holes. From the bottoms of these there are subterranean channels through which the water finds its way into Green River. Oftentimes these underground ways are caverns of immense size, and the sinks are merely places



FIG. 1.—THE ONYX LEDGE ON SMITH LAND, KENTUCKY.
(The White Spot is 20 in. Square.)

erage size shipped will not make slabs larger than 10 by 20 in. But in Kentucky, if it was possible to handle them, blocks of perfectly sound onyx could be obtained as large as 10 by 10 by 10 ft., or even larger. A block of onyx that will make slabs 3 ft. square is worth five times as much per cubic foot as one that will make slabs 1 ft. square, and so on to the larger dimensions. Instances are known near Cave City, in Barren County, Kentucky, where slabs as large as 20 by 20 ft., or even 20 by 40 ft. might be had if it was possible to quarry and work the stone in such dimensions.

The Kentucky field, as first known, was embraced in an elliptical area some 25 miles long and 15 miles wide, with a northeast-southwest trend, extending from the central part of Green County to the vicinity of Knoblick in Metcalfe County. Subsequent continued investigations have shown that the field continues on westwardly through Hart and Barren counties to the vicinity of Mammoth Cave in Edmondson County; also resulted in the discovery of similar deposits in Warren County. The field also extends northward into LaRue County, eastward into Taylor, Adair and Russel counties, and southward into Wayne, Clinton, Cumberland and Munroe counties.

It must not be inferred that this area is an uninterrupted series of onyx deposits; but onyx is found in greater or less quantities at various points throughout the area indicated, and favorable outcrops of it have been examined in all the counties named. The stone occurs in pockets, varying in size from a few square rods to many acres. These pocket deposits, in turn, occur in groups, the disposition of which has been determined by the topographical features that prevailed at the time that the crystallizing forces were building up the deposits.

The largest group of these deposits known is located in the northeast corner of Barren County and covers 25 or 30 square miles, extending into the adjoining counties of Warren and Edmondson. More than 150 distinct deposits are known to occur in this group representing the Barren County onyx field. Sometimes but a few deposits occur over an area

where the strata that formed the roof of the cavern became too weak to support itself and so caved in.

The onyx deposits of this region have a vertical range of about 200 ft. The top of this range is about 150 ft. below the base of the coal measure sandstone. The first deposit of onyx discovered in this region is on Fritz Knob, about 1 mile northwest of Cave City. Some three or four small out-crops of white and variegated onyx occur on the west slope of this knob, but the quantity at this point is not sufficient to justify an elaborate opening of quarries. Other out-crops occur on Crump's Knob, ½ mile west of Fritz Knob, and on the Doyle lands, ½ mile west of Crump's Knob, but these out-crops are all small. From Fritz Knob an irregular line of onyx deposits runs in a southwest direction, nearly parallel with the railroad, and about 1 mile distant from the road, to the vicinity of Rocky Hill in Warren County. This line may be readily traced by occasional out-crops and frequent small detached pieces on the surface.

The first deposit of importance is located on the Smith land, 2 miles west of Cave City. This is a tract of 155 acres, upon which there are known 20 distinct deposits. The photograph reproduced in Fig. 1 shows part of one of these deposits, upon which a considerable amount of development work has been done. No. 2 shows the exposed top of the ledge about 300 ft. up the side of the ridge, measuring along the slope. Vertically the top of the ledge is about 75 ft. higher than the place at which the boulders lie, showing that the total thickness of the deposits here may be 75 ft. or more. Solid blocks of onyx may be obtained at this place as large as can be handled.

Continuing on westerly on the same slope, and still on the Smith land, within a distance of ¼ mile, are nine different deposits of onyx, one of which has been developed to a considerable extent. Directly west of the Smith land, and immediately adjoining it, lies a tract of 150 acres owned by Mrs. Shaw. Upon this tract 20 distinct deposits have been found, many of which have been developed. The known thickness of the de-

posits at this point is from 40 to 50 ft., and the total length, as shown by the out-crops, is probably 500 ft. Solid cubes of onyx may be obtained at several points on this land as large as 10 by 10 by 10 ft. There is one cavern on this land, containing a mass out of which slabs might be made as large as 20 by 40 ft., and there is one block in the same cavern that is 10 ft. in diameter and 20 ft. high. There are some eight or ten deposits on this Shaw land that have been opened up. West of the Shaw tract lie the farms of John Reynolds, 150 acres, and Israel Tisdale, 118 acres. There are seven known deposits on the Tisdale land and three on the Reynolds land. A considerable amount of work has been done at one point on the Tisdale land, and at this point a fine showing has been made, both as to quantity and quality of the onyx.

Fig. 2 shows an out-crop of onyx on the Tisdale land.

West of the Tisdale land and about three miles from Glasgow Junction, lie the Henry Poynter lands, 165 acres, with 6 deposits; then the John Poynter lands, 60 acres, with 17 deposits. Following on west of Glasgow Junction, and nowhere more than two miles from the railroad track, one comes to other accessible deposits of onyx.

The deposits mentioned above form an irregular line extending from the vicinity of Cave City to the neighborhood of Rocky Hill. North of this line, for a distance of four or five miles, are many isolated deposits, all between the Louisville & Nashville Railroad and Green River. A number of deposits occur within a short distance of Green River.

These Barren County deposits are new, having been recently discovered, and this article is the first notice that the public has had of their existence.

THE UTILIZATION OF BLAST FURNACE SLAG. II. DESULPHURIZING SLAG.

By Alex. D. Elbers.

The proposition to desulphurize blast-furnace slag in the molten state for the purpose of making building stone is apt to be received rather skeptically; and there is no doubt that some technical difficulties will have to be overcome, no matter in which way such a project may be attempted. The discussion of the various methods that have been thus far proposed is, however, apt to dispel many imaginary difficulties; and that may serve to bring the project nearer to its realization.

It seems scarcely necessary to state that blast-furnace slag cannot be desulphurized by the Bessemer process, inasmuch as it is certain that the combustion of the sulphides does not produce sufficient heat to overcome the chilling effect of the air-blast.

On the other hand, a charge can be freed from its sulphur by the introduction of sodium nitrate without losing any of its liquidity. This method, which has been described in the "Engineering and Mining Journal," of June 22d, 1889, is fashioned after that which Heaton and Hargreaves proposed about 20 years earlier for the purification and partial decarbonization of pig iron. The success of the process, when applied to the desulphurization of slag, depends mainly on suitable arrangements for a more gradual decomposition of the nitrates. The product is, however, apt to be too alkaline for building stone. But it may be suitable for admixture to cement; and if moderate quantities of boric acid flakes are added to the desulphurized charge the product is apt to become so extremely tough that it could be used for railroad ties.

It goes without saying that the vessels or receivers in which molten blast-furnace slag is to be treated have to be lined with a material that can withstand the corrosive action of the charge. The only kind of clay that meets this requirement is pure kaolin. Its suitable preparation for linings, etc., is described in United States Letters Patent No. 485,917, dated November 8th, 1892.

It has also been proposed to desulphurize blast-furnace slag in an open-hearth furnace, by injecting air or steam, or both, into the molten bath. The principal reactions that are to be expected from the introduction of the respective blasts are:

For air: $\text{Ca}(\text{Mg})\text{S} + 3\text{O} = \text{Ca}(\text{Mg})\text{O} + \frac{3}{2}\text{O}_2$.

For steam: $\text{Ca}(\text{Mg})\text{S} + \text{H}_2\text{O} = \text{Ca}(\text{Mg})\text{O} + \text{H}_2\text{S}$.

According to these equations, one kilogram of calcium sulphide requires, theoretically, for its combustion, 2.9 kg. of air, or $\frac{1}{4}$ kg. of steam; and as these relative proportions are not apt to be much changed by the actual requirement, it seems that the application of steam is more practiced than that of air. The blast is to be introduced at intervals, through movable tuyeres or tubes that can be pushed deep into the bath. The result of the operation is supposed to be that some of the slag gets chilled by the blast without becoming desulphurized, that the blast becomes highly heated and then reacts on the still liquid portion of the bath, and that the chilled slag itself floats to the surface and remelts.

Doubts have frequently been expressed whether such a bath can be kept perfectly fluid until the finish—chiefly for the reason that the slag of open-hearth steel is usually not fluid at the time when it has to be removed. This is, however, no criterion, considering that such slag is either very basic or very acid, the oxygen ratio of the basic kind being as low as $\frac{1}{2}$:1, and that of the other about as high as $2\frac{3}{4}$:1.

The temperature of the open-hearth furnace is estimated to be about 1,400° C. when melting rail-steel, and about 1,800° C. when the charge is tapped, whereas the melting point of singulo-silicate blast-furnace slag is not much higher than that of gray pig iron, which melts at 1,200° C. to 1,300° C. Taking also into account that the melting point of desulphurized slag is about 100° higher than that of the crude, it may be assumed that the highest temperature required for desulphurizing blast-furnace slag in the open-hearth furnace will range between 1,400° C. and 1,500° C.

How long it will take to desulphurize a charge completely is hard to tell until it has been tried. It is, however, likely that the bath will give up the greater portion of its sulphide contents by liquation, a phenomenon that will be explained more fully hereinafter. This would shorten the duration of a heat considerably because the liquated sulphides, that portion which separates from the silicate-mass and gathers on its surface—can be drawn off.

Taking it for granted that such changes can be effected, there is still ample room for prejudicial notions as to the question whether it is pos-

sible to desulphurize slag in the open hearth at a sufficiently low cost to make it pay. Considering, for instance, that in making open-hearth steel over 40 per cent. of the effect of the fuel-consumption is lost by radiation, that this loss is proportional to the size of the hearth, and that one ton of slag takes up about as much space as $2\frac{1}{2}$ tons of molten steel, the computation of the cost by weight is apt to yield rather discouraging figures. It should, therefore, be remembered that the product is to be sold by measurement and not by weight, and that it measures about 11 cu. ft. to the ton.

The liquation theory before referred to has led to the proposition to desulphurize fresh-tapped blast-furnace slag by treating it in preheated ladles with reagents that will cause the sulphides to float to the surface, just as the gall of boiling glass does. A treatment that is intended to accomplish such results is described in United States Letters Patent No. 558,370, dated April 14th, 1896. It consists in dosing the slag—at a cost for reagents of about \$1 per ton—with sodium tetra-silicate, better known as "commercial crystals of silicate of soda," and with sodium sulphate or salt-cake. The sodium tetra-silicate lowers the freezing point of the charge in uniting with the silicates of the slag, and causes them to undergo rapid molecular rearrangements, on account of which the sulphides are apt to become released and the sodium sulphate is supposed to act chiefly as a bearer that carries the liberated sulphides to the surface. The dosing of the slag is expected to be amply effective when the reagents are applied in the following proportions: Sodium silicate, from 1 to 2 per cent. of the weight of the ladled charge, and of sodium sulphate about one-half more than the sulphur contents of the slag amount to. The essential reactions are expected to come to a finish within a few minutes after the slag has been poured into the ladle. All the sodium sulphate is supposed to go into the gall or scum; hence, the desulphurized charge will only become enriched with alkali to the extent of about 0.2 per cent. for each per cent. of the admixed silicate of soda, or 0.4 per cent. in all, which is certainly not enough to render the product vitreous, or unsuitable for architectural use.

Which one of the desulphurizing methods herein described will yield the most practical results is apt to remain a matter of conjecture until they have all been tried. It is, however, highly probable that any well-conducted series of experiments in either direction will bring the problem of disposing advantageously of an annual production of several million tons of encumbrance much nearer to its ultimate solution.

RECENT DECISIONS AFFECTING THE MINING INDUSTRY.

Specially Reported for the Engineering and Mining Journal.

MINERAL SPECIMENS AND HOTELS.—A notice posted in the office of a hotel directing guests to leave their "valuables" in the hotel vaults does not apply to mineral specimens in a guest's trunk.—Brown Hotel Company vs. Burckhardt (56 Pacific Reporter, 188); Court of Appeals of Colorado.

BUYER MUST OFFER TO RETURN DEFECTIVE ORE CRUSHER.—A buyer gave his note for the price of a rock crusher, and agreed to return it, if it failed to do a certain work as represented; and the seller agreed, on such failure, to receive it, and to cancel the contract of sale. The court held that the transfer of the note to an innocent purchaser, and the payment of same by the buyer, did not enable him to recover damages for the failure of the crusher to do the work, where he had not previously offered to return it and the seller had not refused to receive it.—Austin Manufacturing Company vs. Clendenning (52 North-eastern Reporter, 708); Appellate Court of Indiana.

REORGANIZATION CONSTITUTING NEW COMPANY.—A manufacturing company had been organized to sell lime. Its stockholders decided to enlarge its business by adding mining, and for that purpose a certificate of incorporation of the new company was prepared, and filed under the laws of Colorado. The old company sold to the new one all its property, and received the entire issue of its capital stock, which was distributed to the stockholders of the old company, and the new company assumed all the debts of the old one. The court held that this evidenced the formation of a separate corporation, and not merely an amendment of former articles of incorporation.—Clough vs. Otis (55 Pacific Reporter, 809), Supreme Court of Colorado.

TIME OF DELIVERY A CONDITION PRECEDENT.—A cargo of nitrate was "bought to be a March or April shipment from west coast South America, also bought to test by South American assay." The seller had purchased nitrate to fill the order, but it was not all to be delivered at port of loading before the end of April, and had chartered a vessel which was not to be at the port before March 15th. The buyer knew when signing the contract that the vessel was not in port, but did not know when it was expected, and did not know the seller did not have sufficient nitrate to fill the order in April. The court held that the provisions for "March or April shipment" was a condition precedent, authorizing the buyer to rescind, the vessel not sailing until after April.—Browne vs. Paterson (55 New York Supplementary Reporter, 404); Supreme Court of New York.

DELIVERING ORE "IN A MANNER SATISFACTORY TO" PURCHASER.—One complies with a contract to mine ores and to load them on cars free from foreign substance "in a manner satisfactory to" another by loading them on the cars free from foreign substance, irrespective of the manner in which they are taken from the ground and loaded on the cars. And he may recover for a breach of contract though the purchaser expressed dissatisfaction with the ore, where the expression was a mere pretext, and in such action evidence of the quality of the ore is immaterial. And the purchaser is not justified in terminating the contract by the other offering to deliver only a small quantity of ore, which was not free from foreign substance, where such offer did not evince an intention not to comply with the contract.—Worthington vs. Given (24 Southern Reporter, 739); Supreme Court of Alabama.

NATIVE METALLURGY IN THE PHILIPPINES.

Written for the Engineering and Mining Journal by R. L. Packard.

The geology and mineralogy of the Philippines has been studied by French and German travelers besides Spaniards. An excellent summary of the geology, especially the petrography, of Luzon, Samar and Leyte by the well-known German geologist, J. Roth, is given in Jagor's "Reisen in den Philippinen," 1873. There are other later works. Jagor's book contains an interesting account of gold mining and copper smelting in Luzon, the latter art having been practiced for centuries—long before the islands were discovered by Europeans—by the Ygorrotes, one of the wild tribes of the island. The civilized and Christianized natives, the Tagals, Visayas and some others, are farmers and not miners. The gold district visited by Jagor is in the extreme eastern part of Luzon, in Camarines Norte. He remarks that the localities called Paracoli and Mambulao in that district are places well known to mineralogists on account of the occurrence there of lead chromate. Those places are on the coast. The rocks of the district, according to Roth, are gneiss and hornblende schists, the latter running into serpentine and talcose schists, in which particularly the gold-bearing quartz veins occur, carrying iron pyrites, chalcopyrite and galena, and their weathered products, in which the gold occurs dendritically. Where the workings occur the ground consists of a coarse gravel of decomposed crystalline rock full of fragments of quartz, in which material the miners sink narrow pits to the depth of 30 ft. At about 3 ft. below the surface the ground begins to carry gold and increases in richness to about 18 ft. in depth, after which the value decreases; but as there is no uniformity in this rule, many un-

rock destined for crushing are washed in the trough itself in order to save the gold in the sand adhering to the latter. The gold dust is then placed in the shell of a bivalve, together with some charcoal, which is ignited and kept burning by the woman operator, who uses a bamboo tube as a blowpipe. In a few minutes the gold melts to a button, which is sent to market. One of these buttons was found to contain 77.4 per cent. gold and 19 per cent. silver. The daily pay of one of these pits is very small.

Copper is found in many places in Luzon, and Dr. Jagor was shown specimens of native copper from the east coast. Important deposits are found in the central mountain ranges of Luzon, between Cagayan and Ilocos in the district of Lepanto. Unsuccessful attempts have been made to work them by European companies, but the Ygorrotes have smelted the sulphantimonide and sulpharsenide ores of the district for centuries. These are the men who have recently opposed modern firearms in the hands of American troops with their primitive weapons. They make copper kettles and other utensils, and copper pipes and ornaments, which it was supposed up to 60 years ago must have been made from native copper. The copper district was formerly divided among these natives into larger or smaller "claims," according to the population of the neighboring villages, and no trespassing was allowed. Moreover, to each family in a village was allotted its own mine, so that the mining district presents the appearance of a honeycomb. In mining, fire is used to help break down the ore (as was formerly the case in Europe), and the ore is partly sorted in the mine, the waste being used as supports. The rich ore is smelted without further treatment, but the quartzose ore is roasted to remove a portion of the sulphur, antimony and arsenic, the operation also enabling the miner to separate much of the quartz. The ores con-



FIG. 2.—THE ONYX OUTCROPS ON TISDALE TRACT, KENTUCKY.
(The White Spot is 20 in. Square.)

successful mines are started. The workings are abandoned during the rainy season, because the pits, which are on a hill side, fill with water faster than they can be unwatered by buckets.

The gold-bearing rock is crushed by means of a spring pole and rude stone mortar. The pole rests in an upright fork, one end being fast in the ground, while a 25-lb. rock is fastened to the other by rattan and acts as a pestle, which the operator makes play up and down upon the pieces of ore placed upon a slightly hollowed flat stone, which is the mortar.

The grinding is done in an arrastra rudely constructed of roughly shaped stones, which form its bottom and sides. In the center of the circular bottom is fixed a stout post with an iron pin in its upper end, around which pivot a horizontal beam is made to turn by two buffaloes, which are harnessed to its ends. This beam drags around several heavy stones which are fastened to it by rattans, and they grind the crushed ore mixed with water to a fine pulp. The resemblance between this apparatus and the Mexican arrastra now used all over the mining districts of the West is very noticeable. As there was a constant intercourse between Manila and Acapulco in the seventeenth and eighteenth centuries, it would be curious to know whether the American arrastra may not owe its origin to the Philippines.

The pulp is washed by women who kneel along one side of a wooden trough kept filled with water, on the other side of which, and opposite each woman, downwardly inclined boards are fixed, their upper ends being let into the edge of the trough so that the water will run over them, and they are also tipped obliquely, their lower sides having riffles to hold the heavy sediment. The women throw the pulp upon these boards and the water washes away the lighter sand, leaving a dark residue of sulphides, which is removed from time to time with a flat chip, laid aside, and at the close of the day's work is washed in a flat wooden spoon (batea) and then in a cocoanut shell when, in case gold is present, it is found as a yellow powder at the edge of the ore. During the last washing the mucilaginous sap of a climbing mimosa is added to the shell, which keeps the fine, heavy sand in suspension, so that it is more easily separated from the gold. The fine gravel, and the pieces of

tain from 17 to 25 per cent copper and sometimes as high as 8 per cent. antimony and 7.5 per cent. arsenic, with from 25 to 47 per cent. silica and only 2 per cent. iron.

The hearth of the furnace consists of a round hole in the clayey ground a little over 1 ft. in diameter and half as much in depth. A conical nozzle of fire-resisting stone dips into this hearth as a tuyere and receives two bamboo tubes, which are fixed in the lower ends of a couple of hollow tree trunks, in which wooden pistons, with their circumferences covered with dry grass or feathers, work up and down alternately, and supply the blast. The hearth is charged with 18 to 20 kgs. of rich or roasted ore containing over 20 per cent. copper, the furnaceman always keeping the ore in front of the tuyere and therefore exposed to the blast, while he places the charcoal around the walls of the furnace, which are made of loose stones piled up to a height of about 2 ft. above the hearth. After the fire and blast are started thick, yellow, white and orange fumes of sulphur, antimony and arsenic, are given off for nearly an hour, by which time the heat is the highest attainable by this process and only SO_2 is given off. The blast is then stopped and the product removed. This consists of a slag, or rather a porous mass of silicious roasted ore—the absence of bases and the high percentage of silica preventing the formation of real slag at this stage—and an impure "stein," 4 or 5 kgs. in weight, and carrying 50 to 60 per cent. copper. Many such steins are next melted down in a strong fire from 15 to 20 hours, whereby the greater part of the volatile substances is removed. The ignited stein, suitably broken, is then placed in the furnace in contact with the blast, the coal being distributed as before, and, after an hour or less, a slag consisting of silicate of iron, with some antimony and traces of arsenic is obtained, besides a stein of 70 or 75 per cent. copper. These are removed in thin plates by making use of their cooling surface, leaving a greater or less amount of impure black copper in the hearth, depending upon the degree of desulphurization. This "concentrationstein" obtained by this second process, is roasted again, layers of wood being interposed between layers of the stein to prevent melting together before the impurities are removed. The black copper from the second charge and this roasted concentrationstein are sub-

jected to a third smelting in the same furnace (but in a crucible), whereby a silicate of iron is produced and black copper containing 92 to 94 per cent. copper, which is run into molds for the market. During the cooling in the molds the natives endeavor to prevent oxidation upon the surface by brushing the latter with green twigs.

When the copper is to be used for making kettles, pipes and the other articles which the Ygorrotes manufacture with so much patience and skill, this black copper is again refined by subjecting it to another furnacing, which differs from the former only in diminishing the quantity of coal and increasing the blast as the smelting process approaches its end. Santos found that even with ores of 20 per cent. copper only 8 or 10 per cent. of black copper was obtained, so that from 8 to 12 per cent. was left in the porous mass or slag of the first operation. This smelting process was probably introduced into the Philippines from Japan or China many centuries ago.

SILICON AND COPPER-SILICIDE.

Written for the Engineering and Mining Journal by O. J. Steinhart.

The rapid development of electro-chemistry has now brought within our reach many substances, which promise to become of industrial importance. Silicon and copper-silicide, which are now being manufactured in considerable quantities by the "Fabrik Electrometallurgischer Produkte" at Frankfurt-am-Main, are in a fair way to become of use for various metallurgical purposes.* These bodies are now made in solid ingots by an electrical process, the details of which, however, are secret for the present. It is obvious that solid pieces of silicon possess great advantages over the small crystalline product hitherto available. It can be added to a mass of molten metal without burning or deflagrating on the surface, thereby avoiding great loss of material and altogether rendering its application much more economical and practical.

The chief uses of metallic silicon are as follows:

1. In making iron castings the addition of a small percentage of silicon promotes the formation of graphitic carbon. By applying this method when using old iron or first quality pigs, the casting will not be rendered white by the employment of silicon. Shrinkage is to a large extent avoided, as the graphitic carbon which separates coats the iron and does not take part in the shrinkage. The absorption of gases forming blow-holes is avoided to a very great extent. The use of silicon is therefore advisable whenever dense and easily machined castings are required. Generally speaking, silicon is desirable in all cases where high grade, delicate castings are aimed at.

2. In the case of steel castings with very low carbon contents the use of silicon is of decided advantage, as it reduces any oxygen compounds without, however, increasing the percentage of carbon. On the other hand, the use of ferro-silicon and ferro-manganese of necessity must increase the quantity of carbon in the finished steel, owing to their high carbon contents. This is avoided by the use of silicon, which only contains small quantities of carbon or graphite. In the Wahlrand-Legenisel process for overheating the steel in a small Bessemer converter silicon has been employed. Sluggish charges are easily rendered fluid by this means. Open-hearth and crucible, as well as tool steel castings, are greatly benefited by the employment of silicon. With regard to the quantity of silicon used for these various purposes, a hard and fast rule cannot be laid down, as this depends upon the individual mode of working and requirements whether a casting is to be gray or white.

Copper-silicide is being produced with 10, 15 and 30 to 35 per cent. of silicon in the shape of ingots weighing from 15 to 18 lbs., divided by notches, so that they can be easily broken into smaller pieces. Its uses include the following:

1. This alloy can be employed in lieu of phosphate of copper as a purifying and deoxidizing agent acting as a reducing medium should any of the oxygen compounds of arsenic and antimony be present and thereby counteracting their deleterious effects. The resultant metals combine with the metallic copper, whereas the silicon employed does not enter into combination with the same. If copper is therefore finally refined with copper-silicide a greater strength and toughness is imparted to it.

2. Silicon may also be added to copper in such a manner that it forms a permanent compound with the latter, thereby adding materially to its hardness and strength, which can be made equal to that of steel if a sufficiency of silicon is incorporated with it. Small quantities up to about 0.1 per cent. render it particularly suited for telephone wires, and other electrical purposes, as this alloy possesses a far greater strength than ordinary electrolytic copper wires.

The subjoined table gives figures showing the relative conductivity and tensile strength of pure copper and these alloys:

	Tensile strength per 1 sq. mm. 28-35 kg.	Conductivity.
Pure copper wire	45	100
Cu. with 0.02, 0.5% Si	45	98
" " 0.05 1.5% Si. and 1.5% Tin. .	83	43

A further addition of silicon of about 0.5 to 3.5 per cent. very considerably increases the tensile strength of copper, however, at the expense of its conductivity:

	Tensile strength. 28-35 kg.	Conductivity.
Pure copper	45	100
Cu. with 0.5% Si	50	28
" " 3.5 Si	95	7

These alloys are particularly suited for bolts in locomotive fire-boxes, for rivets, wire ropes, etc.; that is in all cases where high tensile strength and small elongation are required and iron is not admissible, as well as in all cases where an acid-resisting material should be employed.

3. Copper-silicide also forms a very useful addition to tin and zinc bronzes in lieu of copper-phosphide. The bronzes thus prepared are very elastic and heat resisting, much less silicide being required as compared with the corresponding phosphorus compound. The purifying power of 10 per cent. silicide as compared to the same strength

*"Silicon copper" is made in the United States by the Cowles Electric Smelting and Aluminum Company, at Lockport, N. Y.

phosphide is as 1.48 ÷ 1, or entails a saving of about half the material when the former is employed.

4. As an addition to aluminum bronzes it should be of great importance, as alloys can be obtained with high tensile strength, ranging with respect to their hardness from ordinary brass to the hardest phosphor bronze. The manufacturer, therefore, has a very convenient means of preparing his alloys for any specific purpose. If, for instance, aluminum bronze of great strength is required, being soft at the same time the chilling of the alloy when red hot is advisable. Generally speaking, the presence of silicon in aluminum bronzes, such as the Heroult and Cowles, increases their strength and hardness, at the same time reducing their elongation.

With reference to the quantity of copper-silicide required for these various purposes a hard and fast rule cannot be laid down, as this depends upon the object to be attained and the material employed, but in most cases 50-100 gr. per 100 kilos will generally suffice for copper alloys and bronzes.

The immense influence the presence of very small quantities of other metals or metalloids has upon the physical properties and general characteristics of metals and their alloys, which fact is being more clearly shown every day, will doubtless prove the necessity of practically testing the employment of silicon for this purpose, especially as it is now obtainable in marketable form at a comparatively reasonable price.

MICA IN THE PROVINCE OF QUEBEC.

Written for the Engineering and Mining Journal by J. Obalski.

There was no white mica worked in Quebec during the year, although there are a few important mines of this variety, but progress is to be mentioned in the mining of the amber mica, in Ottawa County; in fact, in 1897, but three or four mines worked by about 50 men were in operation, and in 1898 we see 7 or 8 good mines worked, not including numerous prospects, employing altogether over 250 men. I suppose that the main reason for this state of prosperity is the recognized fact that the amber mica answers the purposes of the electrical industry, and that it is easily obtainable at short notice of the grade and size required. The mica is no longer sold in the cut form, but mainly in the thumb-trimmed form, being sorted at the mine according to the size.

After extracting from the mine, the mica is roughly split and then handled by boys or girls under the direction of an experienced foreman. They split the crystals to a thickness of about 1/4 in., take off by hand all the pieces that may be parted, and clean the surface with a knife; the good pieces are put in boxes according to their grade, and then sent to the sorters, who classify them by sizes, the foreman being the last to see it, and barrel it. The mica is then pressed in the barrel which, after it is closed and nailed, weighs 350 to 400 lbs.

Mica mining is carried on in the usual way; steam drilling has been used, but miners appear to prefer hand mining, which gives them a better control of the crystals. Amber mica is found in connection with the Laurentian formation, which covers so large an area north of the River and Gulf of St. Lawrence. The mica deposits are mainly located in certain parts of Ottawa County, in the vicinity of the rivers Gatineau and Lievre, especially in the townships of Templeton (near Perkins Mill), Hull, Wakefield, and Bouchette. Sometimes it is found in a form of chimneys appearing with pyroxene, and at other times in veins, in which pink calcite is the matrix containing crystals of mica, pyroxene and apatite. This last kind appears to be the most durable and promising, although very important mines of the first variety have been operated.

The working of these mines is regulated by the Quebec mining law. In many cases the mines have been previously sold with the land, but when the mines belong to the Government they are sold or leased on very liberal terms and prospecting licenses may be granted, giving to the holder the right to be the first purchaser. The main market for mica is the city of Ottawa where several brokers do business.

As to the companies producing mica, the following may be mentioned: Wallingford Brothers and Blackburn Brothers, Perkin Mill, P. Q.; T. J. Watters, W. J. Jamieson and T. F. Nellis, Ottawa; C. Gay, Gracefield, Ottawa County, P. Q. These are the more important. Besides these, there are about 20 small producers.

MINERAL IMPORTS AND EXPORTS OF SPAIN.—Imports of fuel into Spain, according to the "Revista Mineraria," for the three months ending March 31st, included 451,001 metric tons of coal and 77,632 tons coke. Imports of iron and steel were 675 tons pig iron, 846 tons wrought iron, 5,325 tons steel and 333 tons tin-plates. Exports of minerals for the three months were, in metric tons:

	1898.	1899.	Changes.
Iron ore	1,796,522	1,966,048	I. 169,526
Copper ore	191,524	225,613	I. 35,089
Zinc ore	13,571	19,880	I. 7,609
Lead ore	1,691	2,001	I. 310
Salt	49,333	56,554	I. 7,221

Exports of metals included 8,227 tons pig iron (13,219 tons in 1898); 8,052 tons copper (7,280 tons in 1898); and 42,909 tons lead (44,445 tons in 1898).

COPPER IN THE OURALS.—According to the "Commercial Gazette" of St. Petersburg the demands for copper mines have increased, owing to the rise of prices of copper. This is unexpected, as but five years ago copper smelting factories gave up their mines to the government. The copper industry has declined in the Ourals, but now the revival of the industry in Russia may be expected. Chemical factories in the district of Elabuga have great demands for copper, and new mines in the government of Viatka have been discovered. This government was formerly one of the first in the smelting of copper, but now only the peasants, when they are free from other work, extract the ore and take it to Kukmor and other villages, where it is smelted in ordinary smithies and made into cheap articles. However, there are two or three workshops which make larger articles and even samovars.

A MONTANA CRIB DAM.*

By Eugene Carroll.

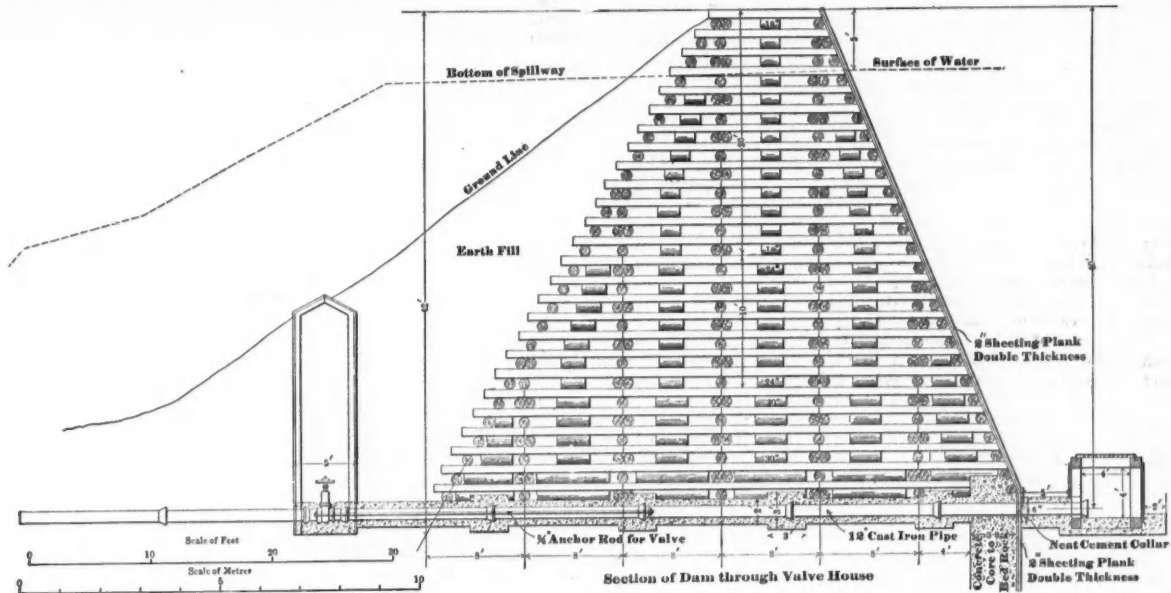
The important dam built for the Butte City Water Company on Basin Creek is one of the largest works of the kind in the West. This dam is 319 ft. long on the crest, including the spillway, and the crib work is 42 ft. high. It is built of round fir logs, in cribs 8 ft. square. The upper face has a slope of 16 ft. horizontal to 39 ft. vertical, the lower face 24 ft. horizontal to 42 ft. vertical. The water face is sheeted with 2-in. plank, laid double, and breaking joints to make it water-tight. This lining extends to bed-rock in front of the concrete core wall. A concrete core wall 3 ft. 8 in. thick is built under the inner toe of the dam, extending from bed rock to about 12 in. above the level of the bottom of the crib work. A 12-in. cast iron blow-off pipe is laid through the center of the structure, with a valve at the lower end and a crib protected by a screen at the upper end. The crib work is 48 ft. wide on the bottom and 8 ft. wide at the top. An earth fill is built on the back of the dam, on a slope of 1½ : 1.

The cribs, 8 ft. square, are of round fir logs stripped of all bark, and not less than 7 in. in thickness at the small ends. The logs were lapped at all intersections, and at every contact a ¾-in. bolt binds them together. Between the logs, running in the direction of the pressure, fillers were inserted, as shown in the plan. These fillers were firmly held in place by drift bolts, and were put in to make a greater bearing surface to withstand the pressure, and also to prevent a rolling of the cross logs when the pressure was received. At each end of the structure the logs were anchored to the bed rock when possible. The logs forming the water face were hewn to a true surface to receive the sheeting, the

The spillway has a clear width of 17 ft., the bottom being 5 ft. below the crest of the dam. It is built around the west end of the structure, and is so constructed that the overflow can be turned either into the creek or into a flume which extends from the headwaters of Fish Creek to the main reservoir below, known as the Fish Creek flume. This Fish Creek flume extends around the reservoir, and is enlarged at this point so that it can be used as an additional spillway if necessary. The flumes and spillway are so arranged that the reservoir can be entirely cut out of the system, or the overflow can be used; or all water, including Fish Creek, can be turned through this reservoir. The spillway is cut through a point of solid rock, which extends out beyond the west end of the dam and empties into a creek which flows into the main creek about 300 ft. below the toe of the dam.

The water face of the dam is protected by 2-in. planks spiked to the crib work in two layers, breaking joints in every direction. At the knuckle where the sloping face is joined to the vertical sheeting in front of the core wall an additional plank was spiked over the joint horizontally, and all seams were carefully calked with oakum and poured with hot asphalt. A puddled fill of earth and gravel mixed was then made against the dam, extending about 8 ft. above the knuckle, and about 10 ft. wide on the bottom. The outside seams of the sheeting were then loosely calked with oakum to the top. The calking and puddling about the knuckle were left till the last, when most of the settling had taken place.

As it was necessary to waste below the dam, this waste material was used to make a back fill on the lower side of the structure. This served to strengthen it, and it will also protect the timber from the action of the sun and from the danger of fire. At completion this fill extended only about half-way up the structure, but it was afterward carried clear



BASIN CREEK DAM, MONTANA.

lowest one being imbedded in the concrete core to form the knuckle where the slope joined the vertical sheeting of the core wall.

The cribs were filled with broken rock, decomposed granite being flushed in to thoroughly fill all the interstices. Great care was exercised in placing this so that every part of each crib was thoroughly filled. The material was put in in thin layers, spread by hand, and a liberal amount of water was used to settle it thoroughly and flush in the interstices. Owing to the fact that much of the excavation from the bottom of the reservoir had to be deposited below the dam, the filling could not be carried up in regular layers along the whole structure, as was desired.

Along the inner toe of the crib work, extending to bed rock, a concrete core wall, 3 ft. 8 in. thick, with double 2-in. sheeting along the upper side, was built to prevent any leakage under the structure. This concrete was made in the proportion of 5 broken rock, 3 sand to 1 of cement, and carefully rammed in place. The concrete was carried to about 1 ft. above the base of the crib work, to support the lower log to form the knuckle of the sheeting. At the west end this core wall was carried to the top of the structure and extended to the back, as shown in the plans, to form the spillway. The cement used was Utah Portland.

A 12-in. cast iron pipe extends under the dam to empty the reservoir when the water is needed in low water season. This pipe was laid on a concrete foundation extending to bed-rock from the intake to the valve, and then imbedded to a depth of 6 in. in concrete. At regular intervals the concrete was increased 6 in. in width and height, to form collars to prevent leakage from forming a regular channel along it. The upper end of the pipe opens into a timber crib 4 ft. square, on which an iron grating is secured to prevent any debris from stopping up the pipe. This crib is carried 4 ft. above the bottom of the reservoir, but it can be opened at any time to sluice out when this becomes necessary. Where the pipe enters the sheeting of the core wall a collar, 6 in. thick, of neat cement is formed, by grouting, to prevent leakage around the pipe at that point.

In addition to supporting the valve by concrete built back of it, the valve is anchored to the pipe by two ¾-in. rods extending 24 ft. back into the concrete.

to the top, partially to allay the fears of ranchers living below the structure, who were much worked up over the trouble experienced on the Big Hole with a similar structure. A box drain is laid under the back fill to carry off any leakage through the face.

All surface material was carefully removed from the bottom of the reservoir to a depth sufficient to get below all vegetable organisms. The material from the upper end of the reservoir was deposited in two draws, so as to prevent the formation of any shallow places in the reservoir. These fills were carried up on a regular 3 : 1 slope, and it is the intention to cover their water slope with gravel eventually.

The matter given the most serious thought in designing this structure was settlement of the structure within itself. The foundation was perfectly solid, so that there was no fear of settlement there. Instead of butting the logs at intersections, all logs were lapped, thus giving nearly double the bearing surface at the intersections. Fillers were placed between the logs running in the direction of the pressure, not only to increase the bearing surface of the logs, but also to resist any tendency in the parallel logs to roll when the water pressure was applied. The writer believes that a sloping face is greatly preferable to a vertical one, because, as the water rises against the structure, the resultant pressure has more of a tendency to press the structure together and toward the foundation. With a vertical face there is a much greater tendency to push the structure over and to cause a rolling of the timber forming it.

The object attempted in the design of this structure was to make the timber bents, which receive the pressure of the water, sufficiently solid to hold the facing in place even without the assistance of the filling. On building this dam there was considerable trouble in placing the fillers, and possibly a better structure could be built by butting the logs running in the line of pressure and lapping the cross logs. This arrangement would give the same bearing surface at each intersection, and would bring the logs vertically one above the other, thus getting the best results from the fillers.

As stated above, the east end of the dam was filled first, to allow a passage through the dam for the bottom cleaning and to avoid delaying the work. The east cribs were filled to a depth of about 30 ft. before any filling was placed on the west end. The weight of the filling settled the structure considerably, but the writer was pleased to find that when the west end was filled that end also settled, so that there was a regular settlement from end to end, depending upon the depth, the back logs

* Abstract of paper read before the Montana Society of Engineers, January, 1899. From the "Journal" of the Association of Engineering Societies.

taking a regular curve from each end. When the reservoir was filled the structure continued to settle in regular form until, upon its final set, the top of the sheeting at the center was about 2 ft. 9 in. out of the straight line, coming in a regular curve to zero at each end.

The logs in the back showed no sign of movement or undue strain, and all settlement seemed perfectly regular and steady throughout. On August 1st, with the water within 6 in. of the overflow, the top of the dam, at a point of greatest depth, had settled back 2 ft. 3 in.; while on October 1st it reached the maximum of 2 ft. 9 in.

The leakage through the face was considerable at first, but soon became less; and for four months remained steady, amounting to about 30,000 gallons per day. It is the intention to nail battens on the seams as the water goes down, hoping thereby to reduce the leakage considerably. At some future time an earth fill will probably be placed on the water face, to keep the structure absolutely water-tight and prevent the sun from drying the face and opening the seams each year.

The work, with the exception of the back fill, was done by contract at the following prices: Crib filling, 75c. per cubic yard; crib work, 12c. per lineal ft; drift bolts, 4c. per lb.; lumber in place, \$30 per thousand; concrete, Utah Portland cement, \$7 per cu. yd.; excavation for dam and core wall, 50c. per cu. yd.; wet excavation, \$3 per cu. yd. The whole structure cost, including the engineering and the back fill, about \$32,000.

ABSTRACTS OF OFFICIAL REPORTS.

De Beers Consolidated Mines, Limited, South Africa.

This company owns a large area of diamond-bearing deposits in the Cape Colony and the Orange Free State in South Africa, and in effect controls the diamond business of the world. It operates actively three mines—De Beers, Kimberley and Premier, the last named being a new mine. The report is for the year ending June 30th, 1898.

The capital stock is £3,950,000, and there are outstanding £3,166,320 De Beers 5 per cent. debentures and £273,780 Bultfontein 4½ per cent. debentures. There were £132,000 debentures retired during the year by the sinking funds. The reserve fund at the close of the year amounted to £1,349,674, of which £1,148,134 was invested in British consols.

The quantity of diamonds obtained during the year was 2,792,606 carats, the average price realized being \$6.36 a carat. The total receipts from diamonds sold were £3,647,875. The working expenses—including £76,260 for depreciation, £177,227 for interest and £132,000 debentures paid off—were £1,870,079, leaving £1,777,796 as net earnings. The profit and loss account stands as follows: Net earnings, as above, £1,777,796; dividends and interest received, £56,653; total, £1,834,449. From this there was £31,423 carried to reserve fund and £1,579,582 (40 per cent.) paid in dividends; a total of £1,611,005, leaving a surplus of £223,444 for the year. The balance carried forward from the previous year was £683,048, from which £158,004 was paid as fees to the life governors of the company, leaving £525,044. This, added to the surplus for 1898, left a total balance of £748,488 forward to the current year.

The report describes the settlement made with the life governors, by which those gentlemen withdrew certain claims against the company, and agreed to an interpretation of the contract which somewhat reduces their fees. This arrangement has been heretofore referred to in our columns.

The following table gives a summary of the operations at the active mines of the company during the year:

	De Beers.	Kimberley.	Totals.	Premier.
Loads mined.....	2,100,021	1,232,667	3,332,688	1,140,981
Loads worked.....	2,151,981	1,107,711	3,259,692	691,722
Loads on floor.....	1,520,924	856,989	2,377,913	727,039
Diamonds, carats.....	.....	.....	2,603,250	189,356
Av. diamonds per load, carats.....	.....	.....	0.80	0.27
Av. value per load.....	.....	.....	\$5.08	\$1.36
Cost of mining per load.....	\$1.05	\$1.11	.....	0.33
Cost of working per load.....	0.50	0.55	.....	0.29
Total.....	\$1.55	\$1.66	\$1.55	\$0.62
Net per load.....	.....	.....	\$3.53	\$0.74

Development at the De Beers Mine included 6,366 ft. main tunnels, 33,386 ft. ordinary tunnels, and 1,562 ft. passes, 28 ft. shaft sinking and 490 ft. shaft enlarged; at the Kimberley Mine, 8,520 ft. main tunnel, 9,998 ft. ordinary tunnels, 1,309 ft. passes and 223 ft. shaft sinking.

The report gives an interesting supplementary statement from General Manager Gardner F. Williams, which gives the condition of affairs at the mines up to about the close of 1898. This report is substantially as follows:

"Although this report is supposed to end on June 30th, I think that a supplemental statement ought to be made in view of the adverse criticisms which have been made by certain persons and papers which are notoriously unfriendly to the company. Since my return from leave of absence I have gone through the mines and over the works as thoroughly as the time at my disposal has permitted, and now beg to submit the following report as the result of my investigation:

"At the De Beers Mine I found the various levels in good working order, with the exception of the 1,080 ft. level, where a mud-rush had just occurred. Some two years ago I advised you to have No. 1 shaft enlarged and made ready for a greater output of blue ground from De Beers Mine. It must be borne in mind that more than half of the world's supply of diamonds depended upon a single shaft and a single engine, and if any unforeseen accident occurred to either the shaft or the engine, the output would be stopped. Another reason for increasing the plant at De Beers Mine was that a greater output of diamond-bearing ground might have to be made, and that the present winding plant was being worked up to about its limit. In accordance with the recommendation then made, No. 1 shaft was enlarged by adding two compartments from the surface down to the 800 ft. level, to which point the shaft had already been sunk. The shaft has been completed to the 1,400 ft. level and is now the largest of any of our shafts. It has two skipways, two cage-ways, a compartment for water and compressed air pipes and for other purposes, such as electric light cables, etc., and a ladder-way with double ladders. A suitable pit-head frame has been erected, and an engine of sufficient power to wind ground from a depth

of 4,000 ft. or more will soon arrive and be erected without delay. In the meantime the late French Company's engine has been brought from Kimberley Mine and is being used until the larger and more powerful plant is completed.

"In reference to the falling off in yield for some months past, I beg to state that the ground in the mine appears to be, in my opinion, just as good as it has been. On the floors there is a considerable amount of waste (reef and floating shale) mixed with the good blue, which accounts for the somewhat lower yield. This is the result of carelessness and neglect on the part of the contractors in the mine. I have told the manager that greater care must be taken in winning the blue ground, and expect to see an improvement in the yield. Better supervision is all that is necessary to ensure better returns. As soon as the changes now being made in the reduction plant are completed I intend to sample the daily output of blue ground by sending every 20th truck-load of ground to this plant. If the production is 8,000 loads a day, this will mean that 400 loads will be reduced daily, or about 10,000 loads a month. By this method of testing we will be able to tell at once whether the ground sent out of the mine is up to the proper standard.

"At the Kimberley Mine for some time past the yield of the ground has been poor. The explanation of this is that the blue ground in the west end or poor part of the mine has moved to the east and become mixed with the better ground. We have during the past two years had a lot of poor ground, especially in that portion of the mine where there was an expansion to the east and south. The ground from these new claims was very poor indeed on the 1,200 ft. level and improved but slowly as we opened up the deeper levels. A large quantity of this ground was mined and sent to the floors. We have every reason to believe that this part of the mine will now yield good ground. My reason for saying this is that tests extending over a large portion of the mine have been made. These tests were from eight levels amounting to 320 ft. in depth, being from the 1,560 to the 1,840 ft. levels inclusive. It is gratifying to report that an average yield of over ¾ carat per load was obtained. Other tests which have been made have given equally good returns.

"The next matter of importance is the areas of the mines. Taking Kimberley Mine we have 79.3 claims. The average number of claims for the 15 levels from the 925 to the 1,520 ft. levels has been a little less than 90. The 1,120 ft. level was smaller than the 1,520 by 3.4 claims. At the present time the number of claims would make an area of diamond-bearing ground 384 ft. long and 200 ft. wide. At De Beers Mine we are working 152 claims on the 1,200 ft. level. This is equivalent to an area of 730 ft. long by 200 ft. wide of blue ground, which should yield about a carat a load. Besides the above claims there are nearly as many in the west end of the mine of what are called poor claims. Arrangements are now completed for taking out a large amount of this ground for the purpose of making a thorough test of its value. From tests already made I am certain that this ground will pay very well to mine. An estimate of blue ground in sight in De Beers and Kimberley mines is 5,000,000 loads at De Beers and 4,000,000 loads at Kimberley, or a grand total of 9,000,000 loads.

"At the Premier Mine work on a large scale is being done and the output of diamond-bearing ground averages about 7,250 loads a day. The hoisting of ground from the mine is being done by means of an endless wire rope upon an incline with a grade of 1 in 5. The Premier Mine has 1,162 claims, and is now being worked at the 125 ft. level, that is, the ground is coming from the mine between a depth of 72½ ft. (the depth to which Mr. Ward worked it) and a depth of 125. A new level 50 ft. deeper is now being opened. By the time this level is worked out we must be in a position to hoist the blue ground in some other manner than by means of the present incline. I would recommend that a shaft with two skip compartments, two cage compartments and one compartment for pumps and ladder-way be started. The location of the site for the shaft has had my attention, and the most suitable position seems to be on the east side of the mine. The enormous area of this mine, with its good and possibly increasing yield as greater depth is reached, and the cheapness with which it can be worked, will enable us to increase our output of diamonds to almost any extent that may be required.

"In addition to the three above-mentioned mines, we lease under right of renewal in perpetuity 1,460 claims in the Du Toits Pan Mine (which comprise the whole mine with the exception of a few claims), and the greater part of Bultfontein Mine, 907 claims. No work is being done by us in either of these mines. Taken as a whole, our mines are in very good condition, and we should continue in the future, as in the past, to supply all the diamonds the world will take, even though the demand should materially increase from year to year."

CIVIL ENGINEERS' MEDALS.—The Council of the Institution of Civil Engineers has made the following awards for papers read and discussed before the Institution during the past session, says the London "Engineer": A George Stephenson medal and premium to Mr. R. A. Hadfield; a Telford medal and premium to Mr. J. T. Milton; Watt medals and premiums to Sir Albert J. Durston and Mr. H. J. Oram; a Cramp-ton prize to Mr. Francis Fox; a Manby premium to Sir William Roberts-Austen; Telford premiums to Messrs. J. M. Dodson, W. G. Kirkaldy and A. P. Head. The presentation of these awards, together with those for papers which have not been subject to discussion and will be announced later, will take place at the inaugural meeting of next session.

THE GELLIVARA IRON MINES IN SWEDEN.—The works in connection with the Swedish State Railway from Gellivara to the Norwegian frontier are being pushed energetically ahead; it has been found that the work done by the English company, which originated and commenced this large undertaking, means a vast saving to their successors. It is expected that some 30 miles will have been graded, railed, etc., some time in the summer, when some heavy earthwork will have to be got through, but it is confidently anticipated that Luossavara, one of the great centers for iron ore, and one of the principal objects for building the line, will be reached before the end of the year. The whole Swedish section of the line, that is, from Gellivara to the Norwegian frontier, is to be ready before the end of 1902.

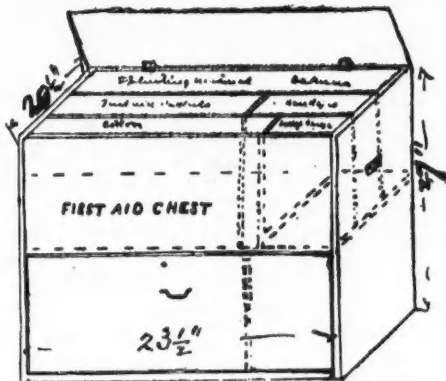
FIRST AID TO THE INJURED IN MINES.*

By Dr. E. Hamilton Fish.

In this paper the author makes some interesting notes in relation to the aid which can be extended on the spot to men injured in mines. The question most pressing usually is the transportation of the injured man to some point where he can be cared for. The hospital, in mining districts, is frequently situated some miles from the scene of the accident. Unless the injured part be well protected, this journey, especially over rough mountain roads, is apt to lead to serious complications. The advantage of preliminary treatment is obvious. For instance, the staunching of an excessive hemorrhage, which left untreated for a few moments until medical aid could be summoned from a distance, would probably prove fatal. The preliminary splinting of fractured extremities preparatory to transportation would prevent much suffering from the constant motion of the vehicle, which is constantly prodding the sharp ends of the broken fragments into the already torn and lacerated tissues. This also frequently prevents the converting of a simple fracture into a compound condition, which might subsequently cost the patient his limb.

The immediate dressing of a wound by an antiseptic dressing relieves pain, checks an oozing hemorrhage, prevents the ingress of filthy material, facilitates the final treatment and acts as a good preventive to the long line of disastrous consequences which follow the introduction of pyogenic and pathogenic micro-organisms. Every accidental wound must be considered as an infected wound and treated as such. The mechanical lavage from hemorrhage frequently dislodges the infecting material received at the time of injury, and, taking advantage of this by the application of suitable dressing known as the "first aid packet," we thereby prevent a subsequent or mixed infection which might prove disastrous.

The methods of hoisting an injured man from the bottom of deep shafts or bearing him along a narrow tunnel with the least possible injury is of prime importance. The methods of transportation of the injured from the scene of accident to the receiving hospital with the ut-



FIRST AID CHEST FOR MINES

most dispatch consistent with safety is of vast importance as a time-saving measure.

The resuscitation of unconscious men from the action of fire damp and other poisonous gases in the absence of the medical attendant is a life-saving measure not to be lightly passed over. I think it the duty of every mining surgeon in justice to himself, his patients and to the company he represents to give systematic instruction by illustrations and lectures to every foreman and to the men in charge of squads of men under him.

Each mine should be supplied with "first aid packets," antiseptic tablets of bichloride of mercury, carbolic acid, iodoform gauze, absorbent cotton and an assorted set of bandages, tourniquets, scissors and one or two haemostatic forceps, apparatus for hoisting and carrying the injured, splinting appliances and transportation materials.

In military surgery, first aid is usually conducted upon the field where the ever changing firing line allows little time for more than the application of the dressing packet, but in mining surgery the patient is usually removed to some building near at hand where more time may be taken in the preliminary treatment.

The instructing of a body of men who know absolutely nothing about the skillful handling of an injured person and the scientific application of antiseptic solutions and dressings is surely no easy task, but as a rule they are willing and eager to learn, and by a few object lessons and plain talks, or lectures free from technicalities, they will soon become quite proficient. The surgeon is amply repaid for his labors when such a trained body is at his disposal in cases of serious accidental injuries. The method of instruction should consist of:

1. Briefly outlining the necessity of absolute cleanliness, and that surgical cleanliness is more than ordinary cleanliness. That it prevents the serious consequences from poisonous and disease producing material and thereby aids in bringing about a more rapid cure.
2. In explaining the contents of the "first aid packet," its uses and the method of applying the same, instruction should be given in the making of antiseptic solutions in different strengths and when and where to use them in the proper manner.
3. Instruction should be given in the diagnosis of the varieties of hemorrhage met with, and the different methods employed for its control in the least harmful manner.
4. They should be taught the preliminaries of splinting a limb and to adapt themselves to their surroundings for the proper material.
5. Instruction should be given in the methods of carrying and holst-

ing injured men from tunnels and shafts in such a manner that the injured part may be kept in a position free from strain and irritation.

6. Instruction should be given in the manner of improvising methods of transportation such as the travois, the pack saddle, double animal sling, etc.

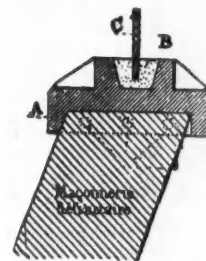
7. In the teaching of the various methods of artificial respiration and its mechanical action.

8. In the instruction in the giving of anaesthetics, to the extent that they may be serviceable as assistants. Sometimes the surgeon is called to a case too badly injured for transportation and requiring immediate operation. After the surgeon has prepared everything which may be needed in the operation antiseptically—as aseptic work in this class of cases is nearly always impossible or when possible is undesirable—he turns his attention to the anaesthetic, administering the drug himself until the patient is completely under its influence. Then he is able to proceed with his operation with some degree of satisfaction, knowing that he is not continually contaminating his hands from the unclean inhaler and, through them, the wound in which he is working. They are also taught to find and accurately count the patient's pulse, so that at any time during an operation the operator may call for the pulse rate, and the assistant immediately counting the pulsations aloud, acquaints the surgeon with his patient's condition.

9. Sometimes instruction may be given in the methods of cleansing the hands so that they may act as the operator's assistants, in emergencies, but as their duties rarely extend beyond the holding of a retractor or the patient's limb, it is probably safer to wrap the hands in antiseptic towels, as there are even few medical men who keep their hands where they belong when acting as assistants during an operation.

We give herewith a rough sketch and a condensed description of the "first aid chest" above referred to by Dr. Fish. The chest contains all the materials which may be needed in a preliminary dressing of a wound; also many articles which the surgeon may need, which are too bulky to be carried quickly from place to place.

The chest is divided into two sections, an upper and a lower one, the latter being a drawer. The upper section is subdivided into five compartments, containing: Two 1-lb. rolls of absorbent cotton; a 5-yd. jar of iodoform gauze; 1/2 doz. first aid packets; an assorted set of roller



SAND-JOINTS FOR BLAST FURNACES.

bandages; splinting material of wood and binder's board; 2 lbs. oakum.

The drawer contains in its three apartments: 2 granite basins; 2 granite instrument trays; 1 doz. towels; 2 sheets; soap and brushes; a 4-oz. bottle of carbolic acid; 100 bichloride of mercury tablets; 1 lb. chloroform; 1 lb. can ether; 2 oz. iodoform powder in sprinkler; 1 chloroform inhaler; 1 pint whiskey; 3 haemostatic forceps; 1 pair scissors; 1 razor and strop; a 3-quant fountain syringe; 2 glass irrigating tubes; 1/2 doz. soft rubber catheters; safety pins; 1 rubber tourniquet; 1 graduated medicine glass; 2 2-in. roll of adhesive plaster; 1 yd. rubber sheeting.

This chest is to be kept in a suitable place to which easy access may be obtained at all hours. It is kept under lock and key and is only to be opened by the proper persons in cases of emergency.

A RUSSIAN IMPROVEMENT IN BLAST FURNACES.

At a late meeting of the French Societe des Ingenieurs Civils, attention was drawn to a recent improvement in blast furnace construction devised by M. P. Francois and adopted at the Olkovaia blast furnace plant at Ouspensk, Central Russia. The object of the improvement was to overcome the drawbacks of the expansion, in height, of the masonry work of the furnace, which results in throwing out of the level in one direction or the other, of the furnace-charging floor. To overcome the difficulty M. Francois has devised what he terms a "sand joint." It comprises a specially-shaped cast-iron crown ring of the form shown at A in the accompanying illustration. A recess, B, is formed in the upper portion of the crown, which is formed in the upper portion of the crown, which is filled with very fine sand in order to prevent any escape of gas. The base of the upper portion of the furnace rests on the sand as shown at C. It is stated that when the furnace was lighted to which the device has been applied, the usual expansion of the masonry under the action of the heat took place, but the upper portion of the furnace together with the charging floor was not displaced in any way, the part C simply bedding down further into the sand as the expansion proceeded.

TEMPERATURE IN DEEP MINES.—According to Mr. J. Sterling in the "Transactions" of the Australasian Institute of Mining Engineers, observations taken in Lansell's 180 Mine at Bendigo, show increases of temperature in depth as below: At 454 ft., 1° F. for each 110 ft.; at 1,294 ft., 1° for each 182 ft.; at 1,750 ft., 1° for each 173 ft.; at 2,295 ft., 1° for each 152 ft.; at 2,701 ft., 1° for each 137 ft.; at 3,110 ft., 1° for each 110 ft.; at 3,250 ft., 1° for each 111 ft. The mean result of these ratios shows that the ratio of 1° F. for every 137 ft. in depth is the record of the Silurian rocks of Bendigo.

*Abstract of paper in the "Colorado Medical Journal."

QUESTIONS AND ANSWERS.

(Queries addressed to this department should relate to matters within the special province of this periodical, such as mining, metallurgy, chemistry, geology, mineralogy, machinery, supplies, etc. As it is manifestly impossible to devote space to all the questions and notes constantly received, preference will be given to topics which seem to be of interest to others besides the inquirer. We cannot here undertake to give professional advice on problems requiring special investigation and which should be obtained from a consulting expert. Brief replies to questions will be welcomed from correspondents. While names will not be published, all inquirers should send their names and addresses. Anonymous questions will not be answered.—Editor E. & M. J.)

Siphoning Water.—Is, or is it not, possible to siphon water over a mountain about 250 ft. high—that is, the total lift would have to be that?—R. L. H.

Answer.—It is not possible to lift water 250 ft. by siphon. The limit for such a lift is the height which a column of water will be balanced by the weight of a column of air at the usual pressure. Theoretically this height is 33 ft.; but practically—owing to losses by friction, imperfect vacuum, etc.—it is not over 28 ft. Your 250-ft. lift will require pumping.

Gold and Silver in Germany.—Can you give me the production of gold (if any) and of silver in Germany last year?—R. W.

Answer.—The official returns for 1898 show a production in Germany of 2,847 kilograms gold and 480,578 kilograms silver. As the total gold and silver ore (reported together) produced during the year was only 12,413 metric tons, it is evident that a considerable part of the gold and silver reported must have been produced or refined from imported ores or bullion. The returns do not discriminate, however. There are several large smelting and refining establishments in Germany which treat foreign ores and bullion.

Vanadium Ore.—Who are the buyers of vanadium ore? How large is the demand?—B. A.

Answer.—The demand for vanadium ore is a very limited one. Vanadic acid is used for making some black dyes, but the quantity required is small. Harrison Brothers & Company, of Philadelphia, buy a little from time to time. A little was formerly shipped to Europe, but we are informed that there is no longer any sale for it, because the chemical manufacturers who have been using the ore now obtain all the vanadic acid they need from certain slags from Creusot, which they can procure at a very small cost. A new demand may arise, as new applications for metals and minerals are constantly discovered; but no market for the mineral now exists.

Rhodin Electrolytic Apparatus.—Can you tell me what is the present status of the litigation over the Rhodin electrolytic patents in England?—M. B.

Answer.—Some time ago the Castner-Kellner Alkali Company brought suit against the Commercial Development Company, owner of the Rhodin patents, claiming that the Rhodin apparatus was an infringement of the Castner-Kellner patents. On trial the first court decided in favor of the Castner-Kellner Company, holding that its claim of infringement was good. The Commercial Development Company appealed from the decision, and on trial the Court of Appeals reversed the decision, holding that there was no infringement. The Castner-Kellner Company thereupon took another appeal, to the House of Lords, and this appeal is still pending. The decision of the House of Lords, when rendered, will be final.

The Rhodin apparatus was illustrated and described in the "Engineering and Mining Journal," November 27th, 1897, page 639.

Pneumatic Cyanide Process.—Are you familiar with the process for the extraction of gold which is being advertised by the Pneumatic Cyanide Process Company, of Denver, Colo? Is it in operation anywhere? Will it do what is claimed for it?—G. W. L.

Answer.—We do not know that the process is in practical operation anywhere except at the company's experimental plant in Denver. The process is based on a fact which is generally known, that a supply of oxygen is necessary in the cyanide process. The general belief is, however, that an abundant supply is obtained under ordinary conditions; that is, that the cyanide solution is sufficiently aerated in the usual methods to enable it to act upon the gold without difficulty. If this view of the case is correct—and many men of experience hold it—the pneumatic process, or the use of compressed air, to agitate the solution in the vats and furnish oxygen, would not be injurious, but simply superfluous. It would be a new complication introduced without any corresponding benefit. To decide fully, however, will require a long test under commercial conditions; the main point in the test being to determine whether the additional cost is warranted by any benefits derived from the process.

Uranium Ore.—What is the value of uranium ore? Is there any demand for it? Who are the dealers in it?—W. S.

Answer.—It is not easy to fix a value for uranium ore, as the sales are not large enough to make a regular market price. Some ore mined in Colorado about a year ago is said to have sold at \$10 per unit in Denver.

This ore carried 53 per cent. black oxide of uranium; a 60 per cent. ore would have brought a much higher price. The buyers would usually want an assay before making an offer.

There is some demand for uranium ore, but not a large one. A little over a year ago some excitement was caused by French buyers who wanted the ore; but their takings were on a very moderate scale. The special use for which they needed it was in making steel armor-plates on a new method introduced at the Creusot Works and elsewhere. The percentage of uranium used in the steel is very small, however. The demand, from present appearances, will not be very large.

Offers to buy uranium ore will be found in our advertising columns from time to time. The chief buyers at the present time are Poulot & Voilleque, of Denver, Colorado.

Bismuth.—What is the market value of and demand for bismuth? Who are the chief users? For what purpose is the metal used?—M. F.

Answer.—1. The market value of bismuth is from \$1.45 to \$1.50 per pound. Prices are given weekly in the metal market column of the "Engineering and Mining Journal." The fluctuations are small and infrequent.

2. The demand for bismuth in this country does not exceed 65 or 70 short tons yearly. Nearly all of this is imported. A little is made in this country, but most of the supply is from Freiberg (Germany) or London. The American supply is irregular. The quantity imported in 1898 was 130,602 lbs., and this was not far from the average for several years past.

3. Nearly all the imports are handled in New York, by chemical importing houses.

4. A small quantity of bismuth is used in the metallic form in certain of the "anti-friction" metals, of which there are a number on the market. The percentage in these alloys is usually a very small one. A more important use is in medicine, and the greater part of the metal imported is taken for that purpose.

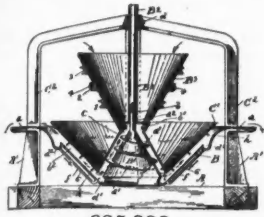
Consult the "Engineering and Mining Journal," Sept. 3d, 1898, page 282; also "The Mineral Industry," Volume II., V. and VI.

PATENTS RELATING TO MINING AND METALLURGY.

UNITED STATES.

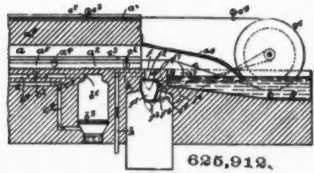
The following is a list of the patents relating to mining and metallurgy and kindred subjects issued by the United States Patent Office. A copy of the specifications of any of these will be mailed by the Scientific Publishing Company upon receipt of 25 cents.

- Week Ending May 30th, 1899.
- 625,738. **ART OF TREATING MOLTEN IRON.** James R. Billings, Chicago, Ill., assignor, by direct and mesne assignments, to Jas. D. Lacey, New Orleans, La. The method of treating molten iron with metal-oids of less specific gravity than the iron, consists in gradually and positively pressing a body of the metalloid in a finely-divided condition, downwardly into the molten iron against the upwardly-directed ferrostatic pressure, protecting the main body of the metalloid against contact with the molten iron, and allowing regulated portions of the metalloid to escape and rise freely through the molten iron, preventing during this operation any unnecessary agitation of the molten iron, such as would result from the introduction of a blast, and positively controlling the rate of feed of the metalloid throughout the operation to correspond to the rate of reaction produced by the treatment.
- 625,791. **DEVICE FOR USE IN ERECTING BENTS OF ORE DOCKS.** Finlay R. McQueen, Superior, Wis., assignor to the Barnett & Record Company, Minneapolis, Minn. The combination with brackets adapted to be detachably secured at the front of a bent, of a body supported thereby and adapted to serve to align the uprights of the succeeding bent as they are erected.
- 625,863 and 625,864. **PRODUCTION OF CHEMICALLY-PURE GOLD BY ELECTROLYSIS.** Emil Wohlwill, Hamburg, Germany. The process consists in passing an electric current from an anode of impure gold or of an auriferous alloy to a suitable cathode through a gold-chloride solution and maintaining in said solution at all times during the passage of such current another chloride compound in such quantity as to prevent the liberation of gaseous chlorine at the anode and so as not to dissolve the silver that may be contained in said anode.
- 625,900. **SINGLE EXPANSION PLUNGER PUMPING ENGINE.** Andrew H. Reeder, Uniontown, Pa. The combination with two independent pump-plungers and their cylinders, of a single-cylinder expansion-engine, a rock-shaft rocked by the engine, two cranks fixed on said rock-shaft at an angle to one another, and on opposite sides of the mean vertical center of the rock-shaft, and connecting-rods each connected at one end to one of said cranks and at the other end to one of said plungers, the arrangement being such that as the expansive force of the steam in the cylinder decreases the receptive cranks exert an increased leverage on the plungers.
- 625,908. **EXPLOSIVE AND METHOD OF MAKING SAME.** Ernst A. G. Street, Paris, France. The process of manufacturing consists in forming, at an elevated temperature, a solution of a nitric ether an analogous combustible substance wherein the nitric ether is soluble, and an oil, derived from an organic substance, and adding thereto a chlorate powder.
- 625,909. **AMALGAMATOR.** Ernest J. Verrue, San Francisco, Cal. The combination with a stationary pan of a central cone-shaped worm-threaded hub; a rotatable shell fitted within said pan so as to form an annular passage-way which holds an amalgamating bath, an inclined central wall in said shell which fits over the cone-shaped hub of the pan, a drive-hopper attached to the central wall of the shell, and a central supporting-shaft connected to the wall of the hopper.
- 625,912. **FURNACE FOR TREATING ORES.** Alfred G. Wells, London, England. In combination, a closed roasting-chamber wherein the ores are roasted and reduced, a fire-chamber, means for supplying reducing-gases to said closed chamber and leading them therefrom, the roasting chamber hearth, the transversely-arranged zigzag heating-flues below the bottom of the closed roasting-chamber serving to lead the furnace gases from the fire-chamber to and fro under the roasting-chamber hearth, and air-heating flues below said heating-flues serving to lead atmospheric air from an inlet at the cooler end of the apparatus to the fire-chamber whereby it is heated, the fire-chamber being arranged adjacent to the ore-outlet end of the apparatus.

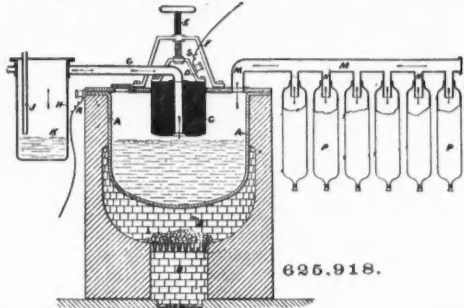


625,909.

625,918. PROCESS OF AND APPARATUS FOR PRODUCING WHITE LEAD. Ernest Bailey, George R. Cox and Walter T. Hey, York, England. The method consists in melting the lead, volatilizing the lead at the surface of the molten metal by the action of an elec-



625,912.



625,918.

tric arc, directing the necessary commingled gases or fumes against the surface of the molten lead at the point of volatilization and conveying away the resulting product.

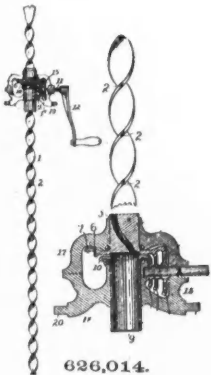
625,933. PROCESS OF REFINING OILS. Charles de la Roche, Paris, France. The process of freeing oils and fats, siccative oils and essential oils from moisture and acid which consists in mixing the same with carbide of calcium whereby the moisture in the oil or fat attacks the carbide, forming acetylene gas and lime and the lime thus formed neutralizes any acid in the oil or fat, and finally separating the oil or fat from the precipitated lime and impurities.

625,964. PROCESS OF EXTRACTING CYANOGEN FROM COAL GAS. Julius Bueb, Dessau, Germany.—The process of separating the cyanogen from gases of dry distillation containing ammonia in excess of cyanogen, which consists in treating such gases with a concentrated solution of a metallic salt, thereby precipitating all the cyanogen and part of the ammonia in the form of an insoluble double compound, and leaving the greater part of the ammonia with the gas.

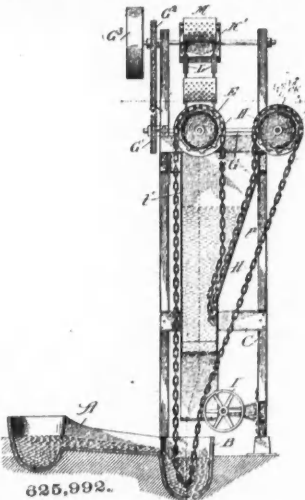
625,978. ART OF DRIVING PILES. Thomas A. Kearns, Chicago, Ill. A follower-head for use in driving piles, comprising a plate or disk provided in its outer side with a socket adapted to receive one end of a follower and with a port or passage which extends therethrough to the side which engages the pile.

625,992. APPARATUS FOR TREATING SLAG. Edward A. Uehling, Newark, N. J. The combination with the receptacle for molten slag of a moving slag-conveyor made of material to which the liquid slag will adhere, and a chilling device to receive the moving conveyor carrying the slag whereby the slag becomes disintegrated, said conveyor passing through the receptacle and chilling device.

626,014. COAL DRILL. George F. Weiss, Springfield, Ill. Filed June 10, 1898. The combination of a spiral drill-shaft having a longitudinal groove or grooves, a rotatable drive-sleeve mounted on the drill-shaft and having a spline engaging the groove, a rotatable feed-collar mounted



626,014.

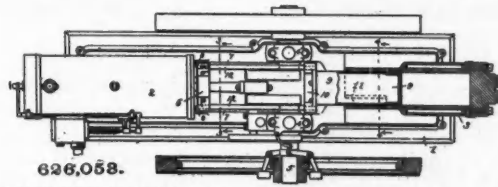


625,992.

on the drill shaft, a drive-shaft at right angles with the drill-shaft, a gear-wheel fixed on the drive-sleeve, gear-wheels of different diameters fixed on the feed-collar, a gear-wheel fixed on the drive-shaft in mesh with the wheel, the drive-sleeve wheels mounted loosely on the drive-shaft and meshing one with each of the wheels of the feed-collar and means for fixing either of the loose wheels on the drive-shaft.

626,003. ELECTROLYTIC APPARATUS AND PROCESS OF TREATING IMPREGNATORS THEREFOR. Marcel Ferreux-Lloyd, Paris, France, assignor to the Electrical Copper Company, Limited, London, England. Combination of an anode, a rotary cathode, an impregnator of animal-membranes having its albuminous and gelatinous constituents combined with formaldehyde and means for holding the impregnator in light contact with the cathode.

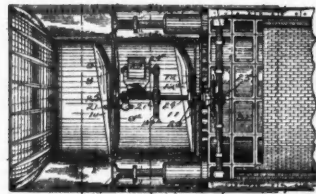
626,063. COMPRESSOR. James A. Carter, Chicago, Ill., and Frank G. Hobart, Beloit, Wis., assignors to the Fairbanks, Morse & Company, Chicago, Ill. The combination with a bed or frame, a power-cylinder and a compression-cylinder mounted thereon, a power-piston and a compression-piston operating in said cylinders, and a yoke connection between said pistons, a crank-shaft mounted between said cylinders, said yoke connection comprising rods arranged on opposite sides of said shaft and also on opposite sides of said crank; of slots in the inwardly-projecting end of said compression-cylinder, said slots forming clearance or guide ways for said yoke.



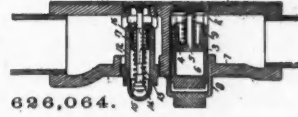
626,058.

626,063. TUNNELING SHIELD. Cornelius G. Hastings, Chicago, Ill. A tunneling shield with a cutting face, a hood behind, two concentric shells connected at each end, and a number of hydraulic rams placed at the rear end of the shells.

626,064. COMPRESSOR-VALVE. Frank G. Hobart, Beloit, Wis., assignor to the Fairbanks, Morse & Company, Chicago, Ill. A compressor-



626,068.



626,064.



626,078.

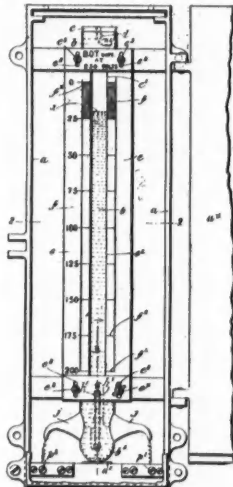
valve having a stem provided upon its spring end with an integral enlargement, and a split or divided guiding-bushing held in place by a containing-collar.

626,078. TUNNEL LINING. Thomas H. Murphy, Boston, Mass. A tunnel lining comprising an outer circle of segmental wooden blocks placed end for end and one upon the other and secured together in rings to receive the rams of a tunneling shield and connected together in a suitable manner longitudinally to provide a self-sustaining outer shell to closely follow the shield and an inner lining of suitable material as masonry or concrete to be protected by said outer lining until set.

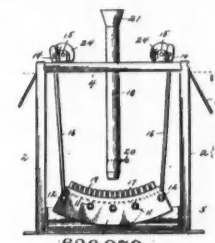
626,079. QUARTZ-MILL. Norman McAulay, Hill City, S. D., assignor of one-half to Camillo von Woehrmann, same place. Rocker-plates connected in pairs, in combination with the interposed ridged or corrugated apron connected to and rocking with said plates for distributing the material, and the pans in which said rocker-plates operate, said pans underlying the discharge sides of the apron.

626,088. MANUFACTURE OF CEMENT CONDUITS OR PIPES. Frederick H. Paine, Newport, R. I., and John L. Given, Stony Point, N. Y. The method of removing the cement body from the core or mandrel around which it is formed, which consists in preliminarily coating the core with a material which will soften or become plastic under the influence of heat, and then after the cement body has been molded around or upon the coated core, melting or softening the coating by the application of heat, and withdrawing the core.

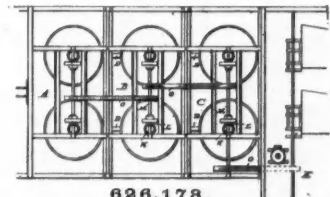
626,135. ELECTROLYTIC METER. Charles O. Bastian, London, England. Combination of a glass frame or open-work support with thin sheets or surfaces of platinum mounted opposite one another on



626,185.



626,079.



626,178.

said frame so that said sheets cannot come in contact; means for securing said sheets to said frame; and platinum wires connected to said platinum sheets and also connected to the circuit wires.

626,173. APPARATUS FOR TREATING ORES. Millard F. Leach. The combination of a series of arrastras arranged in sets after the manner of steps, conduits leading from the top of one set of arrastras to the next set below; whereby the pressure upon the large fragments will force the finer particles to raise and pass through the over-flow conduits to the next set.

626,176. CARBURETER. Ferdinand Logan, Philadelphia, Pa., assignor of two-thirds to Thomas Leiper Hodge, same place, and Price Wetherill Janeway, Media, Pa. The combination of a casing having a partition arranged at a distance above the bottom, an inlet for air entering the space under the partition, an opening in the partition communicating with the main chamber of the carbureter, a series of absorbent sheets mounted in the chamber above the partition so that air forced into the casing will pass through the liquid under the partition and then through the liquid in which the absorbent sheets are partially submerged.

626,199. BINDING MATERIAL FOR ARTIFICIAL FUEL. Herrmann Wolf, N. Y., assignor to Alexander Menke and Herman Oppenheimer, same place. Material consisting of wax tallings, barium sulphate, silicate of soda and benzine.

626,200. HYDROGEN-GAS GENERATOR. Irwin R. B. Arnold, Chicago, Ill., assignor to the Stereopticon and Film Exchange, same place. A tank for inflammable gas comprising an outer cylinder closed at the ends, with means for attaching a communicating pipe thereto, at one of the ends, a receptacle of less capacity placed within the cylinder and communicating with the pipe, a pipe from the bottom of the inner receptacle extending to near the bottom of the outer receptacle, a filling contained in the inner receptacle, such filling arranged to be saturated by liquid forced into the tank and to be agitated by gas, under pressure, being discharged from the tank, and means for forcing volatile inflammable liquid into the tank along with an inflammable gas.

PERSONAL.

Mr. A. O. Ihseng, of Joplin, Mo., is on a visit to New York City.

Mr. Robert Mein, son of Capt. Mein, has returned to San Francisco from Alaska.

Mr. Geo. W. Milliken, mining engineer, of New York, is in San Francisco to look after the interests of an Eastern syndicate.

Mr. Walter B. Wilson, manager of the Elkton Consolidated and El Paso Gold companies, of Cripple Creek, Colo., is on a visit to London.

Mr. Horace F. Brown has completed the plans of the Economic Mill, at Victor, Colo., on which he has been engaged for some time, and will return to Chicago about June 20th.

Mr. F. G. Fisher, manager of the nitrate of soda department of W. R. Grace & Company, in New York, leaves for a visit to Europe on June 17th. He will remain abroad about 2 months.

Mr. Thos. N. Smith, for many years prominently connected with the Utica Mine, Angels Camp, Cal., has resigned and will practice his profession of mining engineer in San Francisco.

Mr. Frederick G. Farish has resigned his position with the Grand Central Mining Company, Limited, of Minas Prietas, Torres, Sonora, Mex., to take charge of the Humboldt Mine, at Ouray, Colo.

Mr. Theophilus Allen, superintendent of the Sonora Mining Company, of El Oro, Mex., is about to take a vacation for health and pleasure to England. He will be absent 2 or 3 months. During his absence Mr. Robert Wilson will fill his place.

Mr. Arthur Wilson, of the British Gold Mines Company, of El Oro, Mex., has resigned as superintendent to manage a Western Australian mining property for an English syndicate. He was superintendent for El Carmen Company, at El Oro, for 3 years, and is well known throughout Mexico.

Prof. J. C. Branner, of Stanford University, with a party of 5 students, is on a scientific expedition to the coast of Brazil. The party proposes to investigate the coral and sand storm formations on the coast from Rio Janeiro 1,400 miles north to near Cape St. Roque, with a view to settling a controversy of long standing regarding such formations.

Mr. Geo. D. Barron, for nearly 10 years past manager of the Mexican interests of M. Guggenheim's Sons, at Aguascalientes, has resigned to give more attention to the affairs of the Compañia Minera y Beneficiadora de Teztlutlan, of which he is president and treasurer. The company owns large copper mines near Teztlutlan, Pueblo, Mex. Mr. Barron's address will continue to be Aguascalientes.

Mr. Alexander Johnson Cassatt has succeeded the late Frank Thomson as president of the Pennsylvania Railroad. Mr. Cassatt was born in Pittsburg in 1839. He is a graduate of the University of Heidelberg and the Rensselaer Polytechnic Institute of Troy. He entered the service of the Pennsylvania as a rodman in April, 1861, and remained with the company for 21 years, resigning as vice-president of the road in 1882. In 1885 he became president of the New York, Philadelphia & Norfolk.

OBITUARY.

Mr. Philip G. Cochran, of the Washington Coal and Coke Company, died at his home in Dawson, Pa., on June 1st, 1899, aged 49 years. Mr. Cochran was one of the prominent coke manufacturers in the Connellsville region, his father, James Cochran, being a pioneer in that industry. The Washington Coal and Coke Company was organized in 1893 with P. G. Cochran, president; John H. Wurtz, secretary; J. R. Laughrey, treasurer, and J. S. Newmyer, manager. The company, which has a capital stock of \$500,000, owns large tracts of coking and steam coal, the capacity of the 4 mines opened being 3,000 tons daily.

SOCIETIES AND TECHNICAL SCHOOLS.

South Dakota School of Mines.—The school year at Rapid City closed on June 8th. Prof. Forsyth has some members of the class in surveying doing practical work in mine surveying about Portland. This work supplements the school work in surveying and metallurgy. Several members of the faculty are to make a short trip through the Bad Lands, spending 3 or 4 weeks in collecting fossils, etc.

Massachusetts Institute of Technology.—The institute has sent out a pamphlet describing the summer courses it will give this June and July. The programme as laid out embraces instruction in mechanical drawing and descriptive geometry; analytic and solid geometry; architecture; chemistry; biology; sanitary science; physics;

European history, modern languages; mechanism; shopwork and surveying.

Canadian Mining Institute.—B. T. A. Bell, secretary, has issued a provisional programme for the meetings and excursions to British Columbia in September. The party will leave Montreal September 1st and Ottawa the following day, arriving at Banff September 7th, and at Nelson September 9th. The party will leave Nelson September 12th and visit Rossland, Sloum and Sandon, returning to Nelson September 18th. On the return trip the party will visit the Crow's Nest Pass coal mines and arrive at Rat Portage on September 23d, when a visit may be made to the gold mines of the Lakes of the Woods District.

University of Montana.—A summer school of science and biological station will be opened on Flathead Lake, at the outlet of Swan River, on July 17th, with Prof. Morton J. Elrod, of Missoula, director. Membership will be limited to 25, preference being given to teachers, students and investigators. The work will include collecting specimens, instruction in photography as an aid to science, a contour map of a portion of the lake will be made and opportunity will be given for study in geology, palaeontology and geology. The station may be reached by stages from Selish on the Northern Pacific to Polson and thence across the lake by steamer. The school will close August 12th.

Engineers' Club of St. Louis.—At the meeting on June 7th, Mr. W. A. Layman was elected member of the board of managers of the Associated Engineers' Societies.

Prof. J. H. Kinealy gave a talk on the "Pohle Air Lift Pump." The action of the pump was illustrated by means of a small model. As there is but little literature from which to obtain data for designing, it was necessary to make a lot of experiments, and for this purpose, model pumps were made of different dimensions and a series of experiments conducted. The methods of making these experiments were explained and the results given, being illustrated by curves. Several formulae were discussed. The determination of certain constants is still necessary as the formulae and practice do not agree well. Experiments on full sized wells are necessary to secure data for the correct determination of these constants.

Mr. Edw. Flad made some remarks on the Pohle pumping plant at the Anheuser-Busch brewery.

American Institute of Mining Engineers.—The annual convention to be held at San Francisco this fall will open September 25th and probably last 5 days. The following committees have been appointed by the California State Miners' Association:

Executive Committee.—W. C. Ralston, chairman; S. B. Cristy, C. H. Lindley, C. G. Yale, W. S. Keyes, Thomas Mein, E. H. Benjamin, J. F. Halloran, E. A. Belcher, A. A. Watkins, J. J. Crawford, F. A. Leach, San Francisco; H. T. Power, Placer; W. H. Bourne, A. D. Foote, F. Zettler, B. S. Rector, Nevada; W. B. Hammond, Butte; W. F. Detert, Amador; F. F. Thomas, M. B. Carr, Calaveras; D. R. Oliver, T. Hender, F. M. Williams, Tuolumne; H. E. Pitckett, El Dorado; M. E. Dittmar, Shasta; C. C. Derby, Santa Clara, and P. A. Buell, Stockton.

Reception Committee.—H. T. Gage, J. D. Phelan, I. M. Scott, D. M. Burns, A. J. Ralston, W. W. Montague, R. S. Moore, J. Spiers, Jr., T. B. Lacy, T. Henshaw, S. J. Hendy, H. T. Lally, S. Mooney, G. H. Wallis, J. Sloss, E. Coleman, A. Carrigan, J. M. Wright, J. F. Davis, J. S. Brownell, G. Johnson, J. Birmingham, J. Sonntag and W. A. Doble.

American Chemical Society—New York Section.—At the meeting on June 9th the following papers were read: "Apparatus for Testing the Density of Cements," by Morris Loeb, Ph. D.; "The Determination of Sulphur in Bitumens," by S. F. and H. E. Peckham.

The apparatus described by Dr. Loeb is a modification of the well-known method of determination of the density of powders by displacement of a liquid contained in a flask, but by the system of calibration adopted and the use of a specially graduated burette the volume of liquid displaced is obtained by difference between the amount added from the burette and an arbitrary volume contained between 2 marks on the neck of the flask, so that 3 or 4 determinations may be made in about 10 minutes.

Messrs. Peckham's paper recommended the deflagration method for determining sulphur in bitumens, using about 2 parts of asphalt to 30 parts of mixed sodium carbonate and potassium nitrate. Some discussion followed as to the possible loss of volatile sulphur compounds, but the amounts of these forms of sulphur were conceded to be extremely small, and probably without appreciable effect on the behavior of the asphalt.

A report by Durand Woodman, secretary and treasurer, stated that 9 regular and 2 special meetings had been held, at which 37 papers were read. The average attendance at these meetings was 65.

The expenses of the section had been \$1.19

per member for the year. The membership numbers about 3,050.

The following officers were elected: Chairman, C. F. McKenna; secretary-treasurer, Durand Woodman; executive committee, William McMurtree, E. G. Love and G. C. Stone.

INDUSTRIAL NOTES

The Sterling Emery Wheel and Manufacturing Company, Tiffin, O., states that it has recently improved its grinding machinery and enlarged its productive capacity by extra tools.

The Brown Hoisting and Conveying Machine Company, of Cleveland, O., is shipping a large crane to La Societe d'Ougree, of Liege, Belgium. The entire shipment of this tool will occupy 5 carloads.

The Turner Engineering Company, of Bucyrus, O., is to erect at once a complete plant of Turner water tube boilers for the Marion Steam Shovel Company, including a large self-supporting steel chimney, brick lined, of special design.

The Heine Safety Boiler Company, of St. Louis, Mo., has nearly completed 8 large boilers to be shipped to Johannesburg, South Africa. The boilers are to be used by the Simmer & Jack and the Consolidated Gold Field companies' mines.

The Chicago Pneumatic Tool Company, of Chicago, has opened an office at St. Louis to look after its business in the Southwest. This branch will be in charge of Mr. Sidney H. Wheelhouse, who was formerly connected with the M. M. Buck Manufacturing Company.

Considerable machinery is at present being sent to the Kaltschugin Brass and Copper Company, of Moscow, Russia, by the Robert Poole & Son Company. The machinery consists of rolls, gearing and shafting for a rolling mill plant. The first shipment is said to be valued at \$30,000.

At the annual meeting of the United States Mineral Wool Company, in New York City, the following officers and trustees were elected: Trustees, G. C. St. John, J. W. Kennedy, F. A. Boyden, G. S. Belth, Jr., Henry Franz. Officers, President, G. C. St. John; vice-president and secretary, Henry Franz; treasurer, F. A. Boyden.

The Taunton Locomotive Works, of Taunton, Mass., announces that hereafter its department manufacturing Wainwright appliances will be represented in New York by Charles H. Paine, with offices in the Singer Building. The company's catalogue "E" of feed water heaters, surface condensers and expansion joints, is now ready for distribution.

Tests, reported satisfactory, have been made of the new blooming mill of the Lorain Steel Company, at Lorain, O. The first of the 2 new furnaces is expected to go in blast about July 1. Rebuilding the dam for the blast furnace reservoir goes ahead as rapidly as possible. There are now employed in all departments and on construction about 3,700 men.

A complete machine tool equipment for the Odawara Electric Railway Company, of Odawara, Japan, was recently shipped by the Peckham Motor Truck and Wheel Company. Among some of the large pieces were a 150-ton hydraulic press, car wheel borers, a 20-in. stroke shaper, a double-head car wheel grinder, various sized lathes, pneumatic hoists, etc.

By compromise the Virginia Iron, Coal and Coke Company is again in possession of the Middleboro (Ky.) steel plant and other properties to the value of about \$1,500,000, which formerly belonged to the Watts Steel and Iron Syndicate. The injunction by which the Watts Syndicate re-obtained control of the property has been dissolved upon condition that the Virginia company fill the old contracts of the Watts Syndicate.

The Oliver Wire Company, the Pittsburg Wire Company and the Allegheny Furnace Company, of Pittsburg, Pa., have filed petitions for decrees in dissolution. The plants were recently purchased by the American Steel and Wire Company, and after all debts and liabilities are paid each of the companies has a large balance on hand for distribution. The Oliver Wire Company has \$1,000,000, the Pittsburg Wire Company has \$950,000, the Allegheny Furnace Company has \$400,000.

The Edison Portland Cement Company has been incorporated under New Jersey law with a capital of \$10,000,000. It is claimed for the company that it can manufacture cement for much less than the present price by the use of blast furnace slag. The officers and directors of the company are: A. H. Still, president; A. E. Mallory, vice-president; Harlan Page; Thos. A. Edison, Theron L. Crane, H. L. Townsend, Luther S. Bent.

Recently the Litchfield Car and Machine Company, Litchfield, Ill., shipped 3 large rope haulage plants complete to the Pittsburg & Connaut

Dock Company, at Conneaut Harbor, O., to be used in moving ore cars in place of switch engines. The company has also nearly completed 2 hauling winches and 1 hoisting winch for the Government, 1 pair of 20 x 36 in. hoisting engines for a mine at Witt, Ill., 2 pairs of 14 x 24 in. hoisting engines for Missouri and a carload of mining machinery for the Sand Coulee Coal Company, of Cottonwood, Mont.

In March, 1898, the Davis Johnson Company, of Chicago, Ill., shipped 1 of its rotary pumps, with steam engine attached, to a manufacturer in Mexico, and the order was duplicated in October of the same year. The firm recently received a third order from the manufacturer which was shipped the same day as received. The Davis Johnson Company is also building a 6-in. wrecking pump, suitable also for irrigation work, which will throw 1,000,000 gals. and over per day of 24 hours, and has received a third from another party for a rotary pump.

Messrs. Charles H. Besly & Company, of Chicago, Ill., report that they are western representatives for Pecora machinery paints, of which flat steel color is in paste form for engines, tools and general machinery; egg shell gloss enamel is a finishing paint for engines, tools and general machinery; Dresden machine enamel gives rich glossy effect to radiators, gas engines, etc.; iron filler is for making rough castings smooth; while Pecora blow hole cement, will stand under planer, lathe, file and other finishing operations, stands 200° heat and is gas and air tight.

The Rome Brass and Copper Company, of Rome, N. Y., has placed an order for the steel buildings for a large brass plant with the Berlin Iron Bridge Company, of East Berlin, Conn. The contract comprises a boiler house and an engine house 40 ft. by 120 ft.; a casting shop, 50 ft. by 90 ft., and a tube mill, 120 ft. by 200 ft. The framework of all these buildings is steel. The roofs have a flat pitch covered with tar and gravel and the sides are arranged with a quantity of glass supported on steel framework. The buildings are absolutely fireproof.

The Berlin Company has also received a contract for a warehouse building 40 ft. wide, 120 ft. long and 20 ft. high, to be erected in Dutch Guiana.

The Standard Phosphate and Fertilizer Company has been incorporated at Trenton, with a capital stock of \$1,000,000, of which \$400,000 is 7% preferred cumulative stock and \$600,000 common stock. It is said that this company is to be a nucleus for combining several Southern phosphate and fertilizer companies. Capitalists from New York, Boston and New Haven are said to be interested. The company already has secured control of the United States Phosphate Company of Acme, Fla., which has 650 acres of land and a large plant and is capitalized at \$1,000,000. The Knickerbocker Phosphate Company, of Bartow, Fla., will, it is expected, be taken in later. The company proposes to mine phosphate and to manufacture fertilizers in the South. The company has no connection, it is stated, with the Virginia Chemical Company, or the American Agricultural Chemical Company.

The International Car Wheel Company recently incorporated under New Jersey laws with \$5,000,000 of preferred and \$10,000,000 of common stock, according to a statement issued by the organizers, has now control of some 10 concerns with a total daily capacity of 1,500 car wheels and 100 tons of castings. It has also control of the Weston charcoal furnace at Manistique, Mich., which has a daily capacity of 100 to 125 tons of charcoal pig and will control for some years the output of the Canada Iron Furnaces plant now building at Midland, Ont. The following directors have been elected: P. H. Griffin, Buffalo, N. Y.; T. Guilford Smith, Buffalo, N. Y.; J. Fred Pierson, Ramapo, N. Y.; A. D. Bosson, Boston, Mass.; T. J. Drummond, Montreal, P. Q.; Edgar McDougall, Montreal, P. Q.; Herbert L. Satterlee, New York; C. W. Barnum, Lime Rock, Conn.; S. Singer, Paris, France; Robert Cowans, Montreal, P. Q.; A. E. Domville, St. Thomas, Ont.; Warren P. King, Buffalo, N. Y.; John H. Fleming, Brussels, Belgium, and Howard K. Wood, Jersey City, N. J.

TRADE CATALOGUES.

E. W. Bliss & Company, of Brooklyn, N. Y., have issued their 1899 catalogue of metal working machine tools, including presses, shears, dies and machine for making cleaning and soldering square and round cans. The company makes machinery and dies for manufacturers of drop forgings, elevator buckets, brass and zinc goods.

Bingham, Tintic, Park City, Mercur, Marysvale, Gold Mountain, Deep Creek and La Sal are described and illustrated in a 64-page pamphlet published by the general passenger agent at Salt Lake City, of the Rio Grande Western Railroad. The pamphlet also contains a prospector's map of Utah and claim maps of Bingham, Tintic and Mercur, and gives a lot of con-

densified information about Utah mines and mining.

The Builders' Iron Foundry, of Providence, has published an illustrated 38-page pamphlet on the Venturi water meter, which it manufactures. The meter is based on the relations between the velocities and pressures of fluids when flowing through conveying and diverging tubes. As it consists of 2 parts, the tube through which the water flows and a delicate register to record differences in pressure, it can be made of any size and is claimed to be unaffected by water hammer or substances in the water. The meter is well known among hydraulic engineers and is used by many municipal water-works. It is also recommended for use by irrigation and power plants and two 54-in. Venturi meters are installed at the Pioneer Electric Power Company's station at Provo, Utah. The pamphlet is written in a clear and interesting manner.

A very complete illustrated catalogue and price list of assayers' materials, mine and mill supplies and chemical apparatus and chemicals comprising 234 octavo pages, is published by John Taylor & Company, of San Francisco, Cal. Some of the specialties carried by this old established firm are Battersea crucibles, muffles and furnaces; scorifiers, crucibles, etc., made by the Denver, Colo., Fire Clay Company; Baker & Adamson's C. P. acids and ammonia; Deumston's silver-plated amalgam plates; Oetling's, Becker's, Troemner's, Ainsworth's and Smith & Thompson's assay and bullion balances and weights, bone ash; blowpipe balances and utensils; Haskin's hydro-carbon blowpipes and furnaces; Fletcher's blowpipes, burners and furnaces; chemically pure lead; pure assay lead and chemical apparatus of all varieties. The firm also carries in stock a long list of books on assaying, mining and chemistry, and sends free on application some handy tables for computing gold and silver assay values.

Catalogue No. 224, published by the Westinghouse Electric and Manufacturing Company, of Pittsburgh, Pa., treats of central station transformers (which are made in 2 types, outdoor and indoor, from ¼ to 25 K. W.) and of transformer fuse blocks for 1,000, 2,000 or 3,000-volt service. The 15-page catalogue contains numerous cuts and diagrams with specifications and prices.

Another Westinghouse catalogue recently issued is No. 223, of 24 pages, on "Lightning Arresters for Alternating Current and Direct Current Circuits." The arresters for alternating circuits are of the non-arc metal type and are made in styles adapted to different potentials and for outdoor or indoor use. Complete specifications and directions for installation are given. Catalogue 222 treats of direct connected railway generators of the multipolar type. It gives cuts of some very large units. Catalogue 228, 24 pages, describes Tesla polyphase motors, type "C." This type is built for 2-phase or 3-phase circuits, for 7,200, 3,600 or 3,000 alternations per minute and for capacities from 1 H. P. up. Standard voltages are 200 and 400 volts. The type is stated to be simple and compact and of high efficiency.

MACHINERY AND SUPPLIES WANTED.

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

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

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

GENERAL MINING NEWS.

Oil Exports.—The Bureau of Statistics reports the exports of mineral oils from the United States in May as follows: Crude, 5,624,830 gals. (9,966,687 gals. in 1898); naphthas, 1,208,104 gals. (1,884,238 gals.); illuminating, 70,688,476 gals. (66,436,994 gals.); lubricating and paraffin, 5,825,122 gals. (5,812,352 gals.); residuum, 3,869,838 gals. (2,330,874 gals.); total, 87,216,379 gals. (86,431,145 gals.). For the 5 months ending May 31st the exports were 353,508,795 gals., as against 396,528,964 gals. in the corresponding period last year, and 365,156,673 gals. in 1897.

Seven Devils Mining and Development Company.—This company has secured a charter under New Jersey laws to purchase, develop and operate gold and copper mines in Idaho, Utah and Arizona; and intends to increase its capital, as occasion requires, up to \$10,000,000. The directors of the company are: Nathan Appleton, Samuel L. Powers, William L. Pratt, H. A. Gammon, all of Boston; Colonel Nicholas Treweek, Salt Lake City, Utah; Colonel Lee Crandall, Globe, Ariz.; Hon. George L. Shoup, H. F. Wild and George A. Rahm, all of Boise City, Idaho.

ARIZONA.

Mohave County.

(From Our Special Correspondent.)

Arizona & New England Consolidated Mining Company.—This company is opening the Sheep Trail Group, 6 miles west of the Colorado River. The shaft is now down 300 ft. and 2 levels have been opened a total of 375 ft. Some of the assays were as high as \$150 per ton. The milling and cyanide plant has a capacity of 60 tons per day. The average is said to be \$18 per ton.

CALIFORNIA.

Amador County.

(From Our Special Correspondent.)

Oncida.—The shaft at this mine, 2 miles north of Jackson, is down 1,875 ft. and the ledge has been crosscut at the 1,500 and 1,700-ft. levels. The main shaft is to be sunk to the 1,900 ft. In all 26 men are employed under Superintendent Truscott.

Calaveras County.

(From Our Special Correspondent.)

The Mokelumne River, near Wallace, is to be dredged for gold extensively. The bed of the river is ½ mile wide, nearly all of it dry. The dredger is to have a capacity of 1,500 cu. yd. of gravel every 24 hours. The gravel prospected is said to run from \$2 to \$6 per cu. yd. The average depth is about 14 ft.

El Dorado County.

(From Our Special Correspondent.)

Consumnes.—This old copper mine, 4 miles from Fairplay, has again been bonded and will probably be reopened. Thirty-four years ago the mine was equipped with a smelter, but on account of the low grade of the ore work was discontinued. A tunnel was run 100 ft., cross-cutting the 26 ft. of vein matter. A chamber 26 x 60 ft., 40 ft. high, was stoped out. The average in the old workings was said to have been 7% copper.

Kern County.

(From Our Special Correspondent.)

Yellow Aster.—The main shaft of the Trinity Claim, at Randsburg, is to be sunk to 1,500 ft. A large hoisting plant has been ordered and will be at work by August 1st.

Los Angeles County.

(From Our Special Correspondent.)

King of the West Copper Mining Company.—This company recently has been incorporated with a capital of \$600,000 to work a group of mines near Acton. The incorporators are: W. J. Woodside, W. W. Robinson, W. D. Alexander, Jr., A. Woodside and Theodore Frolich.

Nevada County.

Grass Valley Exploration Company.—This company, which has its mines and works at Grass Valley and its main office in San Francisco, has appointed Mark B. Kerr general superintendent and H. Pengelly superintendent of the W. Y. O. D. Mine.

(From Our Special Correspondent.)

Gold King.—Arrangements are being made to reopen the Gold King Claim, on the South Fork of the Kanaka Creek, 3 miles east of Al-leghany. The Gold King and Gold Queen veins vary in width up to 10 ft. and are between black slate walls. Water is obtained from Kanaka Creek by a flume.

Gold Point.—The 10-stamp mill on this property, 2 miles east of Grass Valley, has been burned to the ground. Insurance \$5,000. The principal stockholders are: S. Granger, J. Watt, E. Creller, T. Mein, A. B. Brady and the Richards and the Bennalack Estates.

Hudson.—This mine, on Deer Creek, below Rough and Ready, is to be reopened under the management of W. J. Morrill. Development work will commence very soon.

Providence.—A large dynamo is being installed at this mine, 1 mile west of Nevada City, to furnish light for the buildings. The property is operated by water power obtained from the South Yuba Ditch and piped across Deer Creek. The saw mill, 4 miles distant, is running a full force of men.

Sleeping Beauty.—This property, 3 miles north-east of Moore's Flat, comprising 2 claims on the Middle Fork of the Yuba River, is being worked successfully through 2 tunnels by the owners, Vizzard & Bauder. The ore, which is a rusty red, is said to be very rich. The ledge is from 1 to 6 ft. wide.

Plumas County.

(From Our Special Correspondent.)

Bonanza.—The tunnel at this mine is being run to cut a second ledge which is said to be from 4 to 6 ft. wide. The bullion from a 30-day run which has been shipped, is estimated at \$1,200, or \$5 per ton.

Four Hills.—The management of this mine, 6 miles southwest of Johnsville, is preparing to push work as soon as the snow will permit. Work on the electric plant has begun. A large force of men will be employed.

New York.—The 5-stamp mill, in North Can-

yon, is crushing a good quality of ore. A small working force is engaged on development.

Round Valley Consolidated.—The lower drift at this mine, on the east side of North Canyon, 2 miles southeast of Greenville, has been extended on a 3½-ft. east and west ledge, and the tunnel has cut the north and south lode sought for by the extension. These veins prospect well, some of the ore being rich. There are now about 200 ft. of backs. The management contemplates moving the mill down below the mouth of the tunnel.

Shasta County.

(From Our Special Correspondent.)

Mount Shasta.—The shaft at this mine, in the Shasta District, is down over 300 ft., and a drift has been commenced on the 300 ft. Sinking will continue, also work on the 100 and 200-ft. levels. The ore, said to be high grade, is shipped to the Keswick Smelters and 20 tons are mined daily. About 100 men are employed under Superintendent Oscar Rogers.

Phoenix.—This mine, 4 miles west of Redding, one of the Salt Creek Group, shows a telluride pay streak 12 in. wide that is very rich. A 50-ft. shaft is down and a 30-ft. drift has been run. The ore is shipped.

Thompson.—This mine, 2½ miles southwest of Shasta, idle for some time, is worked under lease by B. Swasey with 4 men and about 4 tons per day are shipped to the Keswick Smelter. This ore, said to average over \$14 per ton, is taken from the old tunnel in 100 ft., while 2 shafts are down 30 and 70 ft. each.

Trinity County.

(From Our Special Correspondent.)

Golden Jubilee.—The shipment from this mine, near Carrville, in May realized well, 20 sacks of assorted ore, 1,880 lbs., yielding \$949 in gold and silver; 4,737 lbs., about \$200 per ton, and a third lot of 3,808 lbs. of concentrates \$261 per ton. This ore came from tunnel No. 2, in about 200 ft., with 125 ft. actual depth. Three ore shoots are developed. The mill has a capacity of about 10 tons per day and the cyanide plant is working satisfactorily.

Tuolumne County.

(From Our Special Correspondent.)

Draper.—Arrangements are being made by the Eastern men, who control this property, 1 mile west of Soulsbyville, adjoining the well-known Black Oak, to put in hoisting machinery, a mill and other machinery. The title has been perfected and development work is progressing rapidly. Superintendent G. F. Dyer, on the second level south, has cut a fine body of ore assaying \$22 free gold besides the sulphurets. A small body of ore has been opened up on the 1st level south, which shows by assay \$10 free gold and \$200 sulphurets per ton. The tests were made by Mr. L. Mason, of Sonora, who will run 10 to 20 tons in a few days at his works at Sonora.

Philadelphia Diggings.—At this hydraulic property, 10 miles northeast of Columbia, 2 monitors are in use and the gravel continues to improve. A saw mill is to be erected.

Temescal.—At this mine, 12 miles from Sonora, the concentrators are in and the mill has started. In the new tunnel some good rock has been encountered after driving the cross-cut 70 ft. This vein, though small, is promising. Work in the old tunnel has been discontinued. Frank McPherson is superintendent.

COLORADO.

Clear Creek County.

(From Our Special Correspondent.)

Comstock.—The District Court has decided that the lease on this property at Idaho Springs, held by E. C. Eddie, had been forfeited because of no work being done in the mine. He was working the Dove's Nest Mine on the same vein and proposed driving the levels into Comstock ground, but the owners objected to the scheme, as they had been in litigation for many years over ore taken from Comstock territory by the Dove's Nest.

Conqueror Mining Company.—This company, at Empire, is opening a big body of ore, running about \$10 per ton, in virgin ground. The company owns its own mill and is running night and day.

Freeland Extension.—J. H. LeMoyné, of Denver, has secured this property at Idaho Springs and is preparing to put on a plant of machinery and sink the shaft. In the lower level it shows a streak of free gold ore and a streak of milling ore that will pay to stamp.

Gum Tree Gold Mining and Milling Company.—A contract has been let for sinking the shaft and drifting on the Belmont vein. In the shaft is a streak of mineral and in the drifts the pay streak is several feet across. The ore body on the west side of the shaft on the Gum Tree Lode is 3 ft. wide and runs 5% copper, 40% lead and enough in gold and silver to bring the net value to \$50 or \$70 per ton. New York capital is back of the undertaking. Development as mapped out will require 2 years.

Sun & Moon Mining and Milling Company.—John Owen, having resigned as manager of this property, comprising 7 claims, at Idaho Springs, H. N. Sims, of Altoona, Pa., has been named as his successor. The shaft is to be sunk and several of the levels driven to open up the virgin ground on its east side. In the Moon shaft a streak of free gold was opened last month which it is thought will reach \$1,000 in gold to the ton.

Perkins Tunnel.—The management reports that an air compressor and machinery are to be installed at this tunnel above Idaho Springs. The tunnel has been driven by hand about 800 ft. Levels have also been driven on veins cut.

Dolores County.

(From Our Special Correspondent.)

Eight-Hour Law.—When the 8-hour shift becomes the Colorado law for all work in mines and smelters, on June 15th, there probably will be no trouble in Dolores County. Time will begin at the breast and there will be 8 hours of actual work.

Enterprise.—On June 5th J. H. Silliman, Robert Thompson and W. E. Hawley, of Pittsburg, Pa., arrived to perfect the details for the proposed concentrator. The mill is to be built this season, with a capacity of fully 150 tons daily.

Lake County—Leadville.

(From Our Special Correspondent.)

Leadville Smelter Situation.—The employees have taken until the 12th to consider whether or not they will accept the proposition as made by the united smelter combination—to pay by the hour with an increase of 10% on former wages, and have the privilege of working 8, 10 or 12 hours. Many of the men feel inclined to work 8 hours with hour pay until it is decided whether the new 8-hour law is constitutional.

Leadville Ore Output.—The daily tonnage last week was over 2,300 tons.

Aurora.—The lessees on this property, in Long & Derry Section, have opened up a body of iron ore running 16 oz. silver and a good excess iron.

Big Four Gold and Copper Mining Company.—President Remick, of Detroit, has gone to Colorado Springs, where he will list this property. It will also be listed in New York. The new company is capitalized at \$1,250,000 and has already done over 11,000 ft. of drifting and level work. Last year nearly 3,000 tons of ore were shipped averaging, it is said, \$35 to the ton. The ore runs from 5 to 8% copper. It is understood from Manager M. J. Walsh that the company will sink the shaft to a total depth of nearly 1,300 ft.

Cady Mining Company.—This company's ground, leased to Thos. Owens, after a battle with surface water, will ship 1,200 tons for June from the Four Per Cent and O. K. shafts.

Chippewa Consolidated Mining Company.—This company's ground has been leased to Messrs. Robt. and Norman Estey, who will sink to the lime contact. The claims on the western slope of Breece Hill include the Little Chippewa, Comstock, Wade Hampton, Last Chance, Lady Jane, Homestake and Silver Spray.

Coronado.—The work of the Leadville Pumping Association is nearly completed and arrangements are being made by the company to resume development. It is also understood that a deal is on foot looking to the sale of the Wolcott territory to the Coronado Mining Company. The company already has a long time lease on the ground.

Home Mining Company.—The company made its first shipments this week from the Starr shaft, the stuff assaying 50 oz. silver and 25% lead, some of it remarkably rich. Shipments will run about 20 tons per day.

Omaha Syndicate.—Omaha capitalists have secured a lease on important territory in Iowa Gulch, a part of the old Rex Group, including the Gwendoline Claim and a portion of the Motor, Pyrite and Nugget lodes. The new company will not at present work the old Rex Shaft, but will sink a new shaft on the Gwendoline. Mr. A. Van Camp, of Omaha, is looking after the interests of the lessees.

Penn Mining Company.—Shipments have been increased to 120 tons per day of a good grade ore to the smelter. In addition, the Penn Mill is handling 50 tons per day from the immense low grade bodies.

Penrose.—About 1,000 gals. of water per minute are handled. Work is confined to the main drift running to the Starr.

Weber.—This proposition, on Brooklyn Heights, started several years ago by a son of Weber, the piano manufacturer, has laid idle since water frightened out the projectors. It is understood that St. Louis people are figuring on resuming work and sinking to the ore shoots below. A deep shaft and plenty of pumping will be required.

La Plata County.

(From Our Special Correspondent.)

Local Smelter Outlook.—Since the closing of the Omaha & Grant's Durango smelter on June

2d events point to a quiet summer among San Juan mines. Beginning June 7th, each train from Silverton is crowded with miners leaving the country, and others are going out via Ouray. Following the closing of the smelter, the Iowa, Silver Lake, Royal Tiger, Silver Ledge and Gold King have closed, throwing 650 men out of work. Pride of the West, Ridgway, Esmeralda and Scotia will probably follow suit this week, and it is probable, with one exception, every shipping mine of the region will be idle by the 20th. Quite a number of those passing through Durango are buying tickets for the old country, but nearly all expect to return next year. Fully half the men who walked out of the smelter have gone to other fields.

Mineral County.

Amethyst Mining Company.—A suit has been filed in the United States Court by the administrator of the estate of the late Nicholas C. Creede, against David H. Moffat, Walter S. Cheeseman, Sylvester T. Smith, L. E. Campbell and the Amethyst Mining Company, of which they are sole stockholders, to recover a 1-3 interest in the mine, alleged to be worth \$5,000,000.

Ouray County.

(From Our Special Correspondent.)

Brooklyn.—Manager Charles Newman met Mr. Otto Mears at Red Mountain on June 7th and accompanied him to Durango. Mr. Mears is satisfied the pyritic ore bodies are large enough to warrant extending the Silverton Railroad to the mine and a shipping contract is arranged.

Camp Bird.—J. W. Benson, of Ouray, manager of this property, has been in Denver purchasing machinery. The mill's capacity will be doubled by adding 20 stamps. About 200 men are now employed in the mine and mill. The new tramway is working very well.

Revenue Tunnel.—About 550 men are employed, the mill is running full capacity, and a large number of teams are hauling smelting ore and concentrates to the railroad at Ouray. No trouble of any kind is expected when the 8-hour law takes effect.

Silverton Railroad.—On June 11th the first train of the Silverton Railroad reached Red Mountain. For 2 weeks a crew of men were cutting ice to open the road over the summit; mail and travel via Red Mountain are again resumed.

Wedge.—It is rumored that the closing down of this mine was not due to the company's not being able to make satisfactory arrangements with its men, on account of impending litigation with an adjoining property. The closing of the smelter at Durango does not effect the Ouray mines here, as their ores go to Pueblo and Denver. The prospects for Ouray this summer are very flattering.

Pitkin County.

Holden Lixiviation Works.—This plant at Aspen was sold at marshal's sale on June 6th for \$1,150. The plant originally cost over \$200,000.

Independence.—This company, backed by Boston capital, has started work for the season on the mill at Independence. The company is after gold.

Smuggler.—At this Aspen mine the concentration mills are running steadily.

San Miguel County.

Tomboy Gold Mines Company.—Ptarmigan Lake, which has furnished water for the mill, is now the property of the company, as well as 7 adjoining claims. The claims belonged to a number of men and their aggregate cost is put at \$20,000.

(From an Occasional Correspondent.)

Development work on a group of claims near Placerville, located for uranyl-vanadate, has disclosed a large body of ore running high in vanadium oxide. There appears to be no other mineral present, but the vanadium oxide is close to the uranyl-vanadate. The formation is nearly horizontal strata of light and dark sandstone. A layer of limestone lies above the ore-body, which is exposed for about 1,200 ft. in the nearly vertical cliff on the north side of the San Miguel River, about 17 miles from Telluride. The deposit is a mottled green and brownish red in color, silicious and very even in texture and easily worked. The ore-body now defined can supply any probable demand for vanadic acid. The discovery was made by A. B. Frenzel, at present located at Placerville.

Summit County.

Iron Mask.—This mine, at Breckenridge, is being equipped with a steam hoist and the owners, Finding & Marvel, are to put the mine in shape for production, which will be when the water can be handled. The tunnel will reach the ore body in about 400 ft.

North American Gold Dredging Company.—This company, operating placer ground on Swan River, near Breckenridge, has received 18 carloads of machinery recently. Two new dredges are to be erected and several additional hydraulic elevators installed. The 2 dredges used last year are already at work.

Peabody.—These placers, in Gold Run, are now being worked with a force of 15 men.

W. B. Duval, one of the promoters of the Wardville smelter, is putting in a similar plant at Robinson. The plant is to have a capacity of 200 tons per day and 2 mines in the vicinity are said to be able to furnish that amount. The ore is stated to carry 40% iron and from \$4 to \$20 in gold.

Teller County—Cripple Creek.

(From Our Special Correspondent.)

Work on the reduction works being constructed by the Woods Investment Company, of Victor, for the product of their mines in the Cripple Creek District, among which is the well-known Gold Coin, is progressing nicely and some of the machinery is in place. W. A. Watson, formerly of the Black Hills, will be superintendent, and before long the plant will begin work on a large scale. There will be a cyanide department, but the principal extraction will be by chlorination. The works are built on a very steep incline and a side track from the Florence & Cripple Creek Railroad will bring the ores, etc., to the plant.

Kiln Chlorination Works.—Under the direction of J. Q. MacDonald many improvements are being made at these works at Florence, Colo.; among them a concentration plant for the tailings, which contains 6 double-deck Wilfley concentrators with room for several more if needed. Fire plugs are placed at different points, a lot of new machinery is added and before long the works will be among the finest in the West. Mr. MacDonald recently built a cyanide plant in California. He was superintendent of the Brodie Mill, at Cripple Creek, and will be superintendent of this mill under the new owners.

May Ore Output.—The output for May amounted to 35,521 tons of ore of the value of \$1,251,265. Of this 8,072 tons of the value of about \$270 per ton, making 565,040, were sent to the smelters and 27,449 tons of the value of \$25 per ton, making \$686,225, were treated by the chemical mills. The stamp mills handled practically nothing. The tonnage was the largest of any month in the history of the district, the next best being August, 1898. April of this year showed somewhat of a falling off from March, but May is considerably ahead of March. The increase is principally in milling ore and is probably due to the increased work in the district in general and to the opening of the Independence in particular. Among the principal dividends paid by the public stock companies were Portland, \$60,000; Gold Coin, \$10,000, and others.

Stratton's Independence, Limited.—Considerable ore is shipped. Since it was transferred to the Venture Corporation it has started shipping in good style. J. H. Emerson is in charge.

FLORIDA.

Manatee County.

Manatee Fuller's Earth Mining and Manufacturing Company.—This company has been formed with Belmont Tiffany, of New York, president. The company will construct a dock 50 by 100 ft, with a 700-ft. approach, and put in machinery to cost \$16,000, with a capacity of 100 tons per day. The capital stock is \$500,000. Mr. Tiffany has been looking over the deposits, making preparations for active work.

IDAHO.

Blaine County.

Tip Top.—This Salt Lake company has its mill at Halley about ready for work. The mill has 30 840-lb. quick-drop stamps and can handle 60 tons of ore daily.

Idaho County.

The owner of the Big Buffalo refused the offer of Messrs. Clark & Sweeney for the property. Messrs. Clark and Sweeney have bonded 2 nearby claims, the Crack-a-jack and Jumbo.

Shoshone County.

Mining Conditions.—Martial law prevails and the mines up Canyon Creek remain closed. At Wardner the Bunker Hill & Sullivan Company is rushing work rebuilding its concentrating plant, and employs over 200 men. The Last Chance is also active. There promises to be a considerable influx of labor from outside soon, though the members of the Miners' Union not under arrest decline to return to work, and are trying to keep out miners. The coroner's inquest to investigate the deaths of the 2 men shot on April 29th has completed its labors, after examining nearly 500 witnesses. Sheriff Young and Commissioners Boyle and Stinson are under trial at Wallace on charge of impeachment for their failure to take any active measures against the mob that blew up the Bunker Hill & Sullivan Mill.

IOWA.

The total production of coal in Iowa in 1898 is officially reported at 4,759,967 short tons; an increase of 259,967 tons, or 5.7%, over 1897.

MICHIGAN.

Copper.

Arcadian.—According to the Marquette "Mining Journal," up to June 1st over 1,200 ft. of drifting has been done. The company now controls 5,229 acres of land and has started a shaft on the Highland property, 1,600 ft. south of "A" shaft, which will be shaft "B." With this shaft the lode will be opened for a length of 1½ miles. No. 1 shaft is being sunk to the 4th level, No. 2 to the 8th, and No. 3 and No. 4 to the 6th. All shafts are 3 compartment. Work on the mill progresses rapidly. It will be equipped with the very best machinery to turn out copper at minimum cost.

Elm River.—About 75 men are now employed. Pawnee.—At this Keweenaw County property 22 men are at work. Exploration has started to find the Mohawk lode.

Quincy Mining Company.—At the annual meeting, June 8th, the following directors and officers were elected: President, Thomas H. Mason; vice-president, Charles J. Devereaux; secretary and treasurer, William R. Todd; assistant secretary and treasurer, W. A. O. Paul. The directors are: Thomas H. Mason, George T. Bliss, Cleveland H. Dodge, Charles J. Devereaux, Isaac H. Meserve, William R. Todd and Samuel B. Harris. Mr. Thomas H. Mason is the son of former president Thomas F. Mason, who died a week ago.

Resolute.—At this property in Keweenaw County, near the Pawnee, 15 men are at work. The shaft is to be unwatered to the 350 ft. level. Robt. Vivian is in charge.

Iron—Marquette Range.

Goodrich.—This mine, 4 miles south of Ishpeming, idle for 17 years past, is to be reopened and worked by A. B. Miner.

Iron—Menominee Range.

Chapin Mining Company.—Manager McNaughton, of Iron Mountain, has let a contract to the General Electric Company, through its Chicago office, for a complete incandescent electric lighting system for underground and on the surface. The generator will be 120 K. W. with a capacity for furnishing between 2,000 and 2,400 16-candle power lights. Power will be furnished by a Lefel & Company water wheel. All machinery will be at Hydraulic Falls, on the Menominee River, and it is estimated that the loss of power in transmission will be less than 5%. Work will begin at once.

Flesheim Exploration.—James Flesheim, of Menominee, has taken an option to explore the N. E. quarter of the N. W. of section 25, T. 43, R. 32, a ½ mile directly south of the Armenia Mine. This land was explored in 1892 by Thomas McCusker, who sunk 2 pits in ore, analyzing about 59% iron and .09 phosphorus. Mr. Flesheim secured the land from I. Stephenson, Jr.

Quinnesec.—At this mine, at Quinnesec, under option to Corrigan McKinney & Company, of Cleveland, O., Capt. Tywell, of Quinnesec, is in charge. The old stopes are being pumped out to get a body of good Bessemer ore 25 ft. thick, recently cut by a winze, to the east of the old workings.

MINNESOTA.

(From Our Special Correspondent.)

At the annual meeting of the Minnesota Iron Company, in Duluth, the usual directors were elected, except that the late R. P. Flower was succeeded by A. R. Flower, and Marshall Field, of Chicago, by the president of the Illinois Steel Company. A large party of directors in the various companies interested went over the ranges prior to the meeting. Among the party were Judge Gary, A. R. Flower, D. H. Bacon, Edward Shearson, Henry Siebert, G. S. Brewster, H. H. Hollister and others, of New York; H. H. Porter, J. H. Chandler, C. W. Hilliard, C. P. Coffin, M. J. Carpenter and C. H. Ackert, of Chicago; E. W. Winter, of St. Paul, and some others.

Seven Japanese officials, among them T. Wada, president of the Japanese Government Steel Works, and U. Hayakuza, chief engineer; N. Shuarski, consulting engineer for Government harbor works, and S. Suzuki, chief engineer of the Japan Railway, were in Duluth and on the Minnesota ranges, inspecting mines, roads and harbor works. They were on their way for a tour of the world.

Henry More, of Whitehaven, Eng., and Douglas Jackson, of Newmaids, near Edinburgh, Scotland, have been visiting Minnesota mines. They are interested in Newfoundland ore deposits.

Iron—Mesabi Range.

(From Our Special Correspondent.)

Adams Iron Company.—The company is shipping about 5,600 tons of ore daily and would ship more if cars could be had.

Fayal Iron Company.—The company suffered severely in its open pit a few days ago by a cloudburst that flooded the working.

Lake Superior Consolidated Iron Mines.—At this company's Sellers Mine there are about

100,000 tons in stock and a steam shovel is loading. The mine is hoisting 700 tons a day. Rust, of the same group, is shipping more heavily and has a stock pile of about 50,000 tons. It is hoisting 500 tons daily. At Sellers crews are testing the west end of the mine.

Oliver Iron Mining Company.—This company is not to operate its Oliver and Lone Jack mines to any extent this year, but will fill its traffic contracts from the Mountain Iron, which may ship over 1,000,000 tons. The company will soon have an 85-ton Barnhart shovel at work. It is expected that with this shovel shipments will be about 7,000 tons a day. Some 40 men are employed and 2 shovels are stripping ahead. The mine is working on the third bench, which is below water line, but no difficulty is encountered in keeping it free of water under ordinary conditions.

Republic Iron and Steel Company.—The company has formally taken over the Franklin and given orders to employ 400 to 500 men at the earliest moment. The mine will be shipping largely before the end of the month.

Iron—Vermillion Range.

(From Our Special Correspondent.)

Annual meetings of the Oriental Granite and Iron Company, the North Star, Hope and Enterprise mining companies were held in Duluth last week. Some of these companies have leased to Jones & Laughlins, of Pittsburg, 11 tracts on the Vermillion and Mesabi ranges, and on part of these tracts the lessees are already at work.

Explorations are under way in section 26, T. 63, R. 13, by Capt. Jas. Bale for Henry Roberts and others.

Munroe Iron Company.—This company has been formed by Weed Munroe, of Minneapolis, and Jas. Wanless and E. C. Little, of Duluth. The capital stock is \$60,000, half common and half 8% preferred. The company has some State leases.

MISSOURI.

Jasper County.

(From Our Special Correspondent.)

Joplin Ore Market.—The week ending June 10th was favorable for mining and there was a large output, but the surplus keeps on growing and the price for zinc ore is gradually falling. The buyers paid the association scale price for top grade zinc ore; the Eagle, at Belleville, sold 2 cars and the Conqueror, in Chitwood Hollow, Joplin, 1 car at \$47 per ton, a drop of \$2.50 from last week's prices for top grade. Outside these sales the top was \$45 per ton, at which Oronogo sold 22 cars, Joplin 12, Stotts City 9, Belleville 5, Alba 1, Hells Neck, 4 cars. One cause for the lighter demand for ore is the strike in the Kansas coal mines. On account of a short supply of fuel the Cherokee-Lanyon Spelter Company bought only 18 cars this week, or about ¼ of its usual supply. The gas smelteries make only ¼ of the spelter produced west of the Mississippi and are not yet a big enough factor to make up the shortage when the coal smelteries drop out. Some operators ascribe the lighter demand to a combination among the metal men for the purpose of fighting the Miners' Association, but the association is sufficiently powerful at present to handle the entire output of the district and there is no doubt that the metal men are unwilling to precipitate an open fight as long as it can be avoided. There was no change in the lead market this week and the price was \$26 per 1,000, the same as for weeks past. Henry Weymann, the buyer for the Picher Lead Company, purchased the big accumulation of lead amounting to over 1,500,000 lbs., that J. W. Aylor, owner of the Eleventh Hour lease at Cartersville has been accumulating for 18 months. The ore will be loaded as fast as possible. During the corresponding week last year top grade zinc ore sold at \$29.50 per ton and lead at \$22.25 per 1,000, the lead sales were greater by 162,780 lbs., the zinc sales less by 1,506,140 lbs. and the value less by \$101,022. For the first 23 weeks of last year the lead sales were greater by 4,362,600 lbs., the zinc sales less by 40,706,670 lbs. and the value less by \$2,448,677. As compared with the previous week the lead sales were greater by 73,320 lbs., the zinc sales less by 940,970 lbs. and the value less by \$24,091. Following is the turn-in by camps:

	Zinc pounds.	Lead pounds.	Value.
Joplin	1,800,060	219,570	\$44,860
Webb City	218,410	27,430	5,354
Cartersville	1,280,780	311,450	35,315
Oronogo	975,330	6,470	22,113
Duenweg	132,050	53,590	3,902
Galena-Empire	2,989,500	262,080	66,718
Aurora	1,395,000	20,000	24,497
Stotts City	379,650	.....	8,447
Central City	447,500	25,230	10,165
Belleville	358,790	.....	8,073
Hells Neck	173,500	51,310	5,238
Alba	44,500	.....	901
Granby-Newton Co.	365,000	12,000	6,284
Total for week	10,560,070	989,130	\$241,867
Total 23 weeks	236,209,670	21,103,460	\$5,141,819

Mining Land Sales.—The transactions were smaller this week than for weeks past, as most of the big producing properties have been picked up by the Colley syndicates. The 40 acres on

which the Get There lease at Carterville is situated, was sold this week to Colley & Company for \$100,000. The land belonged to D. M. Stewart, of Xenia, O., who has received thousands of dollars in royalties since the lease was opened up by Col. T. J. Steers. The Boston-Little Circle Mining Company purchased this week a 7/8ths interest in the Nugget Mine and lease of 14 lots at Oronogo, but the price was not made public. A number of sales of land have been made in counties outside the heart of the zinc belt. The Carbonate Mining Company, of Kansas City, has purchased the Haydock mines, 12 miles west of Linn Creek, in Camden County, the price being \$19,200 for 960 acres of land, a complete concentrating plant and 60 tons of ore on the dump. Forty acres of land on which good zinc ore has been developed near White Plains. Howell County, were sold last week for \$35,000. The land could have been bought 5 years ago for \$5 per acre. Chas. H. Murray, of Webb City, was offered and refused \$85 per acre for 310 acres of land which he owns near Duenweg, where zinc has been struck at 28 ft. There is a brisk inquiry for undeveloped property and the tendency among investors seems to be to develop and sub-lease new ground.

MONTANA.

Beaverhead County.

January.—This group, near the East Pacific, in Weasel Gulch, at Winston, is shipping some ore again.

Keystone.—This mine, in Weasel Gulch, owned by the Connor Brothers, joins the Stray Horse, and is under bond and lease for \$75,000 to Hardy, Deadman and others. Two cars of high-grade ore have been shipped recently.

Noonday.—This claim, at Argenta, belonging to M. A. Miller, is to be developed on a larger scale, machinery having been recently put in for this purpose.

Cascade County.

Cottonwood Coal Company.—This company, which is a part of the Great Northern Railroad Company will not build its contemplated coal washer at Sand Coulee this year. Lewis R. Stockett is manager.

Flathead County.

Snowshoe.—The No. 1 tunnel of this mine, at Libby, is in over 1,400 ft., with a 200-ft. rise to No. 2 tunnel, at a point 400 ft. in. No. 2 tunnel is in nearly 500 ft. Considerable stoping has been done on it, and a raise is up about 250 ft., which will be connected with No. 3 tunnel. A winze is down 140 ft. from No. 1, with drifts from the 100-ft. level. A new hoist, with a capacity of sinking 500 ft., has been put in at this winze.

Jefferson County.

Edelweiss.—This old mine, 22 miles east of Butte, has been bonded for \$30,000 by the owner, Thos. G. Merrill. The ore is reported to carry 60 per cent. lead.

Free Coinage.—In this claim, owned by Howard & Brownlew, at Lump Gulch, a 2 1/2-ft. vein of ore is uncovered at the bottom of the 150-ft. shaft.

Tycoon.—This high-grade silver mine, near Clancy, near the Liverpool Mine, has been bonded by the owner, T. G. Merrill.

Lewis and Clarke County.

Montana Standard Mining Company.—This company proposes to develop some 14 claims near the Drum Lummon Mine, at Marysville.

Violet Jane.—This mine, 15 miles northeast of Helena, is now owned by Reed & Hicks, and is worked under bond and lease by B. N. J. Miljour. The ore is a brown hematite.

Madison County.

Twin Bridge's Smelter.—This plant is about completed, and will soon blow in.

NEVADA.

Storey County—Comstock Lode.

Comstock Pumping Association.—On June 6th elevator No. 1, in the C. & C. shaft, was working again and the water had been lowered to 4 ft. below the caps of the 1,950 ft. level.

Segregated Belcher & Midas Consolidated Mining Company.—At the annual meeting of the old board of directors was re-elected, composed of Thomas Anderson, H. Zadig, J. P. Martin, James Newlands, Jr., and George Searle. Thomas Anderson was re-elected president; H. Zadig, vice-president; E. B. Holmes, secretary, and W. E. Sharon, superintendent.

NEW YORK.

Livingston County.

Retsof Mining Company.—This company is employing about 300 men at its mine, at Retsof, and producing about 1,200 tons of salt daily. The company is part of the company that is to open the salt mines at Avery's Island, La., and a number of its salt miners are going to Louisiana.

OHIO.

Athens County.

(From Our Special Correspondent.)

Sunday Creek Coal Company.—This company is talking of building a new tippie at its recently acquired mine at Orbiston, on the Columbus, Hocking Valley & Toledo Railway.

Perry County.

(From Our Special Correspondent.)

New Hamburg Coal Company.—This company's mines, No. 12 and No. 13, at New Hamburg and Sulphur Springs, on the Columbus, Sandusky & Hocking Railway, are in operation again after an idleness of a few months.

OREGON.

Baker County.

Union Companion.—It is said that Chicago and Youngstown, O., parties are to purchase this mine, near Cornucopia, together with other properties. The Union-Companion is equipped with 5,000 ft. of tunnels and shafts, besides up-raises and winzes; a 20-stamp mill, with 8 Frue vanners and 2 canvas tables, 24 by 50; an 8-drill air compressor, an 80-H. P. electric motor plant, steam being used for milling in winter. The ore runs from \$6 to \$25 per ton.

Jackson County.

Barron.—This mine on Sampson Creek, 10 miles southeast of Ashland, is reported under option to the Altan Mining Company for \$50,000.

Josephine County.

Althouse Placers.—George Hansen recently sold 360 acres of farming land along Althouse Creek in the Illinois Valley to J. M. Wallace of Yreka, who is to run a 3-mile ditch and 6,000 ft. of tunnel to bring water from the creek for 2 giants.

Winner.—This placer mine near Waldo is running 2 giants day and night, and employs 15 men.

PENNSYLVANIA.

Anthracite Coal.

Delaware, Lackawanna & Western Railroad.—General Manager Hallstead and Superintendent Bogart have resigned and their resignations have been accepted. It is expected that the office of general manager will be abolished and that its duties will be performed by Traffic Manager Caldwell. General Coal Agent W. R. Storrs and his assistant, W. H. Storrs, have been superseded.

Johnson Coal Company.—The New York, Ontario & Western Railroad Company has secured C. S. Johnson's controlling interest in the company's colliery at Priceburg.

Lehigh Valley Coal Company.—This company's Prospect Colliery, north of Wilkes-Barre, is to be lit by about 350 incandescent lamps and 12 arc lights. Power will come from a 30-K. W. Eddy multipolar generator direct connected to a 10 x 10 Harris automatic engine. The main roads in the mine, the switches at the foot of the shaft and slope will be lit with incandescent lamps. The arc lamps of the enclosed arc type will be in the breaker and about the yards. The wires will go into the mine through an iron pipe.

Lehigh & Wilkes Barre Coal Company.—Fire broke out in the Empire shaft, at Wilkes Barre, on June 10th, starting in the Red Ash vein, over 1 mile from the foot of the shaft. Superintendent Richards, Superintendent Morgan and Mine Inspector Williams were overcome by gas and had a narrow escape. The Empire shaft had been idle some time, and the origin of the fire is unknown. The mine can not be flooded without drowning the workings of 3 mines, and the fire will be confined by masonry walls.

Mineral Spring.—This breaker, at Parsons, formerly worked by the Lehigh Valley Company, burnt down on June 9th. The loss was light, as the breaker had been idle for 9 years and nearly all the machinery had been removed.

Bituminous Coal.

Many miners in the Clearfield region are idle. Those about Dubois went out on June 8th and 9th. Over 12,000 men are reported idle.

The strike spread on June 14th to the mines at Greshaw, Brock and Shawmut, about 1,000 more men stopping work there. The Berwind-White Company and the Clearfield & Jefferson Company, according to a statement of one of the organizers of the Miners' Union, are to be forced to pay a higher rate for machine mining.

Slate.

(From Our Special Correspondent.)

Albion.—A large slide occurred at this Pen Argyll quarry, owing to rains. It was expected and work stopped several hours before it fell. The rubbish will be cleared within a month.

American Bangor.—Sales of large blocks of slate have been made within the last few days, and it is said that a European syndicate is seeking control. The quarry is noted for its fine slate, and the dip of the rock is such that it can be quarried to better advantage than any in the region, but it has not been a dividend-payer in recent years.

Diamond Slate Company.—Wert & Bloese are opening a new quarry on the Williamstown vein, on the land of Henry Rex. The outlook is favorable.

Pen Rhyn Quarry.—Extensive removals of top are in progress at this Portland quarry.

Pennsylvania Hard Vein.—Six hundred squares of roofing slate were made in May and 800 squares were shipped.

Chester County.

E. & G. Brooke Company.—It is stated that this company is preparing to get out iron ore at its mines near French Creek, which have been idle 10 years.

Lancaster County.

Iron Mines.—The iron ore mines in Providence Township, near Hess Station, formerly owned by Collins, Fried & Lefever, which have been idle for years, are leased to A. B. Fried & Brother, who are to operate them extensively, putting in improved machinery.

Lebanon County.

Cornwall Iron Mines.—In the 6 days ending June 10th, 900 cars of ore averaging 25 tons each were shipped from the Cornwall ore bank, the largest 6 days' tonnage on record. About 500 men are employed. The new B. C. Coleman furnace at North Lebanon will, it is said, be put in blast about July 1st, giving employment to 150 men.

SOUTH DAKOTA.

Lawrence County.

(From Our Special Correspondent.)

Baltimore & Deadwood.—J. H. Delaney, secretary, has been in the Hills from Chicago. A first cleanup late in May in the new stamp mill, at Gayville, amounted to only about \$270.

British-American Mining Company.—J. M. Sweeney, secretary, is in Deadwood. He has bought 67 claims of copper bearing ground 6 miles west of Rockford, or 2 miles west of Hornblende, north of ground now belonging to the Black Hills Copper Company.

The company is also opening a gold proposition on one of the forks of Butcher Gulch. The company has about 300 stockholders, mostly in Michigan.

Deadbroke.—R. M. Maloney, who has bonded the mine and mill for \$25,000, is fitting up a cyanide plant to treat tailings from the ore in the Deadbroke Mine. The ore averages about \$10 per ton gold, and tests made have saved about 90 per cent.

Great Northern.—All the property of this one of the Hardin companies, in Two Bit, has been sold at sheriff's sale to satisfy judgment of \$2,460. The property was bid in by J. P. Hymers, trustee for the judgment creditors. The machinery cost about \$25,000. The general worthlessness of Two Bit ground seems to be apparent.

Pennington County.

(From Our Special Correspondent.)

Holy Smoke.—Some directors of the Golden Return Mining Company, including Harry Chipman, of Detroit, have been at Keystone. Plans are being made to equip the Vulcan and Holy Smoke shafts. The Holy Smoke is down about 150 ft., and a crosscut has found a ledge of free-milling and concentrating ore assaying from \$3.10 to \$24 per ton gold. The Vulcan shaft is down 100 ft., in ore. The company was organized by Capt. James A. Clark.

Holy Terror.—The Holy Terror and Keystone mills were compelled to close down temporarily on account of a shortage of wood for fuel. The present forest reserve law requires an application to be made to the department for wood grants and the Holy Terror Company failed to make a request in time.

Montezuma Mine and Mill.—The Chicago company, which bonded this property through Chas. Cadmus, is taking out some ore.

TENNESSEE.

Hickman County.

Phosphate Industry.—It is stated that about 1,500 men are now employed in mining phosphate rock about Centerville.

R. A. Perry, of Swan Bluff, 4 miles east of Centerville, has sold his farm to the Cleveland-Dyer Company, of Cleveland, O., for \$12,500. This same company has bought the farm of O. A. Prince, near by.

Jefferson County.

John Weir Company.—This company now controls mineral rights on about 3,500 acres of land near Mossy Creek. The company is preparing to work some of its ground and is putting old workings and milling plants in shape and preparing to erect a furnace at Clinton. The zinc or mineral is stated to be high grade, containing no iron, antimony or arsenic.

UTAH.

(From Our Special Correspondent.)

It is probable a larger proportion of the State's smelting ores will be treated at home, owing to the trouble in Colorado over the 8-hour

law. With but slight expense 3 additional stacks can be put in commission in Salt Lake Valley. Also good men thrown out of employment in Colorado are finding work in Bingham, Tintic and other camps.

Bullion and Ore Shipments.—During the week ending June 10th the bullion and ore shipments forwarded east from the different smelteries and camps of the State were 20 cars, or 829,822 lbs. lead-silver bullion, 3 cars or 123,941 lbs. copper bullion, and 63 cars or 2,154,930 lbs. silver and lead ores.

Inland Crystal Salt Company.—It was supposed the Salt Trust had control of all the salt manufacturing in Utah, but the Solar Crystal plant, at Ogden, has been working under lease. The Inland Crystal the other day made a proposition to purchase, which was declined; next day a car of trust salt was placed on the Ogden market, away below any margin of profit, which brought the obstreperous Solar Company to terms.

Juab County.

(From Our Special Correspondent.)

Tintic Shipments.—In the week ending June 10th there were sent forward from the 3 different shipping points of the district 110 cars of ore, 10 cars of concentrates and 2 bars bullion, as follows: Bullion Beck, 20 cars ore; Gemini, 9 cars; Centennial Eureka, 8 cars; Eagle, 1 car; Godiva, 4 cars; Grand Central, 23 cars; May Day, 1 car; Mammoth, 3 cars; Swansea, 5 cars; South Swansea, 2 cars; Rabbit's Foot, 1 car; Star Consolidated, 3 cars; A. Johnson, 1 car; Dragon Iron Mine, 11 cars; Four Aces, 2 cars; Mammoth, 3 cars concentrates and 2 bars bullion; Bullion Beck, 7 cars concentrates.

Summit County.

(From Our Special Correspondent.)

Park City Shipments.—For the week ending June 10th the crude ore and concentrate products sent out through the Mackintosh sampler were 2,962,395 lbs., as follows: Ontario, crude, 402,490 lbs.; Anchor, concentrates, 210,960 lbs.; Silver King, crude, 701,675 lbs.; Silver King, concentrates, 577,960 lbs.; Cooney, concentrates, 57,920 lbs.; Daly West, crude, 1,011,290 lbs.

VERMONT.

Orleans County.

Newport Copper Mining and Development Company.—This company, organized with \$250,000 capital under Maine laws, claims to have undeveloped copper property near Newport. The incorporators are: O. Sweet, North Sutton, P. Q.; H. G. Waters, Everett, Mass.; J. E. Barnard, Franklin, N. H.; T. S. Pitts, Boston, Mass.; H. E. Sweet, Somerville, Mass.; M. S. Westover, Boston, Mass. J. E. Barnard is president.

WASHINGTON.

Ferry County—Republic.

(From Our Special Correspondent.)

Mabel.—A tunnel has started 500 ft. northwest of the shaft on the vein. It is running on an 18 in. streak of fine looking quartz, part of the vein filling. The shaft is down 45 ft. work on it has stopped.

Marietta.—A 2-ft. vein is opened at the south end of the claim, which is reported to give encouraging assays. Surface prospecting at the northwest corner of the Montana Claim has shown a gold-bearing quartz vein from 3 to 3 in. thick. No assays reported.

Nalbra.—This claim has been incorporated by Rossland, B. C., people. A shaft is down 30 ft., showing quartz under porphyry capping.

North Star.—The winze on the tunnel level is down 45 ft. The south drift is in 65 ft., following the foot wall.

O. K.—This claim, south of the Mountain Lion, and east of the Merrimac, has been incorporated, and work has begun. The owners claim the southerly extension of the Mountain Lion lode.

Orphan Boy.—The superintendent reports that the shaft is down 50 ft., and the vein 3 ft. wide at the bottom.

Okanogan County.

(From Our Special Correspondent.)

Golden Zone.—Machinery for the concentrator is being hauled in from the steamboat landing at Johnson's Creek and it is expected to be ready within 60 days. About 20 men are employed.

Little Falls.—More men are at work and a carload of ore will be shipped within the next 2 weeks. The proceeds will be used for putting a hoist and other machinery on the property.

Q. S.—The locations take in one side of a precipitous mountain rising about 6,500 ft. from the valley; the summit is a Logback and on this is what seems to be a ledge of ore from 200 to 300 ft. wide and 3,000 ft. long, showing copper. A tunnel to cross-cut this at 600 ft. depth is now in 350 ft.

Palmer Mountain Gold Mining and Tunnel Company.—The tunnel is in 1,900 ft. and is 900 ft. deep at the face. Drifting has begun on 2 of the 11 ledges cut and good ore is being encountered. Improving the water power goes on steadily. By January 1st, 1900, it is expected

the Black Bear, War Eagle and Wisconsin Central ledges, among the best surface showings, will have been cut and a treatment plant decided on. Funds are provided for all this year's work.

Utica.—This is a Douglas Mountain property near Loomis, with a porphyry dyke 90 to 120 ft. wide, the entire length of the claim, showing 3 parallel veins. A pit 12 ft. deep shows 5 ft. of ore, assaying \$31 in gold.

Wehe Group.—A month's work has brought good results and the manager claims he has struck gray copper that runs high and is of good width.

WEST VIRGINIA.

(From Our Special Correspondent.)

It is stated on excellent authority that Morgan interests are purchasing controlling interests in the coal companies along the line of the Toledo & Ohio Central and Kanawha & Michigan railways, and intend to close down the mines, cutting off the revenues of these lines to force them to sell. In keeping with this report is the fact that though the Kanawha & Michigan Railway had arrangements made to put in additional tracks for the new plant of the Boomer Coal and Coke Company, of Boomer, W. Va., and had much of the track material on the ground, the work has been indefinitely postponed. The improvement of the track of the Kanawha & Michigan through Kanawha and Fayette counties is also stopped.

WYOMING.

Carbon County.

Black Hills Coal Company.—It is expected that this company, composed of New York parties, will close down permanently at the Hay Creek coal mines July

FOREIGN MINING NEWS.

AFRICA.

Transvaal.

A London despatch of recent date says: "Advices from South Africa, emanating from British sources, show the utter failure of the recent conference at Bloemfontein between President Kruger, of the Transvaal, and the British High Commissioner, Sir Alfred Milner. The newspapers are beginning to talk quite seriously of the possibility of war in South Africa. Mr. Chamberlain, Secretary of State for the Colonies, in his speech in the House of Commons yesterday, announced that his reply to the petition of the Uitlanders, which had been held back pending the result of the conference at Bloemfontein, would now be presented to the Transvaal. This reply is semi-officially described as 'explicit, but conciliatory,' but it is believed to be in the nature of a practical ultimatum. The resources of diplomacy are regarded as exhausted with the failure of the conference. Nothing is left, it is felt, but a recourse to force."

CANADA.

British Columbia—Cariboo District.

Miocene.—At this deep gravel proposition, near Harper Camp, a shaft with three 4 by 5-ft. compartments is down 140 ft. in blue gravel, but bedrock is not expected to be found inside of 400 ft. The machinery equipment on the property is very complete.

British Columbia—West Kootenay District.

(From Our Special Correspondent.)

Rossland Ore Shipments.—From January 1st to June 7th the ore shipped from Rossland mines amounted to 53,000 tons.

Eight-Hour Law.—The effects of the enforcement of this law may be summarized thus: A strike in the Slocan mines and the closing of all the mines there with the exception of two; an agreement between the mine owners and men in Rossland that some of the men shall work underground 8 hours and above ground 2 hours each day. This arrangement is believed to be only a makeshift. It has, however, been practically in force since the adoption of the 8-hour system a few weeks ago.

British American Corporation.—At the No. 1 the management announce a strike of shipping ore at the 300-ft. level. Sinking continues to the 400-ft., where a pump having a capacity of 400 gal. per minute will be placed.

At the Nickel Plate, the new gallows framework of the old shaft is about completed. The upraise from the 200 ft. to the 100 ft. is finished. The management intends to sink the shaft to the 400 ft.

Iron Horse.—The north crosscut of this Rossland Mine, is in 252 ft. and the south crosscut 265 ft. No pay ore has been cut.

At the Columbia & Kootenay, drifting on the veins in tunnels 3, 4, 5 and 6 is progressing.

Gertrude.—The shaft is down 210 ft., including a run of 10 ft. Drifting from the 200-ft. level will begin as soon as the timbering is completed.

Le Roi.—During the 75 days beginning March 1st and to May 15th, the smelter returns showed that 23,420 tons of Le Roi ore were treated by the company's smelter at Northport, yielding

14,400 oz. of gold, 26,000 oz. of silver and 440 tons of copper. The 33,000 tons of ore produced for the first 5 months of the present year at this rate must have yielded 20,290 oz. of gold, valued at \$417,974; 34,073 oz. of silver, valued at \$20,785, and 1,239,965 lbs. of copper, valued at \$210,794; total of \$649,553. For 1898 the Le Roi produced 66,000 tons, valued at \$1,211,800.

Virginia.—The assessment levied is 5c., and not \$5, as erroneously stated. The par value of stock is \$1 a share. There is no ore body in sight.

Nova Scotia—Cape Breton.

Dominion Coal Company.—The output of coal for May was the largest for that month in the history of the company. It amounted to 164,000 tons. It is expected that the June output will reach 200,000 tons. Twenty-two vessels are employed to carry the coal to the different markets, with an aggregate tonnage of 65,000.

Ontario—Rainy Lake District.

Canadian Mines Development Company.—This company, with £300,000 capital in pound shares, has been organized by London and Toronto men to acquire gold mining properties in Ontario, the principal one being the Foley Mine, near Mine Centre. The prospectus states that the main shaft on the Bonanza vein is 400 ft. deep. The ore is said to vary greatly in width, from a few inches up to 4 or 5 ft., while the milling value of the ore treated is about \$10 per ton.

(From Our Special Correspondent.)

This spring there has been great trouble from water at all mines and prospects. Prospectors have been delayed and the work of getting in supplies made doubly hard. The roads are almost impassable and some cannot be traversed till fall. There are tons of mining machinery at points on the Canadian Pacific road or scattered on the roads to the mines, whose delay will hinder the summer's development materially.

Alice A.—A meeting of stockholders is called to sell the property to the British-Ontario Gold Mining Company, recently formed in London to buy and work this mine, with a capital stock of £300,000, of which £195,000 go to the owners of Alice A. The sum of \$150,000 has been underwritten for working and operating. Every shareholder in Alice A. will receive one £1 share of the new stock for every five \$1 shares of his former holdings. The new company's plans include the erection of a mill with a capacity of 250 tons daily, equipped possibly with the Krupp ball mill and the Bihartz concentrating table, in place of the Frue vanner. The sale to the English company has been made by Col. J. S. Hilyer, of Superior, Wis.

Hammond Reef Consolidated Gold Mining Company.—This company has been organized by the consolidation of 5 mines in the Sawbill District, including the Hammond Reef and the Hammond Folger, with a capital stock of \$5,000,000. It will, it claims, put in a 100-stamp mill on Hammond Reef, machinery for which has been ordered, and make water power improvements for the mines and mill. The headquarters are in Toronto, though most of the stock is held in New York.

Headlight Gold Mining Company.—This company, at its annual meeting at Mine Center, Ont., re-elected the old officers and directors. The main shaft is down about 80 ft. and will continue to 100 ft., where drifting both ways on the vein will begin.

CHINA.

Anglo-French Quicksilver and Mining Concession, Limited.—This company, with £310,000 capital in pound shares, of which 130,000 are 7% preferred, has been organized in London to work a concession in the province of Kweichow granted to the Societe Francaise d'Explorations Minieres of Paris. The province, according to the prospectus, borders on the French sphere of influence and the cinnabar deposits, which occur in limestone, are said to be quite extensive, have been worked in a small way and by crude appliances by the natives. The ore is stated to run from 1.7% to 4.4% mercury. The concession includes iron mines and the smelting works erected at Tsing-Ki by the Chinese government.

MEXICO.

Guanajuato.

(From Our Special Correspondent.)

Compañia Minera de la Trinidad.—At a meeting of the executive board on May 31st it was decided to pay dividend 36, of \$5 per share, at City of Mexico, June 15th.

Compañia Minera de Mackintosh.—Dividend No. 2, of \$8 per share, has been declared by this company, payable in the usual manner, June 15th, 1899.

Lower California.

Despatches received by way of San Diego, Cal., report the arrival of more vessels at Ensenada with some miners and 15 kgs. gold from the placers lately discovered at Sierra Pinta in Lower California. The reports now brought from practical and experienced men do not justify the boom accounts first sent out about the Sierra Pinta.

They say that there is gold there, but not in any such abundance as to justify a rush. It is not a field for inexperienced men, though it is probable that a moderate number of old miners can do well, or at least make fair wages. The great difficulty is the lack of water.

(From Our Special Correspondent.)

From advices received by the Mexican Government from Mulege, the center of the mining district in which the wonderful strikes are reported at Sierra Pinta, there is nothing to warrant the great excitement in California newspapers. Parties of from 8 to 20 prospectors continue to leave Los Angeles and San Francisco daily for the new diggings, some going via steamer the entire distance, and others via rail to Guaymas, Mex., then across the Gulf of California to Mulege. As is well known here, the placers of Lower California are among the richest of Mexico, but the lack of water and wood makes the working of the mines extremely difficult. Several parties of prospectors now in Mexico City have returned recently from Mulege, and were disgusted with the country.

Mexico.

(From Our Special Correspondent.)

La Esperanza.—The failure to purchase by the English company that had an option on this famous mine, at El Oro, has not disturbed the present owners, and operations are being made to increase the plant. The \$100,000 gold paid for the option will be used to develop the property. A representative of the company will soon go to the United States to buy machinery to increase the mill from 40 to 120 stamps, each stamp to have a capacity of 2 tons daily. Work has already begun on the new cyanide plant, which, with the old one, will treat 150 tons of tailings daily.

La Hoya Mining Company.—This company is about to resume work on its shaft, at El Oro, after 6 months' idleness. The capital has been recently increased.

Michoacan.

(From Our Special Correspondent.)

Inguaran Copper Mines.—One of the engineers who recently inspected the Inguaran property was Mr. Comenge. The Inguaran Company proper has not been formed yet and will not be till Mr. Lafarge returns to Paris. It is the development company with 3,500,000 fr. capital that has been organized. It will do the preliminary work on the mines, railroad, etc.

Oaxaca.

(From Our Special Correspondent.)

Las Peras Gold Mines, Limited.—This company has been organized in London, Eng., with a capital of £100,000 in £1 shares, to acquire certain mines and mining properties in Zimatlan, in Oaxaca, and to develop and work the properties. The signatories are C. H. Cornish, C. D. Ross, S. Cox, R. H. Haviland, G. H. Fookes, F. W. S. Clark and S. Dukerson, all of London. An option has already been secured by the company on 290 acres of mineral lands.

COAL TRADE REVIEW.

New York. June 16.
Anthracite.

The movement of coal west is now heavy and docks at upper Lake ports are very busy. In the East consumers at most points pursue a waiting policy. A considerable volume of business was called out by the announcement of the contemplated advance on July 1st, but things eased off again quickly and there is little to note. The output for May is stated to have been very near 3,500,000 tons. This is considerably in excess of what was thought the market needed, but stocks have not accumulated to any perilous extent and the large companies have been pretty strict on quotations. It is evident now that the fall and winter buying will in all probability be very heavy indeed, and if the producing interests hold together a couple of months longer there will be a profit for everybody. The prospect also is against labor troubles of any importance and as soon as fall buying starts the miners are likely to find things coming their way. The heavy demand for labor in many western mining fields is likely to be felt and there is a possibility that anthracite operators may find themselves short-handed.

The shake-up in Delaware, Lackawanna & Western that has followed Mr. Sloan's retirement has been a remarkably thorough one. It is fair to presume that there will be some change in the road's manner of doing business in certain ways. It is also fair to presume that the road will earn just as good profits for its shareholders.

There is no change in quotations, but sales agents say they think the advance on July 1st will go. We continue to quote free burning white ash, f. o. b. New York: Broken, \$3.15; egg, \$3.40; stove and nut, \$3.75.

Bituminous.

The demand for coal from points along the Atlantic seaboard continues good. Long Island Sound trade may be less active than it has been,

but the far East is calling for a lot of coal. New York Harbor trade is active, and all rail trade, good as it was, has improved during the week. Export business is rather quiet, as captains and vessel owners do not care to have vessels go to South and Central American ports during the hurricane season.

The Clearfield miners are out on a strike. It's rather difficult to see just why, though nominally the strike is for an advance in the rates of machine mining. As matters stand probably at least 7/8 of this year's output is covered by contracts, the operators cannot get better prices for coal, and consequently do not feel like paying higher wages. As there is little prospect, apparently, of West Virginia men going out, the strike of the Clearfield miners will simply turn a lot of good business over to the operators of the Pocahontas and New River fields. This was precisely what happened in 1897.

So active is the general demand just now that some firms are declining transient orders, having all they can do to take care of deliveries to their contract trade. Transportation from mines to tide is fair, while car supply is poor. Vessel freights are weaker at 80@85c. from Philadelphia to Boston, Salem and Portland and 70@75c. from Philadelphia to Sound ports.

Prices are nominally \$1.65 for best grades at Philadelphia and Chesapeake Bay ports. Transient customers have to pay more for coal than they have been paying.

Birmingham, Ala. June 12.

(From Our Special Correspondent.)

The only thing of interest as to the coal trade in Alabama to be noted now is the approaching convention of the miners, to be held June 19th, for the purpose of adopting a new schedule of wages for the coming year, commencing July 1st. The miners do not state definitely what they desire in the shape of a contract, though it is believed that they will ask for one that will have pig iron selling prices as the basis, as now. The difference, however, will be in the grade of pig iron that is to be the basis. The general average is now figured on. The selection of one certain grade would have resulted in a better price, it is believed, for the miners in the long run. The president of this district of the United Mine Workers, who called the meeting, has extended an invitation to the operators to attend the meeting also, so that the schedule can be arranged together. At present the miners are receiving 50c. per ton for their work; having received four increases in wages since January 1st. Some of the operators in this State are loud in their complaints as to the high wages, saying that the prices they are getting for the product do not advance with the wages. It is argued that operators who do not have their own furnaces to supply with fuel but who sell in the straight market cannot pay their miners an advance every time pig iron goes up, for they do not reap any of the benefits of the advance in iron.

Chicago. June 11.

(From Our Special Correspondent.)

Anthracite Coal.—Nothing new has transpired in the anthracite coal situation, the buying remaining as for weeks past. There has developed a considerable inquiry relative to July prices, but dealers are holding off for the present. Sales made are in small quantities—a carload or two—and buying from outside points is no better. Shipments of hard coal to town have slackened somewhat. Prices remain fairly firm, and are \$4.75 for broken and \$5 for domestic sizes.

Bituminous coal continues in active demand from manufacturing concerns, railroads, etc. The large supply of soft coal has weakened the market to some extent, and there are now bargains to be had, consumers taking advantage of the situation, and some large buying is being done.

Coke is in good demand, with supply rather smaller than the wants. Prices are very firm, and tend upward.

Pittsburg. June 14.

(From Our Special Correspondent.)

Coal.—No coal was shipped by river since last report; there is only a limited amount loaded, prices are as follows, per bushel: 1 1/4-in., 3 3/4c.; 3/4-in., 3 1/4c.; run-of-mine, 3c.; nut, 3c.; slack, 1 1/4c.

The Monongahela River Consolidated Coal and Coke Company, of Pittsburg, has been chartered. Gregg L. Whitney is the principal stockholder.

The options on all the property held for Jones & Laughlins, near Coal Center, have been closed and this gives them a clear access to more than 3,000 acres in the Fourth and Fifth pools. They will build a small railroad to cross the Pittsburg, Virginia & Charleston Railroad.

The rail coal combine progresses. Options secured on 100 of 119 desirable plants. The rail shipping coal combine in the Pittsburg mining district has reached that stage where a temporary organization is about to be made. It is stated that the company will capitalize at from \$60,000,000 to \$75,000,000. Moore & Schley, the New York brokers, will financier the deal. Stocks

will be equally divided into common and preferred.

At Dubois, Pa., all the mines in the region are idle with the exception of the Berwind-White colliery, which employs less than 300 men. The Buffalo, Rochester & Pittsburg Railroad has abandoned all traffic except passenger and local freight trains, and 500 of its employees are idle. The miners are marching and have several bands with them.

Connellsville Coke.—At the top notch coke took another step forward last week and both production and shipments reached larger figures than usual. The region shows 18,907 ovens with 16,563 ovens in blast and 2,344 ovens idle; the active ovens were not increased last week on account of the scarcity of cars; should the car supply show stronger this week the active list will be materially increased. The prosperity of the Connellsville District is no phantom boom bubble. There are more ovens in blast than ever before in the history of the region, more men employed; shipments break all records week in and week out, as compared with other years, wages are the highest ever paid, and prospects are constantly brighter and brighter.

Prices are the highest ever attained except at short intervals, when the production was nothing compared to what it is now.

Week's shipment from the region amounted to 9,841 cars, against 9,464 cars the preceding week, increase, 377 cars.

Shipments run: To Pittsburg, 3,224 cars; sent West, 4,914 cars; shipped East, 1,704 cars; total, 9,842 cars.

Cartagena, Spain. June 6.

(Special report of Barrington & Holt.)

Iron and Manganiferous Ores.—For the month of May there have been 13 shipments of ore; 4 were dry ore, 8 manganiferous and 1 magnetic iron ore. The comparatively small number of shipments for this past month is mainly due to labor difficulties. On May 1st the men employed in loading ore cargoes went out on strike, and no work was done for some days. Subsequently the Chamber of Commerce secured the aid of Government sailors from the Minister of Marine. In sight of this the men agreed to resume work on old terms, but working very badly they were again shut out. One ship was loaded by miners brought down from the sierra under the protection of the Civil Guards without any disturbance. At the present time the labor difficulty is settled and the men are working on the old terms, and should any more trouble arise, merchants have been authorized to have the aid of Government sailors at any time. The sterling price of iron and manganiferous ores has further advanced. This is owing to the continued fall in the exchange and a firm demand for iron ore of every description.

For iron ore we quote per ton as follows: Ordinary 50% Portman, 6s. 3d. @ 6s. 9d.; special low phosphorous, 6s. 7d. @ 6s. 11d.; extra quality low phosphorous, 7s. 3d.; special iron ore, 7s. 9d.; specular iron ore, 9s. 9d. For manganiferous ores we quote per ton as follows: No. 1, containing 20% iron and 20% manganese, 15s., f. o. b. Cartagena; No. 1 B, 25% iron and 17% manganese, 12s.; No. 2, 30% iron and 15% manganese, 11s. 6d.; No. 3, containing 35% iron and 12% manganese, 9s. 10d. per ton.

SLATE TRADE REVIEW.

New York. June 16.

Quarrymen are rapidly filling back orders, and dealers in quoting on new business are pretty firm, though we hear of occasional favors to some consumers. On the whole the market is in a better condition than for some time past. Last year around this time exporters were quite active, and this year the home demand is attracting increased attention.

May was a good month, and June promises as well, though some apprehension is felt in export circles.

The exports of various kinds of slate from the port of New York in May amounted to \$106,260 and were the largest so far this year, but as compared with May, 1898, there is a falling off of \$6,019. The exports in May, 1899, were distributed as follows: United Kingdom, \$74,354; Australasia, \$12,369; Denmark, \$7,829; Belgium, \$3,700; Germany, \$1,912; Holland, \$1,875; Sweden, \$567; Norway, \$564; Africa, \$277; Central and South America, Mexico and the West Indies, \$2,819. We estimate the exports of roofing slate from this port in May at 19,666 squares, which compares with 12,700 squares in April, and 22,457 squares in May, 1898. The exports of roofing slate from this port for the five months ending May 31st, 1899, were approximately 74,871 squares, of which the United Kingdom received 61,000 squares, or nearly 82%. In the corresponding period last year the exports from New York to all quarters amounted approximately to 82,967 squares, principally to Great Britain and Australasia. Among the other exports in May, 1899, there was a large quantity of school slates to the East, besides a small lot of mantles to London, some blackboards to Rotterdam, and 343 slabs, valued at \$3,700, to Antwerp, Belgium.

Freight rates from New York are as follows: To London, 12s. 6d. (\$3), or about 86c. per square roofing slate; Liverpool, 12s. 6d.; Manchester, Bristol, Leith and Glasgow, 15s. (\$3.60), or \$1 per square; Hamburg, 12s. 6d. prompt, and 15s. near future; Copenhagen, 16s. 3d. (\$3.90), or \$1.11 per square; Newcastle and Hull, 17s. 6d. (\$4.08), or \$1.17 per square; Denmark, Stettin, 17s. 6d., all with a 5% primage per ton weight. To Bremen the rate is 15s. net (\$3.60), or \$1 per square. To Sydney, New South Wales, 15s. net is asked for roofing slate in cases or in bulk.

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

Prices of Roofing Slate.

Table with columns: Size, inches; Monson or Br'n ville; Bangor; Bangor Ribbon; Alb'n. or Jackson Bangor; Lehigh; Peach Bottoms; Sea Gr'n; Unfed's Green. Rows list various slate sizes and their prices.

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. thick, and Peach Bottom 25c. extra per square. Purple sizes run 24x12 and 14x7, and vary from \$3.75 to \$4 per square. Variegated purple, \$2.25@2.90 per square, according to size. Intermediate red, 14x7 and larger, \$6; 12x7 and 12x8 in., \$5 per square, net. Intermediate sea green, \$2.15@2.35 per square according to size.

CHEMICALS AND MINERALS

(For further prices of chemicals, minerals and rare elements, see page 722.)

New York, June 16.

Heavy Chemicals.—The market is bare of domestic goods, while for foreign alkali the demand is slow, owing to the high price. Jobbers have made sales of domestic alkali around 85c. per 100 lbs., and caustic soda at \$1.65. Bleaching powder and chlorate of potash are easier in price. Imports this week included 340 bbls. and 340 casks bleaching powder, and the receipts of domestic goods were 1,013 sacks, 150 boxes, 90 bbls. and 97 drums soda ash, and 42 casks potash. We understand the exports in May from this port included several hundred bags of soda ash to Yokohama, Japan.

Quotations are as below, per 100 lbs.

Table with columns: Articles, Domestic (F.o.b. Works, In New York), Foreign (In New York). Lists prices for Alkali, Caustic Soda, Sal Soda, Bicarb. Soda, Bleach, Eng. prime, other br'nds, and Chl. Pot. cryst. powd.

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

Acids.—Sulphuric acid in better request, owing to the warm weather, but blue vitriol is quiet. The other acids are featureless.

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

Table listing prices for Acetic, Blue Vitriol, Chamber, Muriatic, Muriatic, Muriatic, Nitric, and Sulphuric acids.

Brimstone.—Quiet. No arrivals. Spot, best unmix'd seconds, \$21.75@22 per ton; shipment, \$20.50@20.75. Best thirds are about \$2 less per ton.

Pyrites.—Imports were 4,691,086 kilos from Huelva, Spain, for the Pennsylvania Salt Manufacturing Company. Importers of Spanish pyrites are asking about 50c. more per ton for 50% ore, though we understand purchases can be made in a large way at less. Domestic producers are also stronger in their views, and report small stocks of fines, which are in most demand. We quote American pyrites as follows: Mineral City, Va., lump ores, \$3.25 per long ton (basis 42%), and fines, \$3; Charlemont, Mass., lump, \$5.50, and fines, \$4.75; Pilley's Island, lump, \$6.50, and fine, \$4.50 per long ton, delivered in New York. Spanish pyrites, 12@14c. per unit, according to percentage, delivered ex-ship, New York or other Atlantic ports. Spanish pyrites contain from 46% to 51%, the American from 42% to 44% and Pilley's Island, N. F., 50%.

Fertilizing Chemicals.—Demand is small. Prices for the leading Western animal ammoniates are firm, owing to limited stocks. Sulphate of ammonia, gas liquor, is stronger, in consequence of foreign manipulation, it is said. For spot gas sulphate of ammonia holders ask \$3.45 per 100 lbs., near-by and July shipment \$3.37½ and futures \$3.12½ per 100 lbs. Bone sulphate of ammonia is unchanged.

We quote as below:

Table with columns: Articles, F. o. b. Wks., In N. Y. Lists prices for Potash, Sulph. Am. gas, Bone, Blood, Azotine, Bone black, Fish scrap, Tankage, and Bone, ground.

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

Nitrate of Soda.—Spot is firmer at \$1.62½@1.65 per 10 lbs., and futures \$1.60. Consumers, however, anticipate a lower market, as the quiet season is at hand. But importers are of a different opinion, and do not seem anxious to sell futures at present prices. The "Ansonia" is due here with 18,000 bags.

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

Table with columns: 1899, 1908, 1897. Rows include Imp. into Atlantic ports, Stock in store and afloat, To arrive, Vis. supply, Stock on hand, Deliveries past month, Deliveries from Jan. 1, Total yearly deliveries, and Prices current.

Phosphates.—Producers are firm in quoting for either home or export consumption, and the high-grade Florida rock people report that stocks are very small. The shipments of rock from Fernandina in May are reported at 24,860 tons, all foreign, and the June shipments are estimated at 25,000 tons. Hence the total shipments from this port from January 1st to June 30th would aggregate 138,621 long tons, as against 92,194 tons in the corresponding period last year. There have been a number of charters taken recently, some at private terms. We note a British steamer of 1,851 tons from Port Royal to the United Kingdom at 14s., July sailing, and another of 1,222 tons from Tampa to a French port at 20s., same sailing. We also note an importation of 3,000 bags of phosphates from Antwerp, Belgium.

We quote: Florida high grade, 75@80% rock, \$10 per long ton f. o. b. Fernandina. The freight rate to New York is about \$2 per ton. Florida land pebble, 68@73%, quoted at \$7@7.50 per ton

delivered in New York; South Carolina ground rock, \$6 per short ton, delivered in New York; sun dried, \$3 per 2,240 lbs. f. o. b. Ashley River; hot-air dried, \$3.25 f. o. b. same place, and \$3.45 f. o. b. Charleston, S. C. Tennessee phosphate rock, \$4@4.50 f. o. b. mines for export, guaranteed 78% bone phosphate of lime and 3@4% iron and alumina, and \$3@3.50 for domestic brown, and \$1.90@2 f. o. b. for blue or Hickman County rock; ex-vessel, New York, \$9@10 for high grade rock.

Liverpool, June 6.

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

While there is no special activity as regards new business in heavy chemicals, makers are kept fairly busy on contract deliveries and stocks are in moderate compass all around, with consequent firmness in quotations.

Soda ash is selling at varying prices, according to destination, and maximum range for tierces may be called about as follows: Leblanc ash, 48%, £4 5s.@£4 10s.; 58%, £4 10s.@£4 15s.; per ton net cash. Ammonia ash, 48%, £4@£4 5s.; 58%, £4 5s.@£4 10s. per ton net cash. Bags are 6s. per ton under price for tierces. Soda crystals are in steady request, and for barrels £2 17s. 6d., less 5%, is generally quoted, with special quotations for certain favored markets. Bags are 7s. per ton under price for barrels. Caustic soda is in moderate supply, especially for unbarred makes, and prices are firm, as follows: 60%, £6; 70%, £7; 74%, £7 10s.; 76%, £7 15s. per ton net cash.

Bleaching powder is quiet at £4 15s.@£5 per ton, net cash, for hardwood packages.

Chlorate of potash is in fair demand at 3½@3¾d. per lb. for crystals and 3@3¼d. per lb. for powdered, as to quantity.

Bicarb. soda is moving off fairly at varying prices, according to destination, 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, although still scarce, has weakened a little, and nearest spot values are now about £12 15s.@£12 17s. 6d. per ton, less 2½% for good gray 24@25% in double bags f. o. b. here.

Nitrate of soda is selling in a quiet way at from £8 5s.@£8 10s. per ton, less 2½% for double bags f. o. b. here, as to quality and quantity.

Valparaiso, Chile, May 6.

(Special Report of Jackson Bros.)

Nitrate of Soda.—A large quantity of the refined quality has been placed at 4s. 11d.@5s., steamer terms, according to date of delivery. In 95% a brisk business has also been done for August-December shipments at prices varying between 4s. 9½d.@4s. 10½d., steamer terms, according to delivery; some of these transactions are kept private for the present. There have also been further sales of this quality for May-June shipment at 4s. 8d. alongside, some transactions taking place for July at 4s. 8½d., and August at 4s. 9d. alongside. The market closes with buyers at the quotations given, sellers asking ½d. more. Producers in general are holding back in expectation of an advance, as it is probable that the production of this year will fall off owing to the scarcity of laborers in the nitrate districts; at the same time the deliveries in Europe from January to April have been somewhat larger than last year. The exports from this coast up to April 30th are advised as 8,900,000 qtls.

Sales reported during the fortnight were 1,082,000 qtls., of which 232,000 qtls. were of 96%, and the remainder 95%. We quote: 95%, May-June, 4s. 7½d.; July-August, 4s. 8½d.; August-September, 4s. 9½d.; September-December, 4s. 10d., and for 96%, 5s., all ordinary terms. The price of 4s. 7½d., with 27s. 6d. all round freight, stands in 6s. 6¼d. per cwt. net cost and freight, without purchasing commissions.

IRON MARKET REVIEW.

NEW YORK, June 16, 1899

Pig Iron Production and Furnaces in Blast

Table with columns: Fuel used, Week ending, From Jan., '98, From Jan., '99. Rows include An'racite, Coke, and Charcoal.

The iron market continues in an excited condition, and a large amount of business has been closed for the second half of the year. Most of these contracts have been made at about current prices, and there is now no doubt that quotations will remain at a high level for some time to come. Some contracts running into the first half of 1900 are reported, but most people hesitate over these.

The demand for foundry iron continues unexpectedly large and heavy sales are reported. Some large blocks of Bessemer pig have also been placed for deliveries extending over to the end of the year. Alabama basic iron is also in demand.

The July reports of the furnaces show a small increase in weekly production—6,175 tons—but less than had been hoped for. The unsold stocks reported are lower than ever before, amounting to only about 240,000 tons, or less than one week's production.

There is a general advance in finished materials, and the mills are now covering themselves on the increase in prices of raw material. Contracts continue to be placed, but early deliveries are out of the question. The demand for plates especially is very large, and most of the mills are far behind their orders.

Export business is at a stand, so far as new orders are concerned. This is not for lack of inquiries, but because makers hesitate to take foreign orders when the pressure for home deliveries is so great. The high prices do not seem to deter buyers, whose only thought is to get the material they need.

The railroads are looking for their share in the advance in prices. The Southern lines have decided to advance rates from furnaces, and the same plan will be followed elsewhere. It is a good time for such changes in rates, and the action will find but little opposition.

Birmingham, Ala. June 12.

(From Our Special Correspondent.)

The Birmingham pig iron market continues in a most satisfactory condition and there is much iron being manufactured and shipped out. There has been no change in quotations since last week, No. 1 foundry being given at \$13.25. There is talk of no less than four furnaces being put in blast in Alabama within the next 90 days. The Talladega Furnace is now being overhauled, contracts having been let for the repairing. This furnace will be sold June 25th. Men are at work on the second Oxmoor Furnace, belonging to the Tennessee Coal, Iron and Railroad Company, and it will be ready for the torch about the last of August. More blowing machinery will be put in at Ensley, so that all four of the furnaces there can be kept in blast at one time. At present only three furnaces are in blast. The repairing of the Vanderbilt Furnace is nearing completion. An estimate is being made for a new furnace at Ensley by the Tennessee Coal, Iron and Railroad Company.

The quotations given are as follows: No. 1 fou. dry, \$13.25; No. 2 foundry, \$12.75@13; No. 3 foundry, \$12.50; No. 4 foundry, \$11.75@12; gray forge, \$10.75@11.25; No. 1 soft, \$13.25; No. 2 soft, \$13.

There is a good demand for finished iron, and the rolling mills can hardly supply it quick enough. The rolling mills here are short of hands in the puddling department. Until the formal transfer of the property to the Republic Iron and Steel Company, the Birmingham rolling mills are not taking in many orders ahead.

Another advance in pig iron quotations is looked for within another fortnight. It is confidently expected that there will be an advance of something like 50c. on the ton and No. 1 foundry will go up to near \$14. On June 21st the freight rates on all Southern iron will be advanced 50c. on the ton. This will make the rates from here to Cincinnati \$3.25, as against \$2.75. This action was taken at a meeting of the Southern Iron Committee on Saturday last and notice of this intention is now being given the furnaces.

The intentions now are to put part of the Ensley steel plant in operation by the middle of August. The firms with contracts on the work are being urged to complete their portion of the plant just as quickly as possible and it is believed that four or five of the 10 furnaces at the place can be put in operation at the time mentioned. The steel wire and rod mill will be ready just as soon as the steel plant can furnish them with material.

Buffalo. June 13.

(Special Report of Rogers, Brown & Co.)

The principal features of the week in the foundry iron market in this district are the rather heavy sales and the still further advance in prices. Most foundries have now covered for their requirements for the balance of the year, and those who are not covered are picking up about everything offering. At present prices there is not much evident inclination on the part of large consumers to take hold for next year. Many feel these prices cannot last and cannot see the wisdom for buying so far ahead. We quote for cash f. o. b. cars Buffalo: No. 1 strong foundry coke iron, Lake Superior ore, \$18.50@19; No. 2 strong foundry coke iron, Lake Superior ore, \$18.25@18.75; Ohio strong softener No. 1, \$19.50; Ohio strong softener No. 2, \$19; Jackson County silvery No. 1, \$22; Southern soft No. 1, \$20; Southern soft No. 2, \$19.50; Lake Superior charcoal, \$19@20; coke malleable, \$18.50@19.

Chicago. June 14.

(From Our Special Correspondent.)

Pig Iron.—The demand for pig iron continues large and prices are stiffening. It is almost an impossibility to place an order now for immediate delivery. Many contracts are being closed for iron as much as a year ahead, most of the contracts so placed being at prevailing prices,

and, in some instances, a little advance. The market for the next six months has every appearance of strength. Sales of the week have been numerous in large and small quantities, the Northern and Southern furnaces figuring about even. Following are quotations for cash: Lake Superior charcoal, \$18@20; local coke foundry No. 1, \$16.50@17; No. 2, \$16@16.50; No. 3, \$15.50@16; local Scotch foundry No. 1, \$17@17.50; No. 2, \$15.50@16; No. 3, \$15@15.50; Southern coke No. 1, \$16.50@16.75; No. 2, \$16@16.25; No. 3, \$15.50@15.75; Southern No. 1 soft, \$16.50@16.75; No. 2 soft, \$16@16.25; Southern silveries, \$16.50@16.75; Jackson County silveries, \$19@20; Alabama car wheel, \$18.50@19; coke Bessemer, \$18@18.50.

Bar Iron.—Buying in bar iron continues good, a number of large contracts having been closed during the past week, agricultural and car interests doing most of the buying. Prices on iron and soft steel bars have improved, common iron now being quoted 1.80@1.95c. on mill shipments.

Structural Material.—Small lots have made a good aggregate tonnage for the week, the buying of bridge material being heaviest, mostly for small bridges over railroads. An advance of about \$5 per ton has been made on all material, and prices are now: Beams, 15 in. and under 1.90@2c.; 18 in. and above, 2@2.10c.; angles, 1.90@2.10c.; universal plates, 2.65c.; tees, 1.95@2c.

Steel Rails.—Buying is in small lots, not many orders being booked, on account of uncertain delivery. The mills continue very busy on past contracts, and orders booked now cannot be filled for months ahead. Prices on steel rails are \$26@28 for standard sections, and \$30@36 for light sections.

Cleveland, O. June 14.

(From Our Special Correspondent.)

Iron Ore.—Sales of ore during the past week consisted entirely of odd lots such as buyers might happen to be in need of, and sellers considered themselves lucky when they had it for sale. The transactions were in such lots as have characterized the business in this line for several weeks. The market is very firm and no sales are at as quite low figures as those which were agreed to early in the season. Buyers do not hesitate to pay advanced prices if they can secure certain ores wanted in the present sold-up condition of the market. Good progress is being made in shipping ores from upper to lower Lake ports. The rates paid are 65c. per ton from Escanaba, 70c. from Marquette, and 75c. from the head of Lake Superior.

The quotations are as follows: Specular and magnetic ores, Bessemer quality, \$4@4.25; specular and magnetic ores, non-Bessemer, \$3.25@3.75; red hematite ores, Bessemer quality, \$3.75@4.25; red hematite ores, non-Bessemer quality, \$2.75@3.25.

Pig Iron.—The prices offered for pig iron continue to increase and the general impression among dealers is that an iron famine is not far distant. It is well known that speculators are attempting to get control of what little iron there is on the market. All iron in the warrant yards is gone and all transactions are now directly from the furnaces to the manufacturers. As high as \$18@18.50 was offered for No. 1, and \$18 for No. 2 foundry irons, a few sales consisting of small lots having actually been made at those figures. The following are the quotations for iron f. o. b. Cleveland: Lake Superior charcoal, \$20; Bessemer, \$18.25; No. 1 foundry, \$18.50, No. 2, \$18; No. 1 Ohio Scotch, \$17.65; No. 2, \$17.15; gray forge, \$16.15.

Pittsburg. June 14.

(From Our Special Correspondent.)

Transactions in iron and steel continue to show up exceedingly well; the same can be said of manufactured products, prices being well maintained and in many cases a further advance being demanded. Pig iron and billets have reached the highest point for many years. Production continues to increase. The Douglas Furnace at Sharpville, purchased by W. P. Snyder, has been put in complete order and commenced to make Bessemer iron on June 11th. Many other plants will resume as soon as they can be made ready. Many contracts have been made for iron and steel extending into 1900, certain consumers having supplied themselves for from three to six months of next year.

Stocks in the American Pig Iron Storage Warrant Company's yards May 31st were 67,300 tons, the withdrawals in the preceding 11 days being 7,000 tons and the amount placed in yard 900 tons.

A syndicate of Pittsburg and Philadelphia capitalists have closed the deal for the Greensburg Steel Company's plant at this place. They expect to have the plant running in 10 or 15 days. A charter was issued at Harrisburg to the Warwick Iron and Steel Company of Philadelphia, with a capital of \$1,000,000.

Pig iron prices are difficult to quote with anything like exactness. The problem is to catch a man with iron to sell; then you can talk to him. Pig iron men have had grievances for many years past, but they are on top now, and they enjoy it amazingly; our sales show the range of prices.

Finished Material.—There is no change from the bullish conditions recently noted. In all departments mills are pushed to the utmost to keep up with their orders, but in some cases they are getting further behind than ever and others would if they accepted all the business that is put before them. It is hardly necessary to say that prices are strong, because, as a matter of fact, they are hardly quotable.

Muck bars are very firm; prices have further advanced and sales are large.

Sheet Bars.—Market steady, with a good demand at \$30.75.

Skelp Iron.—Demand active; prices irregular. Sales ground \$2.25, 20 days.

Wire Nails.—Demand active; prices further advanced 25c. a keg, with sales at \$2.85.

Bar Iron.—Prices advanced and are uncertain. Wrought Iron and Steel Pipe.—Market very active, with all the plants sold several months ahead; prices firm and well maintained.

Latest.—Business continues to move along steadily. Notwithstanding the scarcity of metal there is a good deal changing hands, with prices still on the up grade. The present figures are the highest for many years. There is no abatement in the demand for iron and steel of all kinds. In wire nails the advance since January 1st is \$1.80; the advance in wire being in the same proportion. Scrap material and old rails are firm and selling at big prices. The plants here outside the Trust are making extensive improvements. Park Brothers, of the Black Diamond Steel Works, have purchased an interest in the Isabella plant, which will undergo great improvements and enlargement of capacity.

COKE SMELTED LAKE AND NATIVE ORE.		SHEET BARS.	
Tons.	Cash.	Tons	Cash.
20,000 B. J. to Jan. V.	\$17.25	2,000 At mill, P.	\$30.60
10,000 B. J. to O. P.	18.25	1,500 At mill, P.	30.75
5,000 B. J. to J. P.	18.50	WIRE RODS.	
4,000 M. L. J. to J. V.	18.10	500 At mill, P.	40.00
3,000 B. J. A. V.	17.50	BASIC IRON.	
3,000 B. next 6 mos. V.	18.10	1,000 Delivered, P.	17.00
2,000 M. L. J. to J. P.	16.25	SKELP IRON.	
2,000 M. L. J. to O. P.	16.25	2,500 Gr'ved, P. 2.20	20 days
1,500 B. J. to J. V.	18.00	CHARCOAL.	
1,000 M. L. J. A. P.	16.30	4'0 Cold Blast, P.	20.25
1,000 B. J. A. P.	18.25	150 No. 2, W. B. P.	19.00
1,000 M. L. J. to S. V.	15.50	100 No. 2, W. B. P.	19.50
800 White Iron, J. P.	14.75	100 Cold Blast, P.	22.50
600 No. 2 F'dry, P.	16.75	50 Cold Blast, P.	21.00
500 Mill, P.	16.25	OLD IRON AND STEEL RAILS.	
500 Mill, P.	16.00	2,000 Iron Rails, gr. V.	21.00
300 No. 2 F'dry, P.	17.25	1,000 Iron Rails, gr. P.	21.50
200 No. 3 F'dry, P.	16.25	1,000 Steel Rails, gr. P.	14.50
200 No. 2 F'dry, P.	17.30	500 Steel Rails, gr. P.	16.00
200 No. 2 F'dry, P.	17.40	200 Steel Rails, gr. P.	15.50
100 No. 1 F'dry, P.	18.25	SCRAP MATERIAL.	
100 No. 1 F'dry, P.	18.50	800 H. S., net, P.	14.00
75 No. 3 F'dry, P.	16.10	500 Cast Scrap, gr. P.	14.00
50 No. 2 F'dry, P.	17.50	500 Coil Steel, gr. P.	15.50
50 No. 2 F'dry, P.	17.30	400 No. 1 W. S., n. P.	16.50
		350 W't T's, net, P.	10.00
BLOOMS, BILLETS, SLABS.		200 W't Scrap, net, P.	17.00
5,000 Billets, J. A. P.	31.50	200 Old Tires, net, P.	17.00
3,000 Billets, J. J. P.	31.20	200 O. C. W., gr. P.	16.50
3,000 Billets, J. J. P.	30.75	200 C. B'gs, net, V.	9.00
3,000 O. H. B. B., P.	39.50	150 Iron Axles, net, P.	25.00
2,500 B., last 6 mos., P.	31.75	150 Old Pipes, net, P.	12.00
1,500 Billets, P.	30.70		
MUCK BARS.			
5,000 Neutral, del. P.	33.00		
4,000 Neutral, del. P.	33.50		
1,500 Neutral, del. P.	33.75		
1,500 Neutral, del. P.	33.80		

Philadelphia. June 15.

(From Our Special Correspondent.)

Pig Iron.—This week is in most respects a repetition of last week. The same conditions prevail, and the same opinions and forecasts are made. Our people are watching movements in outside markets very closely, and if they are rightly informed, there are negotiations pending for the getting of a good deal of Virginia and Alabama irons this fall. Freights are advancing, however, and Southern agents are showing aversion to doing business at present for fall delivery. Prices have advanced, and quotations for No. 1 X foundry are quoted \$18@18.50, with one or two notched up to \$19; No. 2 X foundry is \$17@17.50 or \$18; forge, \$16.50. There have been some sales of basic and low phosphorus.

Billets.—Considerable wiring has been done to-day and yesterday, with a view of bringing negotiations to a close on large lots of billets, but matters are so much unsettled at mills that nothing definite has been done besides selling a few lots at private terms, though quotations are \$33.

Bars.—The past six days have been busy ones, and it looks as if a large amount of business would be done in bars at present high prices, which are 1.65c. for refined, 1.75c. for tested and 1.85c. to 2c. for special steel bars. Buyers are trying to-day to close for large lots, and probably will.

Skelp.—Some Western skelp business was crowded into our Eastern mills this week at prices close to 2c.

Sheet.—The demand for heavy sheets and galvanized is crowding hard on mill capacity for the fall, but there is no escape from accepting orders.

Merchant Steel.—Buyers all over the East are making such provision as they can for the future, and are not objecting to the strong quotations given them on each succeeding order.

Plates.—It is impossible to add a line or a thought that has not been expressed in substance before. It is interesting to hear the statements of mill representatives concerning the rush of work and how difficulties in making accommodations are surmounted. Quotations mean less than ever, and may be safely omitted this week, as each sale is the subject of special argument.

Structural Material.—The mills are all booking business rapidly, and they will ere long be in the same condition as the plate mills. There is nothing to arrest the upward movement now in sight. Quotations are in and around 1.95@2c.

Steel Rails.—There are fresh inquiries and negotiations which point to a readjustment of prices.

Old Rails.—No large sales are reported.

Scrap.—There is very little scrap to be had. Such as can be picked up is going at top prices.

New York. June 16.

The market continues generally active in spite of higher prices all round. In foreign business we note recent purchases of \$40,000 worth of machinery and tools for Japan, a shipment of \$11,000 worth of railroad iron and \$32,800 worth of locomotives to Brazil; shipments to South Africa of \$62,000 worth of iron pipe, \$50,000 worth of agricultural implements and \$11,000 worth of manufactured iron, besides an order for \$32,000 worth of mining machinery; and continued shipments of agricultural implements and machine tools to Europe.

Pig Iron.—Spite of all talk about increased production and decreased demand on account of high prices, the market is stronger and quotations have been forced up. Buying seems to be of the hand to mouth order. We quote: Northern brands, tide-water delivery: No. 1 X foundry, \$17.75; No. 2 X foundry, \$17; No. 2 plain, \$16.75; gray forge, \$16.25; Southern brands, New York delivery: No. 1 foundry, \$17.50; No. 2 foundry, \$17; No. 1 soft, \$16.25; No. 2 soft, \$16; No. 3, \$15.25; basic, \$15.25. Prices are purely nominal.

Warrant irons continue to rise. No. 2 Alabama has gone from \$13 1/2 to \$13 3/4; No. 3 from \$12 to \$12 1/4; No. 4 from \$11 1/2 to \$11 3/4; gray forge, \$11 1/2 to \$11 1/4.

Spiegeleisen and Ferro Manganese.—The market for ferro is very firm, with quotations of \$85 for 80%. Spiegeleisen is not quite as firm as ferro, but is quoted at \$35 for 18%.

Bar Iron.—The demand continues strong, with a decided advance in quotations. We quote refined iron 1.87c. in large lots on dock, and common 1.75c.

Plate.—The local demand remains only fair, but the demand at other points keeps mills filled with orders for months ahead. Large lots at tide-water are quoted: Tank, 3/16-in. and heavier, 2.50c.; tank, 3/16-in., 2.60c.; shell, 2.60c.; flange, 2.70c.; marine, 2.85c.; fire box, 2.95c.

Steel Rails and Rail Fastenings.—Prices are nominally about \$28 for standard sections f. o. b. mills, with a light demand and a very firm market. Small rails are nominally quoted: 12-lb. \$34; 16-lb., \$34; 20-lb., \$34; 30-lb., \$32; 40-lb. to standard, \$30, with the usual advance for small orders. Angle bars are 1.80c.; spikes, 1.95c., and bolts, 2.20c. Actual prices for rails depend on size of order and how soon rails are wanted.

Structural Material.—Business, considering the high range of prices, is very fair and the number of orders placed rather surprising. The market is very firm, and we quote for large lots at tide-water: Beams, 15-in., 1.95c.; tees, 1.95c.; channels, 1.90c.; angles, 1.95c.

Nails.—The market is firm on the advanced prices. Cut nails are \$2.30@2.35 for large lots on dock, and wire nails are \$2.60@2.65.

METAL MARKET.

New York. June 9, 1899.
Gold and Silver.

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

	May.		Year.	
	1898.	1899.	1898.	1899.
GOLD Exports	\$109,157	\$2,049,255	\$5,850,663	\$6,976,927
Imports	13,322,111	3,070,265	89,266,384	19,944,949
Excess I.	\$13,212,954	\$1,021,010	\$83,315,721	\$12,968,022
SILVER Exports	4,184,432	4,436,549	20,441,347	23,726,819
Imports	1,574,479	3,013,353	16,864,256	12,001,188
Excess E.	\$2,609,953	\$1,423,196	\$13,577,111	\$11,725,631

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 June 15th, 1899, and for years from January 1st, 1899, 1898, 1897, 1896.

Period	Gold.		Silver.		Total Excess, Exp. or Imp.
	Exports.	Imports.	Exports.	Imports.	
Week	\$2,546,300	\$190,366	\$610,914	\$72,313	E. \$2,864,535
1899.	7,004,528	7,074,216	12,713,932	1,478,483	E. 11,165,761
1898.	4,453,639	68,952,764	15,525,127	1,755,914	E. 50,729,942
1897.	11,646,491	1,723,844	18,095,462	1,304,938	E. 27,713,171
1896.	20,649,427	17,107,090	17,672,596	1,071,901	E. 29,143,132

Exports of gold were chiefly to England and Germany; imports were from France and the West Indies. Exports of silver went chiefly to London; imports were from Mexico and Central America.

The United States Assay Office in New York reports the total receipts of silver at 117,000 oz. for the week.

Prices of Foreign Coins.

	Bid.	Asked
Mexican dollars	\$.48 1/2	\$.50
Peruvian soles and Chilean pesos	.43 1/2	.46
Victoria sovereigns	4.86	4.89
Twenty francs	3.86	3.90
Twenty marks	4.76	4.80
Spanish 25 pesetas	4.78	4.84

Average Prices of Silver per oz. Troy.

Month.	1899.		1898.		1897.	
	London Pence.	N. Y. Cents.	London Pence.	N. Y. Cents.	London Pence.	N. Y. Cents.
January	27.42	59.36	26.29	56.7	29.74	64.79
February	27.44	59.42	25.89	56.0	29.68	64.67
March	27.48	59.64	25.47	54.90	28.96	63.06
April	27.65	60.14	25.95	55.02	28.36	61.85
May	28.15	61.23	26.31	56.08	27.86	60.42
June	27.06	58.61	27.32	59.06	27.38	59.61
July	27.48	59.54	24.33	54.19	28.05	60.68
August	27.96	60.42	26.77	57.57	27.93	60.60
September	27.93	60.60	26.87	57.93	27.45	59.42
October	27.45	59.42	26.83	58.01	26.76	58.26
November	26.76	58.26	27.55	59.79		
December						

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

Average Prices of Metals per lb., New York.

Month.	COPPER.		TIN.		LEAD.		SPELTER.	
	1899.	1898.	1899.	1898.	1899.	1898.	1899.	1898.
Jan	14.75	10.99	22.48	13.87	4.18	3.65	5.34	3.96
Feb.	18.00	11.28	24.20	14.08	4.49	3.71	6.28	4.04
March	17.54	11.98	23.82	14.38	4.37	3.72	6.31	4.25
April	18.43	12.14	24.98	14.60	4.31	3.63	6.67	4.26
May	18.25	12.00	25.76	14.52	4.44	3.64	6.88	4.27
June	11.89	11.89	15.22	3.82	3.62	4.00	4.58	4.77
July	11.63	11.63	15.60	3.95	3.99	4.67	4.98	4.66
August	11.89	11.89	16.23	4.00	3.78	4.98	5.29	4.67
Sept.	12.31	12.31	16.03	3.70	3.70	5.29	5.10	4.67
October	12.41	12.41	17.42	3.78	3.78	5.29	5.10	4.67
November	12.86	12.86	18.20	3.70	3.70	5.29	5.10	4.67
December	12.93	12.93	18.30	3.78	3.78	5.29	5.10	4.67
Year	12.03	12.03	15.70	3.78	3.78	4.57		

The price given in the table is for Lake Copper. The average price of electrolytic copper in January was 14.26c.; in February it was 17.02c.; in March, 16.35c.; in April, 17.32c.; in May, 17.20c.

Financial Notes of the Week.

The silver market has ruled very dull and quiet, with a drooping tendency in London. On the reports of the shutting down of the Colorado smelters on account of the labor strikes silver closes higher and stronger. The possibility is of lessened supplies, which may affect the London market.

General business continues to show well, though the hot season has set in earlier than usual over a great part of the country. The speculative markets have recovered a little, but are still unsteady.

The total gold exported last week reached \$7,500,000, but no gold has gone out this week. There is a strong demand in London and Berlin, and the banks have been offering inducements in the way of interest, commissions, etc., which are quite sufficient to account for the present movement. It is really of very slight importance.

The statement of the United States Treasury on Thursday, June 15th, shows balances in excess of outstanding certificates as below, comparison being made with the statement for the corresponding date of last week:

	June 8.	June 15.	Changes.
Gold	\$231,359,526	\$235,128,494	I. \$3,768,968
Silver	5,531,157	5,237,579	D. 293,578
Legal tenders	14,383,628	14,347,939	I. 551,311
Treas. notes, etc.	1,048,984	927,432	D. 121,552
Totals	\$252,323,295	\$256,228,444	I. \$3,905,149

Treasury deposits with national banks amounted to \$80,346,958, a decrease of \$1,033,264 during the week.

Imports and Exports of Metals

Port.	Week, June 14.		Year, 1899.	
	Expts.	Impts.	Expts.	Impts.
*New York.				
Aluminum, long tons			257	10
Antimony ore		140		773
regulus				459
oxide				11
Brass	11	1500	55	1,368
Chrome ore		394	22,648	7,932
Copper, fine	779		550	465
matte, ore		15	20	119
ash				
sulphate	257		11,142	
other				30
Cop-nickel matte				53
Ferro-manganese				51
Iron ore			5	50
pig, bar, rod	57	1169	3,073	754
pipe	808		15,775	
plates, sheets	118		589	
other	77		1,015	
Lead	885		23,334	23,467
Manganese ore				3,286
Metals, old scrap	108	128	2,502	1,285
Composition	290		4,298	
Nails			9,115	
Nickel	40		892	40
Ore				4,001
Rail'd material	20	1115	5,439	1,778
Rails, old	725		10,822	
Spiegeleisen		120		292
Steel bars, plates	1,504	1339	28,464	8,088
rails	50		28,697	155
hoops	18		486	
wire	526	120	18,379	54
not spec'd.	60	125	5,541	1,235
Tin		93		12,808
dross or ashes			60	
and black plates		1509		16,092
Zinc		25	272	223
dross	45		562	
ashes, skim	170		1,350	75
ore				
oxide	46		1,969	244
*Baltimore.				
Alumina, bags				3,479
Antimony regulus, casks		99		175
Copper, fine, long tons	621		17,689	
matte				1,266
sulphate				100
pipe				1,737
Ferro-manganese		102		184
Ferro-silicon				808
Iron pig, bar, etc.			6,594	3,258
ore				59,567
pipe	195		2,063	
pyrites				21,316
other				15
Lead				18,790
Manganese ore				4,167
Metals, scrap				39
Nails				843
Spiegeleisen				55
Steel, bars, plates	440		21,993	217
wire		7	448	
rails	2,109		28,608	573
pipe				1,721
not specified	3			4
Tin				512
dross				874
and black plates		8		25
Zinc	7	5	152	5
dross				131
skimmings				1
oxide				
*Philadelphia.				
Antimony, long tons		5		10
Chrome ore		150		1,320
Copper ore				21,184
old				11
Ferro-manganese		109		717
Iron, pig				250
ore		3,650		57,187
old				732
Manganese ore		850		31,153
Spiegeleisen				1,075
Tin		25		595
and black plates		24		762
Zinc dust				15
ore				3,093
*Galveston, Tex.				
Lead, long tons			725	
Zinc			1,900	
ore			118	
*Boston.				
Tin, long tons		125		590
*Newport News, Va.				
Copper, long tons			3,124	
*Norfolk Va.				
Copper, fine, long tons			1,182	
Iron, pig			18,094	
pipe			410	
Spelter			20	
Steel, bars, billets			3,886	
not specified			477	
*New Orleans, La.				
Copper, fine, long tons			1,370	
matte			1,371	
Zinc			2,057	
ore			345	
*San Francisco, Cal.				
Tin, long tons				129

The statement of the New York banks—including the 66 banks represented in the Clearing House—for the week ending June 10th, gives the following totals, comparison being made with the corresponding weeks in 1898 and 1897:

	1897.	1898.	1899.
Loans and discounts.....	\$513,728,700	\$610,762,500	\$757,407,600
Deposits	585,110,500	724,210,800	897,831,600
Circulation	14,251,500	14,719,300	13,609,800
Reserve:			
Specie	89,267,800	179,182,300	204,163,700
Legal tenders.....	194,611,300	55,711,500	59,617,300
Total reserve.....	\$193,879,100	\$234,893,800	\$263,781,000
Legal requirements....	146,277,625	181,052,700	224,457,900
Balance, surplus....	\$47,601,475	\$53,841,100	\$39,323,100

Changes for the week, this year, were increases of \$16,805,400 in loans and deposits, \$7,770,000 in deposits, and \$186,500 in legal tenders; decreases of \$30,100 in circulation, \$1,531,500 in specie, and \$3,387,500 in surplus reserve.

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

Banks.	1898.		1899.	
	Gold.	Silver.	Gold.	Silver.
N. Y. Ass'n.....	\$179,182,300	.....	\$201,163,700	.....
England	189,973,750	.....	151,749,210	.....
France	374,682,665	\$246,775,600	369,509,910	\$244,045,755
Germany	143,865,000	74,110,000	150,990,000	77,775,000
Aus-Hun.	174,190,000	62,845,000	180,875,000	63,440,000
Spain	49,170,000	21,945,000	59,285,000	65,565,000
Neth'Inds ..	14,295,000	34,775,000	19,170,000	34,010,000
Italy	76,280,000	9,655,000	76,630,000	12,300,000
Russia	556,460,000	22,295,000	482,745,000	26,170,000

The returns for the Associated Banks of New York are of date June 10th, and the others are of date June 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 coin only.

Shipments of silver from London to the East for the week ending June 1st, 1899, are reported by Messrs. Pixley & Abell's circular as follows:

India	1898.		1899.		Changes.
	£	1898.	£	1899.	
China	£2,742,140	£1,825,800	D.	£916,340	
The Straits.....	285,166	545,978	I.	260,812	
Totals	£3,027,306	£2,371,778	D.	£655,528	

Arrivals for the week, in specie are £201,000 in bar silver from New York, and £17,000 from Chile; total, £218,000. Shipments were £100,000 to Bombay.

Indian exchange is fairly steady, though the demand has been rather light. Only 30 lakhs of Council bills were offered in London, and they were taken at an average of 15.94d. per rupee.

Exports of merchandise in May were larger than in April, reaching a total of \$93,836,489; but they were less by \$17,446,946 than in May, 1898. The imports were larger than for many months—with the exception of March last—and amounted to \$70,131,628. For the eleven months of the fiscal year from July 1st to May 31st the statement of the Bureau of Statistics is as follows:

Exports	1898.		1899.	
	\$	1898.	\$	1899.
Imports	\$1,036,503,607	\$1,139,629,572		
Excess, exports.....	564,784,423	635,362,519		
Add excess of exports, silver.....	\$471,719,184	\$695,267,053		
Total	\$23,696,093			
Deduct excess of imports, gold.....	\$718,963,146	\$69,235,158		
Net apparent balance.....	\$649,727,988			

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

Specie shipments by water from San Francisco in May included \$385,154 in gold and \$250,625 in silver. For the five months ending May 31st the shipments were as follows:

	Gold.		Silver.		Totals.
	\$	1898.	\$	1899.	
Hong Kong.....	\$18,580	\$1,270,974	\$1,289,554		
Shanghai .....	.....	593,442	593,442	
Japan .....	.....	200	200	
South Sea Islands.....	3,937	1,000	4,937		
Central America.....	4,636	5,964	10,600		
Mexico	375	27,000	27,375		
Total foreign.....	\$27,528	\$1,898,580	\$1,926,108		
Honolulu	1,050,370	102,500	1,152,870		
New York	7,938,384	32,647	7,971,031		
Totals	\$9,016,282	\$2,033,727	\$11,050,009		

The silver shipments included only \$18,426 in Mexican dollars in May, and \$370,011 for the four months; against \$200,694 and \$845,446, respectively, last year. The shipments to New York were very light in May.

Other Metals.

Daily Prices of Metals in New York.

June	Sterling Exchange	Silver.			Copper.			Tin.	Lead.	Spelter.
		Fine oz. Cts.	Lon-don. Pnce	Lake. cts. # lb.	Electro-lytic. # lb.	Lon-d'n stand-ard # ton.	cts.			
10	1.87 3/4	60 1/2	27 1/2	18	16 1/2	76 15 0	25 3/4	4.42 1/2	6.25	
12	1.87 3/4	60 1/2	27 1/2	18	16 1/2	76 15 0	25 3/4	4.42 1/2	6.25	
13	1.87 3/4	60 1/2	27 1/2	18	16 1/2	76 15 0	25 3/4	4.42 1/2	6.25	
14	1.87 3/4	60 1/2	27 1/2	18	16 1/2	76 15 0	25 3/4	4.42 1/2	6.25	
15	1.87 3/4	60 1/2	27 1/2	18	16 1/2	76 15 0	25 3/4	4.42 1/2	6.25	
16	1.87 3/4	60 1/2	27 1/2	18	16 1/2	76 15 0	25 3/4	4.42 1/2	6.25	

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.

The copper market continues quiet. On the one hand, buyers are covered and not inclined to purchase ahead at the prices now ruling. On the other, no pressure to sell is observable and few transactions are reported. From Europe, we learn that consumers continue their hand-to-mouth policy and that supplies are very light. Lake copper is freely offered, practically by all producers at 18c., but at that price no business was possible and a few transactions are reported at 17 1/2c. Very little was doing in electrolytic copper, for which the quotation still stands at 16 1/2c. for cakes, wirebars or ingots and 16c. for cathodes, while casting copper is quite nominal at 16 1/2c. to 16c.

We hear to-day that some sales of Lake have been made at 17 1/2c.

The London market, which closed last week at £76 7s. 6d., opened on Monday 7s. 6d. higher, but soon lost this, and the middle of the week was cabled as £75 10s. It closes to-day firmer at £76 2s. 6d. @ £76 5s. for both spot and three months. Copper statistics for the first half of June have decreased 900 tons.

For refined and manufactured sorts, we quote: English tough, £78 @ £78 10s.; best selected, £80 @ £80 10s.; strong sheets, £87; India sheets, £84 10s.; yellow metal, 6 1/2 @ 6 3/4d.

Copper production, as reported by Mr. John Stanton, who acts as statistician for the producing companies, was as follows, for May, and the five months ending May 31st, stated in long tons (2,240 lbs.), of fine copper:

	May.		5 months.	
	1898.	1899.	1898.	1899.
U. S., Reporting mines ..	21,391	19,832	94,747	92,277
U. S., outside sources.....	1,350	2,250	6,350	10,260
Total, U. S.	22,741	22,082	101,097	102,537
Exports, U. S.	12,795	7,925	58,728	46,560

The cables from the foreign reporting mines have not yet been received. The increase in United States production for the five months was only 1,380 tons, or 1.4%; while there was a decrease of 12,168 tons, or 20.6% in exports.

Tin.—The market has moved but sluggishly and prices have changed little. The London market, which closed last week at £117 2s. 6d., opened on Monday 2s. 6d. higher, receded to £116 5s. and advanced again to £117, closing easier at £116 12s. 6d. @ £116 15s. for spot, and 17s. 6d. higher for three months. We quote the market here 25 3/4c.

Lead.—The labor troubles reported last week have now culminated in the closing down of all the Colorado smelters and a hard struggle is feared. Production will necessarily be interfered with, and should the strikes be of long duration, the market will probably stiffen considerably. Consumers are not well supplied and an active market seems probable. There is quite an accumulation of lead in New York and there are free offerings at 4.42 1/2 @ 4.45c. Considerable business was reported from St. Louis early in the week for chemical lead at 4.30c. and soft Missouri at 4.25c., while desilverized was firmly held at 4.32 1/2c.

The London market remains unchanged, Spanish lead being quoted £14 3s. 9d. @ £14 5s. and English, £14 8s. 9d.

St. Louis Lead Market.—The John Wahl Commission Company telegraphs us as follows: Pig lead is firm and advancing slowly on account of the Colorado strike. The latest sales are on the basis of 4.32 1/2 @ 4.35c.

Spanish Lead Market.—Messrs. Barrington & Holt, of Cartagena, write us that in May the average price of lead was 68.95 reales per qtl., equivalent to £12 17s. per long ton f. o. b. Cartagena, on an average exchange of 30.05 pesetas to £1, silver having averaged 13.30 reales per oz. Exports of lead in May were 302,652 kilos to Coneron, 102,391 kilos to Newcastle and 1,337,876 kilos to Marseilles; total, 1,742,919 kilos. Other exports included 300,000 kilos zinc blende to Antwerp and 1,321 kilos silver ingots to Marseilles.

Spelter.—Under free offerings prices declined further, while consumers restricted their purchases to their most urgent wants. Unquestionably there are still heavy lines to cover both for this and the next two months, and the moment values become more steady a large business may be expected. Early in the week there was still

some business done at 6 1/2c., but since then prices have come down to 6c. New York, and about 5.80c. St. Louis.

The foreign market also has been very flat and declining and good ordinaries in London are now quoted £27 with specials 5s. higher.

Antimony is somewhat firmer. Prices, however, remained unchanged at 10 1/2c. for Cookson's; 10c. for Hallett's, "C" and U. S. Star.

Nickel continues on unchanged lines, and no alteration in prices can be reported. We quote for ton lots, 33c. @ 36c. per lb., and for smaller orders 35 1/2 @ 38c. London prices are 14 @ 16d. per lb., according to size of order.

Quicksilver.—The New York quotation remains \$42 per flask. The London price has gone up 2s. 6d. and is now £8 5s., with £8 4s. quoted from second hands.

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

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

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

LATE NEWS.

Late advices from Dawson City report the death there on May 13th of Joseph Juneau, the well-known pioneer of Alaska and the Yukon country. He founded the town of Juneau, which was named after him. He made and lost several fortunes in the North. No particulars have yet been received.

The latest despatches say that at least 30,000 men in Colorado will be out of work within the next three days unless steps are taken to end the strike of the smelter employees. The Omaha & Grant and the Globe in Denver, the Bimetallic and the Arkansas Valley at Leadville, and two smelters at Pueblo, are closed. The Argo smelter in Denver has complied with the 8-hour law, and is still running. The Guggenheim smelter at Pueblo also is running. The closed works are under guard, but nowhere have the men made any demonstration.

At Central City the men employed in the stamp mills are expected to strike to-day. These mines have already closed: The Commodore, Amethyst, Bachelor, Bachelor No. 2, and Last Chance mines, in the Creede district; the Calliope and Hagerty at Ouray; the Carribean and Montezuma near Ophir; the Iron Mask and Black Iron at Red Cliff; the Smuggler at Aspen. The Porter Fuel Company at Durango has closed, throwing 150 men out of work. From all parts of the State come reports that mines are reducing forces. At Leadville 900 men have been discharged.

Should the mines close all over the State 5,000 railroad men will be thrown out of employment. Four mines of the Colorado Fuel and Iron Company, three near Canyon City, and one in Pitkin County, have been shut down on account of wage differences.

By Telegraph.

(From Our Special Correspondent.)

Collingwood, Ont., June 16th.—The special trip of the party from the Ontario Legislature to Algoma and the Northwest began at Toronto Thursday morning. The party consists of Hon. G. W. Ross, E. J. Davis, about 40 members of the Ontario Legislature and 30 representatives of the press and other guests. A banquet was tendered by the citizens of Collingwood. The party left in the evening on steamer "City of Collingwood" for Sault Ste. Marie and Port Arthur.

By Telegraph.

(From Our Special Correspondent.)

Leadville, Colo., June 16th.—The Arkansas Valley and Bimetallic smelters are now shut down tight. They have already 25,000 tons of ore on hand and refuse to take any more. This shut-down of the smelters resulted to-day in the big mines of the camp laying off fully two-thirds of their men, and a conservative estimate of the total number of men now idle here is 3,000. Though mining has stopped, development work with a small force of men will continue for a time at least at the Resurrection, Ixeh and other big mines, while all the pumps will be kept running. A considerable amount of prospecting work by new enterprises will also continue. The Little Chief, Morning and Evening Star, and a few other leases which mine iron ores needed for fluxing are still shipping, their output being taken by the Guggenheims' plant at Pueblo. There has as yet been no violent demonstration nor any serious trouble with the strikers, but the smelter employees are firm in their demand that they shall receive 12 hours' pay for 8 hours' work.

MINING STOCKS.

Complete quotations will be found on pages 728, 729 and 730 of mining stocks listed and dealt in at.

Baltimore.	St. Louis.	Paris.
Boston.	Salt Lake.	Rossland.
Colo. Springs.	San Francisco.	Shanghai.
Denver.	London.	Toronto.
New York.	Mexico.	Valparaiso.
Philadelphia.		

New York. June 16.

Early in the week the market showed some recovery, particularly in the higher-priced securities, but values again fell around June 14th. Anaconda Copper has been a fraction above London quotations. Amalgamated Copper sold on June 12th at \$96, receding to \$94 bid on June 14th, though holders were asking around \$96. Trading on the curb was principally in odd lots of a few hundred shares. American Smelting and Refining common shares were dealt in to some extent at \$36½@42, while the preferred stock was \$81¼@85¼. A few days ago this company filed a statement with the secretary of state at Trenton, N. J., which showed that \$47,000,000 had been paid for the property now controlled by the company. Tennessee Copper was quiet at \$19½@21, while British Columbia Copper brought \$11½ on the curb on Wednesday, but now holders are asking \$12.

Little Chief of Colorado was steady at 17@19c. The company is soliciting stockholders' proxies for a reduction in the par value of the shares from \$50 to \$1, and already it has about 97,000 shares. The total issue is 200,000 shares.

Standard Consolidated of California held at \$2.25. The company has nearly \$100,000 on hand now. Brunswick Consolidated was very quiet around 15c. The directors have lately engaged Mr. R. Gilman Brown, of the Standard Consolidated, to examine the Brunswick, particularly as regards the hoisting and pumping arrangements. In his report, dated June 1st, Mr. Brown advised "stop the mill; provide funds for the necessary shaft work, and then start up with a good shaft, full pumping and hoisting facilities, and with ore ready to stope." On the other hand, Superintendent Mallen believes he can hoist ore in the present shaft and thus meet the floating debt of the company. So far, we understand, no change has been made in the methods of working the property.

Miscellaneous dividends declared include the Westinghouse Electric and Manufacturing Company, 1¼% quarterly on preferred stock, payable July 1st; Dominion Coal Company, 4% semi-annual on the preferred stock, payable July 1st.

Auction sales included 60 shares New Jersey Zinc Company at \$130; \$2,000 Texas & Pacific Coal Company first mortgage bonds (hypothecated), 107½%.

Boston. June 15.

(From Our Special Correspondent.)

While the week has seen a more active market, the rush has been chiefly in the railroad and industrial stocks, and mining securities have been rather neglected. A few of the coppers drew some attention, however, Arnold being the special feature. This stock sold up to \$16 on pretty heavy dealings.

Dominion Coal has also been rather prominent, and an effort was made to drive the stock down, but with little success. On Tuesday it was down to \$55½, but recovered to \$56½ later.

The high-priced shares were little dealt in. Calumet & Hecla brought \$805; Tamarack, \$220; Quincy, \$165; Osceola, \$86. Boston and Montana sold about \$350.

The general talk is over the drooping condition of Amalgamated Copper. The enthusiasts who really believe in Mr. Lawson have had rather a chill, and the weakness of Amalgamated has been really responsible for the dullness in coppers.

The failure, through Gov. Pingree's veto, of the bill to allow mining companies in Michigan to uncover their stocks has not disturbed any one here except a few speculators.

Several new stocks have been listed this week. Among them is the Victoria Copper Mining Company, which owns 2,300 acres in Ontonagon County, Mich., southwest from the Michigan Mine. The company has 100,000 shares, par \$25, and was floated the past winter at \$7 per share, \$325,000 going into the treasury. The directors of the company are: Thomas B. Dunstan, Calvin Austin, William F. Humphrey, Fred H. Williams, Fred H. Begole, James P. Graves.

The Michigan Copper Mining Company was organized June 5, 1898, under Michigan laws, \$2,500,000 capital, divided into 100,000 shares, par \$25. The stock was offered for subscription through Cameron Currie & Co., of Detroit, at \$10 per share. The company operates the old Minnesota mine and owns 4,780 acres of mineral lands in Ontonagon County. The directors are: John Stanton, Joseph F. Gay, J. R. Stanton, J. Wheeler Hardy, Alfred M. Low. American Loan & Trust Co. is the transfer agent; Old Colony Trust Co., registrar. Financial statement March 31st showed cash on hand over all liabilities

\$276,079. The company gave for the property 67,035 shares of stock and sold 32,965 for \$350,000. About \$27,000 has recently been expended on the surface, and \$30,000 underground.

The Guanajuato Consolidated Gold Mining Company has bought several old mines in Mexico. The company is capitalized for \$1,000,000, being divided into 86,000 preferred and 114,000 common shares, par \$5. The preferred shares are only preferential as to a division of the first \$80,000 of net earnings; after that they become common shares. The president is Fred G. Corning, New York; vice-president, E. A. Wiltsee, San Francisco; secretary and treasurer, Thomas J. Hurley. The late President Mason of the Quincy Mining Company was the largest stockholder in the company.

3 P. M.—To-day mining stocks were exceptionally dull. Arnold rose 1¼ to \$16; Parrot fell 1¼ to \$53, now \$54; Centennial off ½ to \$35; Cochiti, 13½; Calumet, \$800; Franklin, \$19¼; Old Dominion off \$1, at \$38¼; Mohawk, \$28; Old Colony, \$11¼; Tecumseh, \$5¼; Copper Range, \$45; Utah, \$42; United States, \$22½; British Columbia, \$12; American Zinc, \$43½; Michigan, \$13¼; Adventure, \$10; Allouez, \$9¼; Baltic, \$33¼; Bonanza, \$3¼; Fortuna, 55c.; Ysabel, \$15; Winona, \$14; Washington, \$2½; Tri-Mountain, \$11½.

Salt Lake City, June 10.

(From Our Special Correspondent.)

Prices are firmer and the volume of bona fide sales is larger—a happy omen on the threshold of the sultry period, even if it should prove but temporary.

Ajax holds fairly well. Bullion Beck and Centennial Eureka have announced their usual dividends. Eagle & Blue Bell again shows more strength. Four Aces is recovering. Grand Central paid the \$37,500 dividend to-day. It is said this will be increased to \$50,000 in July. Homestake is quiet. Mammoth did business at \$2 and higher. Star Consolidated fairly retains the advance. The demand for Swansea continues, while South Swansea steadily grows in favor with conservative speculators. Sunbeam is recovering lost ground. Northern Light is seemingly strong, around 60. Omaha is moving up and good reports of the mines are current. Sacramento did business at 46c. and higher. Alice is a few points higher. Dalton is offering at 2½. Dexter softened and several lots changed owners. Among the Park City shares Daly West is quietly being bought as an investment. Valeo is once again in favor, while Silver King retains the top round of the dividend ladder, paying \$50,000 to-day.

San Francisco. June 10.

(From Our Special Correspondent.)

The market continues to be made up of small inland trading, with fluctuations within narrow limits. All the efforts made to draw in the outside public have been failures, and the talk of large outside buying has proved to be without any foundation.

Prices have generally been lower this week, but sales have been very light. Some quotations noted are: Consolidated California and Virginia, \$1.60@1.68; Ophir, \$1.10; Sierra Nevada, 69c.; Best & Belcher, 48c.

There is some talk of trouble with the Virginia Miners' Union over the employment of a few electricians at the C. & C. shaft on the Comstock, who are not members of the Union. The matter is now under discussion.

London. June 3.

(From Our Special Correspondent.)

All stock brokers are supposed to go to the Derby and the Oaks races, and consequently the week of the races is conventionally supposed to be a dull one on the Stock Exchange. Nevertheless, this year the week has been pretty busy and the crowds on and outside the Exchange have shown no signs of diminution. The conference between Sir Alfred Milner and President Kruger has been made much of by speculators in the South African market, and some fluctuations have taken place. The West Australian market has, as usual nowadays, been strong and shares of companies in the Kalgoorlie District have continued their upward course. Towards the close of the week a noticeable fall took place in the shares of the copper companies, due to a rumor that the American Amalgamated Company was not getting on so well as was contemplated.

During the past week or two we have been treated to a decidedly better class of new flotations in the copper market. Last week we had the Panuco Company, floated by the Mathesons. This week we have the Lloyd Copper Company, Limited, introduced to our notice. This company has been formed to acquire the well-known Lloyd's Burrage copper mine situated in the Bathurst District of New South Wales, together with the refining works situated at Lithgow in the coal district of that name. This mine has been worked continuously for 22 years, and the Lloyd brand of ingot copper has long been in

demand. Hitherto the mine has been worked in old-fashioned style and the ore is all hand picked at the surface. It is estimated that there is at the present time 130,000 tons on the waste dump, containing 3½% of copper, while there are also some extensive accumulations of slag that would pay to smelt over again on modern systems. Messrs. G. A. Stockfeld, C. Richards and J. Whear Roberts report favorably on the ore in sight and on the indications as to the future. Mr. Henry Bratnobar is consulting engineer, Messrs. James & Shakespeare are the commercial agents and metal brokers, and Messrs. Millar & Llewellyn are the stock brokers. The company comes out under excellent auspices and should do well. The capital is moderate, being £250,000; of this £116,667 in cash and £83,333 in shares is the purchase price, while £50,000 will form a fund for developing the property and erecting smelting plant on modern principles.

The Canadian Mines Development Company, Limited, has been advertised this week. This company has been formed to acquire properties in Rainy Lake district, West Ontario, but the only one specified in the prospectus is the Foley Mine, which is situated on the north shore of Shoal Lake, Seine River District. This property is at present owned by the Foley Mines Company of Ontario, a Canadian company of which Messrs. Lyman M. Jones and Edmund Bristol, both of Toronto, Ont., are leading spirits. Mr. F. G. Corning of New York, Mr. J. H. Chewett of Toronto, and Mr. E. P. Rathbone of London, report on the property in hopeful terms. The ore that has been treated so far appears to vary in grade from \$10 to \$20 per ton, and it is estimated that there is 40,000 tons in sight that vary in contents from \$10 to \$15 per ton. The experts put \$5 per ton as the cost of working, inclusive of all charges. The capital of the company is £300,000, of which £150,000 in shares and £50,000 in cash is the purchase price; £25,000 will be applied as working capital, while 75,000 shares will be held in reserve.

Paris. June 4.

(From Our Special Correspondent.)

The mining stock market has been somewhat irregular, and speculation has for the time been diverted to other quarters. Even the copper shares have quieted down and are dull for the time. The reports from your side concerning the Amalgamated Copper Company have produced an unfavorable effect here, and the situation is not well regarded.

There is apparently no sign of a breakdown in the great strike which has occurred among the employees at the Creusot works. Ten thousand men are said to be idle, and demand an increase of 50c. a day in their wages and certain other ameliorations. The town is reported to be in an excited condition, the works being occupied by troops, whilst the streets are guarded by the gendarmerie, who have already had collisions with the strikers. Should the strike continue for any length of time, one of its effects will be to delay the work on the buildings in course of construction for the Exposition of 1900. All the iron work for the enormous palaces to be built on the Champ de Mars and the Invalides is being manufactured at Creusot, and if the deliveries are stopped, the work on the Exhibition buildings, which is already none too forward, will also have to be suspended. The men employed in the railway section of the Creusot works have expressed their intention of joining their confreres, thus making the strike a general one.

According to the report of the Bureau du Travail, during the year 1898 there were 368 strikes in France, extending to 1,967 firms, and comprising 82,065 workmen and 1,216,306 days labor. The results were a success for the strike in 75 cases, a defeat in 170, and a compromise in the remaining 123. The number of men concerned in the strikes that succeeded was 10,594; in those in which they failed 38,925.

The outlook is again a somewhat uncertain one, owing to political complications. The excitement over the Dreyfus affair again becomes prominent. The arrival of Major Marchand and the Deroulede trial have unsettled the public mind. All sorts of difficulties are possible.

Azote.

Toronto, Ont. June 13.

(From Our Special Correspondent.)

The stock market opened very active this week with an advance of several points in all the favorite stocks. The sales were rather heavy. Golden Star at the close was quoted at 74½ bid. It looks, however, as if this stock would not advance much further for a few days, owing to heavy liquidation. The Hammond Reef Company has been reorganized, and there is a fairly good demand for the stock. Minnehaha advanced from 20 to 25½ and is very firm at that figure. The mine is looking exceedingly well and the mill will be running in a couple of months. Superior Gold and Copper Company advanced 3 points, closing at 11c. In the silver stocks Dardanelles is the favorite and very active. There is some movement in White Bear, which promises an early advance.

STOCK QUOTATIONS.

NEW YORK.

Table of stock quotations for New York, listing companies like Adams Con., Alamo, Alliance, Anaconda, etc., with columns for location, par value, and prices for various dates from June 9 to June 15.

BOSTON - MASS.

Table of stock quotations for Boston, listing companies like Aetna, Adven'u, Alouez, Am. Z. & S., Anaconda, etc., with columns for par value, number of shares, and prices for various dates from June 8 to June 14.

*Official quotations Boston Stock Exchange. Total sales, 244,318.

COLORADO SPRINGS COLO.

Table of stock quotations for Colorado Springs, listing companies like Alamo, Anaconda, Argonaut, etc., with columns for par value and prices for various dates from June 5 to June 10.

*Colorado Springs Mining Stock Exchange. Sales for week ending June 7th, 3,045; quotations from June 8th to June 10th by telex.

COAL AND INDUSTRIAL STOCKS

Table of coal and industrial stock quotations, listing companies like Am. Sm. & Ref., Am. S. & W. Con., Central of N. J., etc., with columns for par value and prices.

*Ex-Dividend

BALTIMORE, MD.

June 15.

Table of stock quotations for Baltimore, MD., listing companies like Atlantic Coal, Big Vein Coal, Consolidation Coal, etc., with columns for location, par value, and prices.

PHILADELPHIA PA.

Table of stock quotations for Philadelphia, PA., listing companies like Bethlehem I., Cambria Iron, Cambria Steel, etc., with columns for location, par value, and prices.

Total shares sold, 50,485.

ST. LOUIS, MO.

June 14.

Table of stock quotations for St. Louis, MO., listing companies like Am. Cold, A. & Nettle, Central L. Mo., etc., with columns for location, par value, and prices.

SHANGHAI, CHINA.

May 15.

Table of stock quotations for Shanghai, China, listing companies like Jeilun Mg. & Trad., Junjion Mg. Ltd., etc., with columns for country, par value, and prices.

*Special report of J. P. Bisset & Co.

The prices quoted are in Shanghai taels.

VALPARAISO, CHILE.

May 6.

Table of stock quotations for Valparaiso, Chile, listing companies like Arturo Prat, Caracoles, Huantajaya, etc., with columns for location, capital paid, and prices.

*Special report of Jackson Br. S. Values are in Chilean pesos or dollars.

STOCK QUOTATIONS.

DENVER, COLO.

Table of stock quotations for Denver, Colorado, listing various mining and industrial companies with their share prices and sales figures.

Official Quotations Denver Stock Exchange. Sales: Mines, 15,800 shares; Prospects, including those mentioned, 14,500 shares; Miscellaneous, 69,000 shares; total, 102,300 shares.

SALT LAKE CITY, UTAH.

June 10

Table of stock quotations for Salt Lake City, Utah, listing various mining companies and their market prices.

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

ROSSLAND, BRITISH COLUMBIA.

June 8.

Table of stock quotations for Rossland, British Columbia, listing various mining and industrial companies.

*From Our Special Correspondent.

SAN FRANCISCO, CAL.

Table of stock quotations for San Francisco, California, listing various mining and industrial companies.

Official telegraphic quotations of San Francisco Stock Exchange

TORONTO, CAN.

Table of stock quotations for Toronto, Canada, listing various mining and industrial companies.

* Official quotations of the Standard and Toronto Mining and Industrial Exchanges. Total shares sold, 314,350.

MEXICO.

June 8.

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

Note.—In most of the older Mexican mining companies the shares have no fixed par value. The capital is formed of a certain number of shares the total value not being named. Many newer companies have a nominal par value, usually \$50 or \$100. Prices are in Mexican dollars.

PARIS.

June 1.

Table of stock quotations for Paris, listing various industrial and mining companies.

STOCK QUOTATIONS.

Main table containing LONDON Stock Quotations (June 2) and MEETINGS. Includes columns for Name of Company, Country, Authorized Capital, Par Value, Last Dividend, Quotations, Name of Company, Location, Meeting, Date, and Place of Meeting.

* Dividend pending. † Ex-dividend.

DIVIDENDS.

Table of Dividends with columns for Name of Co., Date, Am't., Paid 1899, Grand Total, Name of Co., Date, Am't., Paid 1899, Grand Total, Name of Co., Date, Am't., Paid 1899, Grand Total.

DIVIDEND-PAYING MINES.

NON-DIVIDEND-PAYING MINES.

Main table containing two columns: 'DIVIDEND-PAYING MINES' and 'NON-DIVIDEND-PAYING MINES'. Each column lists company names, locations, capital stock, shares, assessments, and dividends. The table is organized into two main sections with detailed sub-headers for each data point.

G. Gold. S. Silver. L. Lead. C. Copper. B. Borax. * Non-assessable. Note.—This table is corrected up to June 5. Correspondents are requested to forward changes or additions so as to reach us before the end of each month.

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

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 May 1st. Readers of the ENGINEERING AND MINING JOURNAL are requested to report any corrections needed, or to suggest additions which they may consider advisable. See also Market Review of Chemicals and Minerals.

Table with multiple columns listing various chemical and mineral products (e.g., Abrasives, Calcium, Mica, Potassium, Sulphur) and their current prices. Includes sub-headers like 'Cust. Meas.' and 'Price' for each item.