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DAVID T. DAY, PH.D. Editor in Chief
EDWARD W. PARKER Managing Editor
FREDERICK HOBART Associate Editor
ROSSITER W. RAYMOND, PH.D., M.E. Special Contributor

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CONTENTS.

Editorial Notes.....	39
Market Conditions.....	39
Labor Conditions in the Transvaal Mines.....	40
The Explosion at the Fernie Coal Mines.....	40
Making Peat Briquettes by Electric Power.....	41
Bauxite in Italy.....	G. Aichino. 41
Gold-bearing Iron-sands of New Zealand.....	41
*New Treatment of the Slimes Problem for Talcose Ores. W. D. Stackpole.	42
The United States Geological Survey in its Relation to the Practical Miner.....	S. F. Emmons. 43
Canadian Mining Institute.....	44
Bismuth Production.....	J. Struthers. 44
California Oil Wells.....	44
*Labor Conditions in Johannesburg.....	T. Lane Carter. 45
Esperanza Mine, Ed Oro, Mexico.....	46
*Underground in the Speculator Mine.....	47
*Mines and Metallurgy Building at the St. Louis Ex- position	47
A Half Year in the Leadville District.....	J. O. Heimberger. 48
Dry Crushing of Ore.....	49
Recent Decisions.....	51
Abstract of Official Reports.....	51
Books Received.....	52
Books Reviewed.....	52
Correspondence.....	53
Questions and Answers.....	54
*Patents	54

*Illustrated.

DEPARTMENTS

Assessments	68
Chemicals, New York and Foreign.....	66
Coins, Foreign.....	67
Dividends	68
Financial Notes.....	67
Industrial Notes.....	57
Markets: Coal, United States and Foreign.....	64
Iron and Steel.....	65
Metals: Gold, Silver, Copper, Tin, Lead, Spelter, Anti- mony, Platinum, Quicksilver, etc.....	67
Minerals, New York and Foreign.....	66
Mining News: United States and Foreign.....	58
Mining Stocks.....	63
Obituary	56
Personal	56
Prices Current: Chemicals and Minerals.....	70
Schools, Technical.....	56
Societies	56
Stock Market Review: United States and Foreign.....	63
Stock Quotations.....	69
Trade Catalogues.....	57

THE INDEX to Volume LXXIII—January-June, 1902—of THE ENGINEERING AND MINING JOURNAL accompanies this issue, and subscribers should receive it with their copies. As usual this index has been carefully prepared and is very full. It includes nearly 11,000 titles and over 15,000 page references showing the variety of the topics covered by the JOURNAL and the diversity of news given during the half-year.



AMONG THE signs of returning activity and prosperity in the Transvaal, we find that the societies which had their headquarters in Johannesburg are renewing their organization and holding meetings once more. Prominent among these is the Chemical and Metallurgical Society of South Africa, which has done excellent work in the past, and to which thanks are due especially for the valuable information it has collected and published as to the various applications of the cyanide process. The first meeting since the outbreak of the war in 1899 was held in Johannesburg, May 10 last, and provision was made for regular monthly meetings. We congratulate the society on its new start, and wish it a successful and useful future.



THE PREDICTIONS of the early decadence of the Leadville District in Colorado, which have been made from time to time for several years past, have not been fulfilled, and the review of the work of the half-year just closed, which our correspondent gives on another page, shows no signs that they will be fulfilled. Leadville is a very busy and prosperous district still, and there are signs that it will continue to grow and prosper, in spite of envious forecasts. In addition to gold, silver, lead and manganese ores, the zinc ores of the district promise to be a valuable addition to its output; and they will probably become a feature in the zinc market before long. It will be a long time before Leadville ceases to add to the mineral wealth of Colorado and the country at large.



THE GOLD MINES of the Kolar District in Mysore, India, which have been making steady and satisfactory progress for several years past, are now showing a considerable decrease in production. This is not due to the failure or exhaustion of any of the mines, but to a cause which threatens serious results over a large section of India. The absence of seasonable rains this year has made water so scarce in the district that it has been impossible to operate the mills and cyanide plants to their full capacity, though there is plenty of ore, if it could be handled. The successful mines in the Kolar District have paid large dividends to their stockholders for several years past, and the companies are in position to pass through a poor year without trouble. Unless the rains set in very soon, they will have this experience.



A BEGINNING has been made by the Canadian Mining Institute in carrying out the policy approved at the general meeting in Montreal last March, of establishing local branches. It is the intention to locate these branches in such a way that each shall cover one of the mining regions of the Dominion, and furnish a center for a group of mining districts. The two branches which have been successfully organized

thus far cover the iron and corundum districts of Eastern Ontario, and the asbestos, mica and copper mines of Quebec. Later it is proposed to establish other branches in Nova Scotia, in Western Ontario and in Quebec. It is believed that this plan will extend the influence of the Central Institute and attach to it many useful members who are now deterred by distance from attending the general meetings. The plan is a promising one and deserves at least a fair trial.



THE STRIKE of the Alabama coal miners, which began on July 1, has no relation to that in the anthracite coal-fields, nor to the proposed sympathetic strike of Western bituminous coal miners. It is a purely local trouble, especially so since the Alabama miners are not included in the Western mining agreement, but have a contract of their own. Under this contract the rate paid for mining is based upon the price of pig iron, the maximum rate being 55 cents per ton. The reason for this is that a very large part of the coal mined in the State is used by the blast furnaces; and the plan has worked very well. Under it the miners have been receiving the maximum rate for over a year. The agreement ran out June 30, and for the new year the miners asked for several changes, their chief demands being an increase of 5 cents in the maximum; semi-monthly pay-days, and eight hours as a day's work. The operators were not willing to concede these demands, and no agreement was reached in conference, so the men ceased work at the end of the year. The strike is not likely to last, however, and it is believed that a compromise will be made and a new contract concluded in a few days. The stoppage of work, however, caused much inconvenience, as the mines generally were very busy and none of the furnaces had any considerable stocks of coal or coke on hand.

Several important mines in Alabama are worked by convicts, whose labor is leased by the companies from the State. These mines, of course, are not affected by the strike, but their output is not sufficient to meet current demands for fuel.



MARKET CONDITIONS.

Iron and Steel.—While the usual midsummer rest is beginning to have some effect on the market, the furnaces and mills are very busy, as they have been all through the year. New business is less pressing, but deliveries on existing contracts leave no opportunity for rest, and production shows no change. Some of the Alabama blast furnaces are banked on account of the strike of the coal miners in that State, but it is probable that the trouble will be settled in a few days.

Copper.—The copper market remains quiet. But little new business has been done, and quotations are almost nominal. While consumption continues large, manufacturers are still occupied by stock-taking and yearly settlements, and do not appear to be taking any interest in the market. This cannot continue very long, however, and the demand for metal will soon be apparent.

Other Metals.—Tin remains in good consumptive demand. Buyers are still taking only for current requirements, but these make up a good business.

Lead is quiet and unchanged, with only about the usual amount of business done.

Spelter continues strong and in good demand. The prices of ore in the Joplin market are still high, with no signs of a drop. The Joplin District has had its full share of prosperity this year, but the smelters are complaining.

The silver market has been quiet and rather dull. Nothing has been done towards the settlement of the Chinese indemnity question. Advices from India are not favorable, and it looks as if poor crops there may affect the demand for silver unfavorably.

Coal.—The Western coal market is in a somewhat better condition, so far as transportation is concerned. Coal is moving more freely, and receipts at leading points for consumption are very fair. The Lake trade is in about the same condition as last week, and shippers are getting hardly three-quarters of the coal they want.

The meeting of the United Mine Workers on July 17 continues to be the subject of general discussion in the trade. While many operators profess to have no apprehensions and do not believe that a general strike will be ordered, others fear that the convention may be carried away and commit the miners to action that may be regretted afterwards. At present the indications are against a strike; but it is, of course, impossible to predict the final action.

The seaboard bituminous trade continues in the same condition as last week. Prices are still high on account of the special demand. Some interruptions to traffic have been caused by storms and floods in Western Pennsylvania, but they are only local and temporary.

Beyond some rumors about starting mines, there is nothing new to report of the anthracite trade. The strike conditions are practically unchanged.



LABOR CONDITIONS IN THE TRANSVAAL MINES.

In our last issue we referred to the labor question as one of the most serious which the mining companies of the Transvaal will have to consider in the future. This impression is confirmed by the letter from our special correspondent, which is published on another page, and which gives a very fair idea of the difficulties which now exist. How much these will be intensified as mining operations are extended can readily be seen.

The normal supply of unskilled labor for the Transvaal is found, of course, in its large negro or Kaffir population. At first sight this would seem to be sufficient to meet all needs. So far as numbers are concerned this might be the case; but the Kaffir is not dependent on the mines alone for a living, nor has he the desire to accumulate money or to improve his condition which might make him a steady workman, if necessity did not. The Kaffir makes a good mine laborer, is fairly intelligent and obeys orders readily. His chief failing when at the mine, is a disposition to drink. But as a rule he does not come to the mines to stay; within reach is still the wide South African veldt where he can live with little or no labor. He labors in the mines only until he has money enough to buy two or three wives and a few cattle; and these will supply all his future needs. Sometimes he returns to the mines after an interval—more often he does not.

The measures which have been taken to secure the supply of negro labor for the mines are described by our correspondent. Possibly they are the best that could be devised under present circumstances; but they seem at this distance to be defective in certain points. The limitation of the wages to be paid is possible only with the class of labor dealt with; but even the negro has a certain amount of shrewdness, and too small a wage seems likely to keep away the

men who are needed. Strict regulations can be made and enforced for the time being, but they will also have a tendency to keep men away.

In 1898, as we noted last week, there were 7,330,000 tons of ore handled, and in round numbers 89,000 Kaffirs were employed. If the output of ore is to be increased to 12,500,000 tons—as Mr. Hammond anticipates—there would be needed approximately 150,000 negroes. To find these would be a difficult task; and a still harder one would be to keep up the number.

There is no doubt that when the war restrictions are fully removed, there will be a great influx of white men into the Transvaal. A large part of these will come in the expectation of better wages and better work than those of a common laborer; while a considerable number, probably, will be men who would be dear at any price. The mines cannot afford to pay for ordinary labor the wages which a white would expect in Africa, unless he were under pressure of extreme necessity. Moreover, a mixture of white and negro labor, if it were possible, would be anything but desirable. In fact, the white influx is likely to be more embarrassing to the mining companies than otherwise, even if it should operate to reduce the wages of skilled labor.

One solution is possible, which is suggested by our correspondent, and that is the adoption wherever possible of machines and labor-saving devices. Very little has been done in this way on the Witwatersrand heretofore, on account of the initial expense involved and the comparative cheapness of native labor. It is quite probable that a good deal will have to be done as operations are expanded. The solution of the labor question may be found, not in increasing the supply of men, but in reducing the number needed by the substitution of machinery for men.



THE EXPLOSION AT THE FERNIE COAL MINES.

One of the worst—if not the worst—mining accidents that ever happened in Canada occurred, as our readers will remember, at the Fernie Mine of the Crow's Nest Pass Coal Company on May 22 last. To recapitulate the facts briefly, Mine No. 2 of the company is on Coal Creek 5 miles from the town of Fernie, in British Columbia, employing about 400 men and having an output of nearly 1,000 tons a day. It works three shifts, two for coal-getting and one for repairs. The morning shift had safely finished work on May 22 and the afternoon shift, commencing at 3 o'clock, had continued until 7.30, when a tremendous blast came from the tunnel mouth of No. 2 and No. 3 mines, which are only 100 feet apart, sending out clouds of dust and debris, flinging timbers and coal across the creek, smashing the sides and roof of the surface store-rooms and blowing the roof off the fan-house. In addition, a column of dust rushed from the fan-house into the air to the height of 500 feet. There was no smoke and no flame. There were at this time in the two mines, which were connected, 152 men. The fan was saved by the blowing away of the roof, and, being unaffected, continued to revolve. Within a few minutes rescuers began to enter No. 3 tunnel and were able to assist 22 men, already in a death struggle with after-damp, to escape. These are all who were saved, for almost immediately the whole of the workings to the mouth of each tunnel were filled with after-damp and it was certain that every man in the mine was dead. From May 22 to date rescue work has continued. Only three or four bodies are still missing, and they, it is almost certain, lie buried beneath falls of rock in some of the roads.

The mines at Fernie were described very fully by our correspondent, Mr. William M. Brewer, in THE

ENGINEERING AND MINING JOURNAL of April 19, about a month before the accident. From that account it appears that, while the mines were at first opened and worked in a rather unsystematic way, under new management many improvements had been introduced, especially in the matter of ventilation. The quantity of air supplied by the fan employed was estimated at 125,000 cubic feet per minute, which would seem to have been sufficient for the extent of the workings covered. The mine was considered a fiery one, so that the use of safety lamps exclusively was required, and the coal being soft, a great deal of dust was made in the workings. It was to the latter fact, so far as the testimony shows, that the explosion and its rapid spread throughout the workings, if not the accident itself, was largely due. In fact, it seems to have been conceded that it was a coal-dust rather than a gas explosion. Every effort was made by the company to combat this theory, which was laid down a few days after the accident by Mr. Wm. Blakemore, a former manager of the mine, in an expert report, but in the end the company's managers, the miners' committee and the Government experts confirmed the accuracy of his deductions, and the jury endorsed it in their findings.

The investigation by the local coroner has now been completed, and the jury recently rendered the following verdict:

"That we, the said jury, find the initial cause of the explosion being at a point in No. 2 Mine aforesaid, not clearly defined, and that said initial cause expanded from the said undefined point throughout the greater portion of No. 2 and No. 3 mines, coal dust being the conveying medium, and we find in consequence that the inadequate method of watering and removing of the dust left the mine in such a condition as to be dangerous, and thereby provided a medium whereby the initial cause was augmented and intensified;

"That we, the said jury, recommend the Government take such steps as to enforce:

"1. The installation of the most approved system of watering for allaying dust in coal mines;

"2. That a more thorough inspection be adopted at these mines, throughout the old workings, and rooms contiguous to the air channel that are not being worked;

"3. That the safest explosives and most approved safety lamps be hereafter used."

We have not yet received a full report of the testimony; but the abstracts indicate that while the company had provided for ventilation and taken certain precautions against gas, the coal-dust question had received little attention. Nothing had been done toward removing or watering the dust in the old workings, while only very slight and entirely inadequate attempts to water the newer part of the mine had been made. Indeed, no one seems to have considered that because the mine was a dry and dusty one any special precautions were needed. The jury's verdict also points at probable neglect of the condition of the old workings and the absence of careful inspection. The management of the Crow's Nest Pass Coal Company seems to be in general intelligent and progressive; but it failed in taking proper precautions against the chief danger threatening the mine, probably more from lack of experience than wilful neglect. The lesson it has received is a severe one, for the money loss to the company is said to be over \$500,000—to say nothing of the loss of life. It will probably be heeded in this case; and it is to be hoped that other colliery managers will also take warning.

GERMAN IRON EXPORTS.—Exports of iron from Germany for the five months ending May 31 were, in metric tons:

	1901.	1902.	Changes.
Pig iron.....	44,391	115,958	I. 71,567
Other iron and steel.....	760,637	1,120,344	I. 359,707

The increase in pig iron this year was largely in shipments to the United States.

MAKING PEAT BRIQUETTES BY ELECTRIC POWER.

The use of electric power in drying peat and manufacturing fuel briquettes is decidedly new. It is now carried out on a large scale at Stangfiorden, in Norway, where a large water-power is available for generating the electricity required. The works are described in a recent issue of the *London Engineer*:

The process in use at Stangfiorden differs from all earlier ones in the use of the electric current for carbonizing the dried peat in retorts of special design. It is the invention of P. Jebsen, of Dale, Norway, and the process is patented in Norway and in other countries. The process has been in actual operation at Stangfiorden since 1898, with favorable results. The plant at present installed deals with 100 metric tons of air-dried peat per day. The process yields a dense and compact mass after the heating in the retorts. The specific gravity of the carbonized fuel in the broken condition is about 0.30, and the theoretical calorific value about 7,250 thermal units. The fuel burns well and yields little soot and ash.

The power required for carrying out the Jebsen treatment at Stangfiorden is derived from five 80-kilowatt dynamos direct coupled to five turbines of equivalent—128 horsepower. The power generating installation was provided by Schuckert & Cie., of Nuremberg, Germany. The wet peat is brought to the factory direct from the bog by water, in lighters of about 100 tons capacity. The boats are discharged by aid of mechanical power, and the peat is submitted to the first drying and pressing operation. This is carried out in a 5 horsepower press which can turn out 2,500 pressed blocks of peat, each measuring 80 by 8 by 8 centimeters per hour. The average weight of dried peat in each of these blocks is 2 kilograms.

The briquettes of pressed and partially dried peat are next loaded into trolley shelf wagons specially designed for tunnel drying by an American company. Each wagon carries, when fully loaded, 140 of the wet briquettes arranged on 10 shelves. The trolley wagons are pushed, when loaded, into the cooler end of the drying tunnel. The air draft which passes through the tunnel is set in motion by fans electrically operated, and is heated by the waste gases from the reports. The air has a temperature of 90° to 100° C. at the top end of the tunnel where the wagons emerge, and one of 40° to 50° C. at the lower end where they enter. As the wagons pass up the tunnel, the peat is, therefore, submitted to a gradually increasing temperature. The drying plant at Stangfiorden comprises one hot air stove, three electric fans, two tunnels, and 102 shelf wagons; 100 tons of air-dried peat blocks can be produced per day. The wagons with their charges of dried peat are next taken on tram-rails direct into the retort house, and are emptied directly into the retorts.

The retorts are upright cylindrical vessels of iron, about 2 meters in height and 1 meter in diameter. Each retort has a removable cover, and a discharging hole below, and is in addition provided with gas exit pipes and a pressure gauge. The retorts are provided with spiral resistance coils of special construction, and the blocks of peat are built up in actual contact with these, until the retort is entirely filled with a pigeon-holed mass of peat, in the center of which the heating agent lies. The top cover of the retort is now clamped down, and the electric current connections were made. Losses by radiation are minimized by lining the retorts with asbestos. The peat yields three products when submitted to this electrical heating in closed retorts. The gaseous products pass away by openings in the retort cover, and after scrubbing are employed for heating the air used in the drying tunnels. The tarry liquid condensed in the gas pipes and in the scrubbers contains tar oils, ammonia and other compounds, and if the plant and technical skill are available, may be worked up for these products on the spot.

The peat fuel remaining in the retort after the carbonizing operation is completed is allowed to cool down to 130° C. before opening the retort, and is then discharged direct into wagons running beneath the retorts. The peat fuel produced at the Stang-

fiorden factory is shipped direct to Bergen, where it is said to meet with a ready sale. The average yield of 100 kilos. of the air-dried peat at Stangfiorden is as follows: Peat fuel, 33 per cent; peat tar, 4; tar water, 40; gaseous products, 23 per cent.

The by-products obtainable from the peat tar are gas-oil, creosote and paraffin; from the tar water they are methyl alcohol, sulphate of ammonia and acetate of lime.

It is said that negotiations are in progress for the introduction of the Jebsen process into Ireland, in connection with the development of one of the water-powers on the West Coast. Mr. B. Horsky, of Prague, Bohemia, is the European representative of the Jebsen process.

BAUXITE IN ITALY.

BY G. AICHIHO.

Until two years ago bauxite deposits were not known in Italy. They have been quoted as existing in Calabu, but it was a mistake in giving the name of locality of a specimen analyzed by H. Sainte Claire Deville. Deposits have recently been discovered in several parts of the central Apennine. The more important of them is, so far as known, at Lecce ne Marsi, on the slopes of Monte Turchio, the nearest railway station being Pescina, on the Roma-Sulmona line. This deposit is at least 250 acres in extent, and the ore is from 3 to 10 feet or more in thickness.

The bauxite of the Italian deposits is generally interbedded in a semi-crystalline or compact limestone of Urdonian (?) age. Sometimes (as, for instance, partially at Lecce ne Marsi) the ore is uncovered. Mr. Capetti, of the Geological Survey, who studied the geology of this region, speaks of the deposits as constituted by more or less extensive lenticular masses. They are considered by other geologists as forming true beds. I am not personally acquainted with the deposits.

The bauxite is a finely oolitic rock in which are disseminated abundant pisolites. It is more or less compact, sometimes earthy. Its color grades from brown red to reddish white.

I had the opportunity of analyzing some specimens of the ore of Lecce ne Marsi, all of the red variety. My analyses were made from a practical point of view. Prior to that Mr. Mattiolo had analyzed a specimen from another locality (Pietraraja), and this was the first published analysis of an Italian bauxite. The following are our results:

	1	2	3	4	5
Al ² O ³	57.60	56.79	54.46	56.80	58.85
Fe ² O ³	26.55	26.20	30.63	25.98	18.62
Si O ²	2.79	2.98	2.48	4.06	.....
Ca O	1.27	2.21	1.17	1.28	.....
Mg O	not det.	not det.	not det.	not det.	7.91
Water at 110° C.	1x.7x	.....	.....	.....	0.30
Loss by ignition.....	11.71	11.95	11.78	12.17	22.40
Total	99.92	100.13	100.02	100.38	99.32

Nos. 1 to 4 are specimens of Lecce ne Marsi, analyzed by the writer; the analysis was made on the ore dried at 110° C.; No. 5 is of Pietraraja, analyzed by Mr. Mattiolo. All the analyses were made in the chemical laboratory of the Geological Survey.

It can be noted that this bauxite is very easily soluble in sulphuric acid diluted by an equal volume of water. All the iron is indicated as peroxide. A small portion of it is, very likely, present as protoxide.

Some of the deposits have been explored, but none of them is worked.

COAL CONSUMPTION IN RUSSIA.—The production and consumption of coal in Russia for two years past is given by *Glückauf* as below, in metric tons:

	1901.	1902.	Changes.
Production	16,137,445	16,315,758	I. 178,313
Imports	3,929,513	3,545,582	D. 383,931
Total	20,066,958	19,861,340	D. 205,618
Exports	13,497	11,335	D. 2,162
Consumption	20,053,461	19,850,005	D. 203,456

The consumption last year showed a decrease, which contrasts with rapid increases for several previous years; and which was due to the industrial depression prevailing through the year.

THE GOLD-BEARING IRON SANDS OF NEW ZEALAND.

The following official notice is published by the *New Zealand Mines Record* for May:

A bonus of £2,000 will be paid by the New Zealand Government to any person who, before January 1, 1904, shall invent such appliance as will successfully save gold from black sands in New Zealand. The bonus will be paid on compliance with the following conditions:

1. The invention shall, in its main features, differ from all machinery and appliances at present in use for the saving of gold, whether coarse or fine.

2. It shall be readily transportable from place to place, and shall be capable of utilizing local water for all its requirements.

3. The invention must be capable of treating not less than 30 cubic yards an hour of black sand or any coarser material up to a diameter of 4 inches; and it must be capable of treating such material profitably where there is not more than a value, in gold, of 3 pence per cubic yard; not less than 80 per cent of the gold contained in the material to be recovered by the machine.

4. No bonus to be paid until the invention has been continuously worked for not less than six months, and it shall, during that period, have treated not less than 100,000 cubic yards of material, working three shifts a day.

5. The bonus will be paid on the certificate of an officer that not less than 20 persons other than the applicant for the bonus are successfully working the invention.

6. Any person who receives the bonus shall not be allowed to take out patent rights in New Zealand for his invention.

A NOVEL APPLICATION OF ELECTRICITY.—The *London Colliery Guardian* says that at a colliery in the Dortmund District of Prussia it was required to dismount a horizontal arm of the pump rods; but this was found impossible, owing to the rusting of the bolts and cotters, while the part in question could not be cut through by hammer and chisel on account of the small space at disposal. It was therefore determined to effect the separation by means of the electric arc. The energy employed was obtained from a continuous-current dynamo, generating 320 amperes at 110 volts, which served for lighting, the negative pole being put in connection with the pump rod, and the positive with a carbon of 20 millimeters diameter, held in a well-insulated gas pipe. The latter was fitted with a rest, so that the carbon might be guided by hand; and, for preventing danger from fire, a bucket filled with sand was placed under the spot where the melting was to be effected, while a small hand-pump was also held in readiness. For protecting the men's eyes from the bright light, red and green glasses were provided, to be held in the hand. The work was carried through with a current of 320 amperes at 60 to 70 volts, the carbon point being held from 40 to 50 millimeters away from the point to be melted in such a manner that a vertical slot of 20 to 30 millimeters was formed, and then gradually deepened. The guiding of the carbon, which became more difficult as the depth increased, had to be effected in the upward direction, so that the molten iron might fall in drops. The work was performed by 6 men, who relieved one another every hour or half hour, in about 12 hours altogether, including a few interruptions. No inconvenience was experienced by the men during the operation; but afterwards all of them felt more or less severe pains in the face and hands, while those who did not always use the glasses also suffered in their eyes. The pains, however, lasted only a short time.

CYANIDE PLANTS IN NEW ZEALAND.—A recent issue of the *New Zealand Mines Record* gives a list of 26 cyanide plants existing at mines in New Zealand. Of these 25 are now in operation, only one being idle.

A NEW TREATMENT OF THE SLIME PROBLEM IN CYANIDING TALCOSE ORES.

By MORRILL D. STACKPOLE.

The installment of the 300-ton mill at Sunshine, Utah, which is now complete, is one of unusual interest, for it promises to be a simple but effective treatment of the slime problem.

Several years ago an ordinary leaching plant was erected, but on account of the presence of slimes and other difficulties, its operation was unsuccessful and the mine was shut down until taken hold of by George Moore, the patentee of the plant now being installed.

The ore to be treated is a mixture of talc and clay, with a small amount of limestone and chert. The ore when crushed to a quarter mesh contains 60 per cent slimes. This makes it impervious to solutions, and were it possible to get the solution to the innermost part of the ore, it would be impossible by ordinary methods of leaching and washing to replace it, no matter how shallow the tanks used. The method of introducing the solution at the bottom and decanting leaves these difficulties unsolved. Any metallurgist can appreciate the obstinacy of these sticky masses of mud, which, no matter how treated, would take almost a prohibitive length of time to precolate. Although experiments show that over 90 per cent of the values in the clay is soluble the ordinary methods only permit an extraction of 50 per cent.

The idea of separating the slimes and sands and treating each separately was adopted, and how to do this most satisfactorily has been the problem which the management thinks it has now solved. Numerous devices consisting of elevators, conveyors and tanks have been patented to accomplish this separation, but as a rule they have been either crude, partial, or too complicated to admit of consideration. The plan finally adopted is simply the adaptation to the cyanide process of a machine designed by Mr. Moore for the treatment of furnace products with acid in copper leaching works. It consists of a hollow truncated cone revolving on a horizontal axis. This cone is of a length suited to the requirements of the process. It is closed at both ends, except for a small hole at each end, the hole in the small end being larger than that in the larger end. Inside the machine at the large end are a series of buckets set around the circumference of the cone. The product to be treated is introduced in the small end and the acid is fed in the large end, the spent acid being discharged at the small end. A difficulty in dissolving metals with acids has always been experienced in the fact that during the action the acid is continually being weakened and the most difficultly soluble particles remaining undissolved to the last are not attacked by the weakened solution and can only be dissolved by separating the solution from the material and giving it another treatment with fresh acid. This involves not only time and expense, but also waste of acid, as the last few percentages of acid will not be neutralized by the difficultly soluble particles of metal, and even large amounts of free acid run off with the waste liquor. By the use of this apparatus material going into the machine full of easily soluble metal entirely neutralizes the acid in the outflowing liquor, which as the material advances with the difficultly soluble portions undissolved, it is brought into immediate contact with fresh acid, which completely dissolves the last traces of metal.

Practically the same problem is presented in the cyanide treatment of these ores, with the additional one of separating the slimes from the sands.

Having thus given a general description of the application of this machine to the treatment of copper products, I present herewith a detailed description of the method to be employed at the Sunshine Mill.

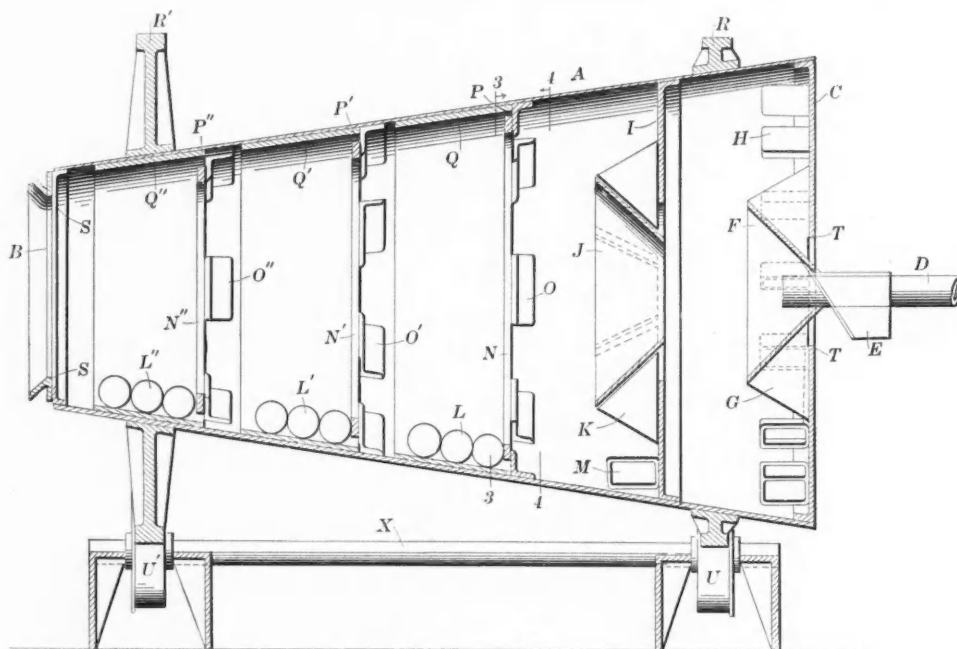
The ore crushed to a quarter mesh is delivered to the cone separator at the top of the leaching room. This separator is 10 feet long, 6 feet in diameter at one end, and 3 feet at the other, revolving on trunnions. In the center of the large end is a circular opening 1 foot in diameter, and at the opposite end

a corresponding opening 2 feet-in diameter. The interior of the cone is fitted with three rings projecting from its circumference; between these rings are placed a number of iron balls which prevent the slimes from attaching to and piling up on the sides or forming in balls. Two feet from the large end is a partition arranged similarly to the large end itself. The ore is introduced through the larger hole in the small end and passes through a bath of cyanide solution to the larger end of the machine, where a series of buckets pick up the sands free from slimes, taking them to the top of the cone, where they are inverted by the rotation of the cone and discharged on to a conical apron which conducts them out of the machine. In the meantime a standard cyanide solution is introduced through the pipe in the center of the conical apron at the large end of the cone. So we have the ore continually fed into the large opening, working its way by gravity to the opposite end, and being discharged. At the same time the cyanide solution is continuously fed into the large end and flows out of the small end,

The slimes are then pumped into pressure tanks and are forced by compressed air through the filter presses. Four filter presses are used. Each press makes thirty cakes 3 feet square and 3 inches thick, in all from 3 to 3½ tons of slimes containing 15 to 20 per cent moisture.

The liquor runs from the press with the solution through percolating tanks to the extractor boxes. The cakes are washed and blown as dry as possible. The washing is effected by forcing with a small compressor from a closed cylinder a measured amount of water sufficient to displace the cyanide solution retained, so that the amount of solution always remains constant. The filter presses are worked in pairs. There are two filling and washing while the other two are being discharged. Two men attend to opening and discharging, while a third operates the pumps and valves for filtering and washing. The dry cakes are discharged from the press, dropped into cars below and conveyed to the dumps.

The coarse material after leaving the separator flows down inclined troughs into the percolation



MOORE CYANIDING PROCESS FOR TALCOSE ORES.

carrying all of the slimes with it. The discharge in the small end being larger than that in the large end, and the separator being horizontal, makes the lowest point of overflow always at the small end, thus causing a continuous flow in that direction. So the ore and the solution with slimes are continuously moving in opposite directions, and the hard sands entirely freed from slimes are continuously discharged from one end of the machine, and all the slimes and all deleterious soluble salts pass with the liquor out at the other end. (In the presence of a large amount of soluble cyanides water can be used instead of cyanide solution.) At the same time all particles of ore have by agitation come thoroughly into contact with the solution with thorough aeration. In fact, by making the separator sufficiently long, practically all of the gold can be dissolved from the slimes before leaving the machine.

The slimes and sands having been separated, we will follow now the course of the slimes. These flow with the solution down inclined troughs into agitation tanks below. The tanks are three in number, 10 feet in diameter and 13 feet high, arranged for three operations of one hour each. While one tank is filling for an hour the second is being agitated and the third forced through the filter presses.

Agitation is accomplished by a centrifugal sand pump which draws slimes and solutions out at the bottom of the agitation tanks and throws it through a 4-inch column into the top of a tank again, so that in one hour's operation the total bulk of slimes has been drawn out and thrown back several times and at the same time has received complete aeration.

tanks. Four of these are placed in a square, the separator being above the square, thus discharging with equal facility into each tank. The tanks are 19 feet in diameter and 13 feet high, each tank receiving material from the separator for 24 hours. This allows 72 hours for percolation, less the time employed in emptying the tanks. They can easily be discharged on account of their height, which is only limited by the height of the mill, as the coarse granular composition allows percolation to any height.

The gold in this ore passes rapidly into solution, being dependent only on facility for rapid contact. In case of slimes where contact is immediate, the gold goes into solution in a few minutes. By crushing the harder particles, fine extraction from them can be completed in a few hours.

The following experiments show results obtained from the Sunshine ore by crushing to various degrees of fineness through the different methods of leach.

Treatment of Cyanides.

Assay heads.	Tailings.	Per ct. Extraction.	Stgh. of solution.	Time of contact.	Mesh.
\$9.10	\$0.50	94.5	0.2%	48 hrs.	10
9.10	0.40	95.6	0.2%	24 hrs.	10
9.10	0.80	91.3	0.2%	36 hrs.	10
5.20	0.10	86.5	0.2%	48 hrs.	1/4
5.20	1.20	77	0.2%	24 hrs.	1/4
5.20	1.00	80.8	0.2%	36 hrs.	1/4
12.80	1.60	87.5	0.1%	24 hrs.	1/4
12.80	0.80	93.7	0.1%	48 hrs.	1/4
12.80	2.60	80	0.1%	4 hrs.	1/4
12.80	1.80	86	0.1%	8 hrs.	1/4
9.20	0.60	93.6	0.1%	4 hrs.	10
9.20	0.40	95.6	0.1%	8 hrs.	10
9.20	0.40	95.6	0.1%	24 hrs.	10
9.20	0.80	91.3	0.1%	48 hrs.	10

i. Slimes were treated for one hour with 0.1 per

cent solution; heads showed \$8, tailings 10 cents; extraction 98.7 per cent.

2. Slimes were treated for one hour with 0.2 per cent. solution; heads showed \$8, tailings 20 cents; an extraction of 97½ per cent.

The accompanying drawing shows the construction of the Moore separator.

ORE SHIPPING DOCKS ON THE LAKES.—

The Cleveland *Marine Journal*, speaking of the ore docks at the Lake Superior ports and at Escanaba, gives a list of 23 docks, and says: "These docks vary greatly in height, particularly in height from water to bottom of pocket. The constant increase in depth of water in the channels connecting the lakes, the like increase in the depth of ships for ore traffic, have necessitated the changing of dock structures and an entire revision in former models. Old No. 3 dock of the Duluth, South Shore & Atlantic road at Marquette is the most notable example of antiquated construction, with a height of 23 feet to pocket, and 14-foot pockets. It is not now in commission. The 'Soo' road's dock at Gladstone is the lowest in use, less than 27 feet to pockets and but 47 feet to the deck. This dock can not handle the type of ore-carrying vessels that has come into vogue in the past eight or nine years. From it to the dock of the Great Northern at the head of Lake Superior, 40 feet to the bottom of pockets and 73 feet in extreme height to deck, marks a notable revolution in lake shipping interests.

"These various docks show an aggregate storage capacity of 865,046 gross tons of ore at one time, and have an aggregate shipping capacity for about 26,000,000 tons in a customary lake season. To them should be added the Algoma Central Railway Company's dock at Michipicoten, Canada, which, though it has no storage capacity, is able to ship from 600,000 to 800,000 tons in a season, depending upon railroad service."

BRITISH IRON AND STEEL EXPORTS.—

Exports of iron and steel from Great Britain for the five months ending May 31 are valued by the Board of Trade returns as follows:

	1901.	1902.	Changes.
Iron and steel.....	£10,354,528	£11,147,128	I. £792,600
Machinery	7,441,627	7,480,915	I. 39,288
New ships.....	4,554,355	2,663,329	D. 1,059,138
Totals	£22,350,510	£21,291,372	D. 1,059,138

The total value of mining machinery exported this year was £227,722, against £232,201 for the corresponding period in 1901. Exports to South Africa (included in the total above) showed a large increase, being valued at £85,092, against £44,763 last year.

GERMAN IRON PRODUCTION.—

The output of the German blast furnaces in April is reported by the Iron and Steel Union at 672,912 metric tons of pig iron, which is 8,437 tons less than in March, but 20,968 tons more than in April, 1901. For the four months ending April 30 the production of pig iron was in metric tons:

	1901.	1902.	Changes.
Foundry iron.....	513,921	528,633	I. 14,712
Forge iron.....	505,568	403,140	D. 102,428
Bessemer pig	158,609	122,628	D. 35,981
Thomas (basic) pig.....	1,465,861	1,553,882	I. 88,021
Totals	2,643,959	2,608,283	D. 35,676

The production is at present showing some recovery from the depression which marked the closing months of last year and the opening of the present year.

MANGANESE ORE IN THE CAUCASUS.—

The deposits in the Tchiaturi District are being thoroughly explored, though recent examinations prove the area to be less productive than was at first anticipated. Consumption, on the other hand, has been impaired by the aggressive competition with manganese ore from Spain, Cuba and Brazil, especially in the United States markets. Consequently exports from Batum and Poti in 1901 amounted to only 279,963 tons, showing a heavy falling off as compared with the previous year.

THE U. S. GEOLOGICAL SURVEY IN ITS RELATION TO THE PRACTICAL MINER.

By S. F. EMMONS.

The value of Mr. Rickard's criticisms upon the work of the Survey in its relations to mining geology, as published in *THE ENGINEERING AND MINING JOURNAL* last week, depends very much on the point of view. His is that of the Western miner to whose energy and enterprise the immense and rapid development of our mineral wealth, as we are all willing to admit, is mainly due. From that point of view he is perhaps justified in saying that timeliness is the most essential element of a geological report, and that when a report is delayed beyond the point of practical utility to the miner in the special district treated, it fails to accomplish what was the chief reason for its preparation. That is, however, not the point of view of those who originally planned and have since had the direction of the mining work of the Geological Survey, and I have reason to believe that it does not correctly represent the views of some of the more broad minded and intelligent of our miners.

There are, of course, several different methods upon which this work might be carried on, and, among these, that was chosen which it was thought would accomplish results of most permanent value to the mining community as a whole.

The fundamental principle of the method of work adopted has been that its primary object is to endeavor to determine the general laws which govern the formation of ore deposits, the immediate aid that may be derived by any mine owner or group of mine owners in working their private property being of secondary consideration, though, of course, a result to be aimed at. Until these general laws are determined any attempt at prediction in any individual case is worse than useless; but their determination requires the most careful consideration and weighing of results. The time occupied in the actual field work of the survey of a mining district forms as a rule a very small proportion of the total involved in the preparation of a report. The rock and ore specimens gathered must be subjected to careful, detailed, chemical and microscopical examinations, the maps of underground workings must be reduced to a common scale and correlated accurately together, before the piecing together of the underground rock structure can be begun, and this is only a preliminary, but a very necessary one, to such deductions as may lead to the formulation of general laws.

It must be borne in mind that what we designate our mining geology is only a very small part of the work of the Geological Survey, which was organized for the purpose of making a geological map of the three million square miles which form the original area of the United States and as a preliminary work has found it necessary to conduct a topographical survey of that area. To this area has since been added that of Alaska, and our insular possessions will doubtless be included in the near future.

Our government has been more generous in its pecuniary endowment of geological work than that of any other nation, but in spite of this generosity the zeal and energy of those engaged in gathering material and preparing reports is constantly outstripping the facilities provided for engraving and printing them, so that delays on this score are likely to increase rather than decrease as time goes on.

In carrying out the principle outlined above as governing the mining work of the Survey, inasmuch as it has manifestly been impossible to study all mining districts at once, those have been first chosen in which the extent of underground workings in actual operation and the peculiarities of geological structure promised to make us most intimately acquainted with all the varied phenomena of ore deposits, and hence to yield the most important scientific results. That these results should prove of immediate practical importance to those engaged in working the particular mines examined, while a most desirable object was considered of relatively secondary

importance and one to the accomplishment of which no jot of scientific accuracy should be sacrificed.

When mines have been opened to such a depth as to prove the most remunerative objects of study from a scientific point of view, they are likely to be dangerously near the zenith of their production, and the report on them, when it appears, may, as Mr. Rickard expresses it, be in the nature of an obituary to the owner of those particular mines. In the case of Silver Cliff and Ten Mile, the most important mines had been closed down before the original field study of the district was completed, and the waiting till their reopening should render an examination possible caused a delay of many years in the publication of the reports; for we are unable to draw any useful deductions from mines that are inaccessible, and do not feel justified in accepting the observations of another unless verified, in part at any rate, by our personal examinations.

In the case of Rico, the work was done as part of a general survey of the whole San Juan region, which has for some time been carried on under the direction of Mr. Cross. Until the extremely complicated areal geology of the surrounding mountains had been unraveled, it was useless to attempt to make a fundamental study of the ore deposits. It is to be regretted that by the time this was accomplished many of the mine workings were more or less inaccessible. But where only a handful of geologists are available to carry on such work, it is manifestly impossible for the Survey to have representatives at every mining district during the time of its maximum development.

It is not true, however, as Mr. Rickard seems to assume, that the reports that have appeared too late to be of use in the practical development of the district of which they treat, have failed of their purpose. Those of which he speaks most slightly have been the most fruitful in establishing general principles, which are applicable to similar deposits the world over. This may not appear evident to the busy miner whose all-absorbing interest is to get the most out of his own particular mine in the shortest possible time. From our point of view, however, it is to the mining engineer rather than to the government geologist that he should look for aid. We stand between nature and the mining engineer, and our duty is to furnish him with the general laws that he is to apply intelligently to individual mines or deposits. If our work is unduly hurried, we may not be able to arrive at any general deductions, or those we think to arrive at may prove false, and then be worse than useless.

I am quite agreed with Mr. Rickard as to the importance of mutual co-operation between the mining engineer and the government geologist. More than fifteen years ago I urged upon the members of the American Institute of Mining Engineers that those who are in charge of mines keep some record of the phenomena coming under their daily observation, and from time to time publish papers thereon, using very much the same arguments that Mr. Rickard does in his paper. Especially is it important for us to have access to the maps of underground workings, but unfortunately all mine owners do not as yet realize of how much actual money value to their property is the keeping up of accurate underground surveys, and where this is not done the record of abandoned drifts is almost irrevocably lost.

I fear, however, that it will be many years yet before the means at our disposal will enable us to detail geologists to keep a continuous record of underground phenomena in all important mining districts, and until that time arrives we must be dependent upon the good will and intelligent co-operation of the mine owner and mine superintendent.

IRON IN SWEDEN.—During the first three months of 1902, the production of pig iron in Sweden amounted to 123,300 tons, as against 146,200 tons in the first three months of 1901; 113 furnaces being in blast, as against 132. There were exported 8,400 tons of pig iron, as against 9,200 tons last year.

THE CANADIAN MINING INSTITUTE.

In accordance with the policy of the Institute, inaugurated at the last annual general meeting, a successful start has been made with the organization of district branches of the Institute. These have been formed in Eastern Ontario with headquarters in the city of Kingston and in the Eastern Townships, with Sherbrooke as a center. Other branches will be formed later in British Columbia, at the Sault, at Rat Portage, in the Province of Nova Scotia, and at other points. The membership of the Institute, which now includes close upon 400 active members and nearly 100 student members, has been considerably augmented by the acquisition of the two new sections.

Eastern Ontario Branch.—The meeting at Kingston was well attended by local mining men, and considerable interest was taken in the proceedings. Dr. W. L. Goodwin, director of the School of Mining, occupied the chair. A motion to the effect that "The Eastern Ontario Section of the Institute be now formed" was then put to the meeting and adopted. The following gentlemen handed in their names for nomination to membership subject to the approval of the Council: Dr. W. F. Coy, H. W. Richardson, Geo. Smith, John Donnolly, G. O. Grover, J. A. Madill, A. M. Chisholm, Fred A. Folger, jr., Joseph Francklyn, R. E. Kent, all of Kingston; David Williams, Port Arthur; A. H. Brown, Deloro; Fred. Foxton, Sydenham; Thos. Caldwell, Lanark.

The following committee of management was then elected: Dr. W. L. Goodwin, Kingston, chairman; P. Kirkegaard, Deloro; Prof. Carr-Harris, Kingston; Prof. S. F. Fitzpatrick, Kingston; John Donnolly, Kingston, secretary.

Dr. Goodwin then read a paper on the subject of "The Occurrence of Mica in Eastern Ontario" which, after some interesting discussion, it was decided to take up again at the next meeting of the section.

The question of the establishment of the proposed new Department of Mines was also discussed and the local secretary was authorized to wire to the Minister of the Interior endorsing the proposals to establish such a department and urging its organization at the earliest possible opportunity.

At the meeting there was exhibited a very handsome series of phlogopite crystals from the Stoness-Kent Mine, and some very fine samples of molybdenite from the Chisholm Mine near Kingston.

The section adjourned to meet again at the call of the chairman.

Eastern Townships Branch.—The meeting of the Institute for the purpose of organizing a local Section to the Eastern Townships was held in Sherbrooke, Que. Mr. George R. Smith, general manager of the Bell's Asbestos Company, was called to the chair.

The chairman, in opening the meeting, referred to the influence and importance of the Institute, which had done much to promote the interests of the mining profession in Canada. A local branch of the Institute would give facilities for local mining men to meet together, and would doubtless be made an excellent medium for advancing the great mineral wealth that they knew existed in the Eastern Townships.

Mr. B. T. Bell, secretary of the Institute, explained that the main idea the council had in organizing these branches was to give greater opportunities for local mining men to meet together than were afforded by the annual meetings of the Institute. By the formation of such a branch in Sherbrooke he thought much could be accomplished on behalf of the mines and mineral wealth of the district.

Mr. S. W. Jenckes, Sherbrooke, moved "That the Eastern Townships Branch of the Canadian Mining Institute be now formed." Mr. James R. Pearson, Danville, seconded the motion. The chairman put the motion, which was carried unanimously.

The following gentlemen handed in their names for election as members subject to the approval of Council: James R. Pearson, Danville; H. J. Williams and J. A. Dresser, Richmond; James R. Woodward, Wm. Farrell, James MacKinnon, W. S. Dresser, Sherbrooke; P. L. G. Mackenzie, Richmond.

The following committee of management was elected: George R. Smith, chairman; H. J. Williams, Thetford Mines; S. L. Spafford, Capelton; John Blue, Eustis; James R. Pearson, Danville; B. Bennett, Thetford Mines; James S. Mitchell, Sherbrooke; A. S. Johnson, Thetford Mines; R. T. Hopper, Montreal; J. Dresser, Richmond. Mr. James R. Woodward, Sherbrooke, was elected secretary *pro tem*.

Mr. C. C. Hansen, Montreal, read a very interesting paper on the subject of "Power Drills." Mr. F. Stacey Shirley read a paper on "Electric Drills," in which he described the new Gardner electric machine.

An abstract was then read of the paper on the "Copper Bearing Rocks of the Eastern Township," presented by Mr. J. A. Dresser at the annual meeting of the Institute last March. This was discussed by Messrs. Adams, Smith, Bell, Woodward, Farwell and Obalski. The opinion was generally expressed that the copper resources of Quebec were much more extensive than has generally been supposed, and that important developments are possible. At the close of the discussion a special committee was appointed to consider what action can be taken towards developing the copper resources of the Province, a report to be made at the next meeting. The committee consists of Messrs. George R. Smith, Wm. Farwell, J. S. Mitchell, S. W. Jenckes, J. A. Dresser, C. C. Colby, A. N. Thompson, John Bene, S. L. Spafford, A. N. Thompson and J. P. Woodward.

BISMUTH PRODUCTION IN 1901*

By JOSEPH STRUTHERS, PH.D.

The production of bismuth ore in the United States in 1901 amounted to 318.6 short tons, as compared with 220 short tons in 1900. Colorado supplied the entire output, Lake County contributing 253.6 tons, carrying from 4 to 10 per cent bismuth, and Ouray County 65 tons, which varied in bismuth contents from 6 to 12 per cent. The ore averaged from 1 to 2 ounces gold and from 5 to 6 ounces silver per ton, for which the producers were paid. The price for the bismuth content varied from \$8 to \$11 per unit. The demand for metallic bismuth is limited, and producers in this country are little inclined to report the details of annual production and market conditions. As nearly as can be ascertained, the value of the 318.6 tons was \$25,488, less deductions for transportation and treatment charges, or an average of \$80 per ton. The ore was purchased by the Leadville Sampler, at Leadville; the State Ore Sampling Works, at Denver; or was shipped direct to Johnson, Matthey & Company, Limited, England.

The world's supply of metallic bismuth is controlled by the combined interests of Johnson, Matthey & Company, Limited, and the Government of Saxony, who regulate absolutely the production and the prices of the metal and its ores. It is stated that the supply of this metal greatly exceeds the demand, and that this condition has necessitated a combination of interests in order to maintain the price at a figure which would be remunerative to mine owners. The schedule of prices for ore is based on the market price of metal, and with the latter at \$1.25 a pound the following prices were paid on delivery at the smelting works, all deductions for treatment having been made: Ten per cent ore, \$150 per ton; 15 per cent ore, \$250 per ton; 20 per cent ore, \$350 per ton; 30 per cent ore, \$550 per ton; 40 per cent ore, \$750 per ton; 50 per cent ore, \$1,000 per ton.

The imports of bismuth into the United States in 1901 were 165,182 pounds, valued at \$239,061, against 180,433 pounds, valued at \$246,597, in 1900. In addition to this there was a small importation of bismuth in medicinal preparations.

The monthly average wholesale prices per pound for the metal, f. o. b. works, during 1901 were: January to March, \$2.25; April to June, \$2.05; July and August, \$2.02½; September, \$1.64; October to December, \$1.50.

*Extract from *Mineral Resources of the United States, 1901*. United States Geological Survey.

The occurrence of bismuth is widespread, and it is found in both the combined and the free state in many of the Western States. The principal bismuth minerals occurring in Colorado are bismuth carbonate, which is found in Lake, Larimer, Boulder, and Chaffee counties; native bismuth, in Summit, Jefferson, Boulder, and Larimer counties; bismuth tellurate and telluride in Boulder and Ouray counties; and sulpho-bismuthite in Park, Custer, Ouray, Hinsdale, Clear Creek, La Plata, Boulder, San Juan and Lake counties.

CALIFORNIA OIL WELLS.

[SPECIAL CORRESPONDENCE.]

The following shows the condition of the producing oil districts in California as they existed in May:

	Producing.	Shut in.	Drilling.
Coalinga	30	39	11
Santa Maria	3	4	4
Midway	2	13	9
Sunset	14	64	8
McKittrick	27	39	7
Kern River	241	320	20
Summerland	245	..	..
Newhall, Santa Paula and Ventura	274	24	15
Los Angeles	972	..	16
Fullerton and Brea Canyon ..	55	10	26
Whittier	64	..	18
Puente	35	..	4
Totals	1,962	513	138

The approximate daily yield for April was 36,000 barrels. The State has now 1,962 producing wells and 513 capped and 138 drilling wells. The stocks on hand May 1 amounted to 2,780,000 barrels.

The Southern Pacific Railroad Company let contracts lately for eight new oil-storage tanks. Of the new tanks two will be placed in San Francisco, each of 55,000 barrels capacity. Others will be distributed as follows: Tracy, 55,000 barrels; Port Costa, 55,000; Alameda Point, 55,000; South Vallejo, 30,000; Roseville Junction, 20,000, and Sacramento, 30,000. The company will also distribute smaller tanks along its line. The company has ordered 250 new oil-tank cars, with a capacity of 13,000 gallons each.

AN IRON COMBINATION IN RUSSIA.—The *London Engineer* says: "Trusts as such have found but little favor so far in the eyes of the authorities in Russia. Nevertheless, 16 South Russian ironmasters wish to form themselves into a syndicate under the modest title of the Leading Company for Trade in Metallurgical Products. These ironmasters represent a total yearly output of 745,150 tons of various sorts of iron goods, and of 300,000 tons of cast iron. But there are two works, the Drushkoff and Novorossiisk, which have refused to join the syndicate. Their output is 166,111 tons of various kinds of iron work and 63,620 tons of cast iron, and this represents nearly 25 per cent of the total output of the firms forming the syndicate. Thus the refusal of the two firms mentioned to join the proposed syndicate has delayed its formation. Still, the 16 ironmasters forming the syndicate have not abandoned all hope of being able to win over to their side the two outstanding firms at a final conference. It is said that the chief cause of the refusal of these two ironmasters to join the syndicate has been removed, and that their refusal was based upon a disinclination to break off their relations with their old customers. In any case, M. de Witte, the Minister of Finance, will have the last word in the matter, for individual effort and private enterprise in Russia are dependent still upon the approval of the Czar's Ministers."

SALT LAKES AS HEAT ACCUMULATORS.

—Recent experiments made by Alexander Kaleczinski at the salt lakes near Szovata in Transylvania, show that the sun's heat absorbed by the brine in the lakes is largely retained. These lakes are at elevation of 1,600 feet above the sea, and have an average depth of 30 feet. While the surface temperature varied with that of the atmosphere, the salt water was found to be much warmer from 4 feet below the surface down. At a depth of 5 feet the salt water was 150° F. in September, and went down to a minimum of 80° F. in April.

LABOR CONDITIONS IN JOHANNESBURG.

By T. LANE CARTER.

After so great an event as the declaration of peace, a letter from this part of the world might prove of interest to the JOURNAL's readers. For many days past, about the only topic of conversation on the mines, has been the probabilities of the Boers giving up the prolonged struggle. When the news was given out from the principal churches last Sunday night, there was a profound sigh of relief, even from those who were Boer partisans, that at last the day of peace had dawned. But the signing of parchment, the declaration of peace, does not settle the great difficulties that this country will soon have to face. The local press, as usual, over-optimistic, banishes all the problems and declaims this to be "the grandest, richest, best land God's sun ever shone upon, with a future more glorious than ever a nation experienced, since the morning stars sang together," etc. In spite of this declaration, our troubles are not over, nor will they be for a long time to come.

Let us first speak of labor, as that is one of the most pressing problems of all. The kaffirs, known to the mining people here as "boys," have in the past been the rough laborers of the mining industry. Under the new regime, an all powerful organization, known as the Witwatersrand Native Association, has been formed to recruit for natives. All the mines contribute to the association, which obtains the native labor. When the kaffirs arrive, they have no choice as to which mine they are to work on, but are apportioned to the next mines on the list. There is a fixed scale of wages for the "boys," and no mine manager is allowed to give a kaffir more than the schedule wage, under a very heavy penalty. The wages agreed upon is certainly small compared to that in force in 1896, for now 1 shilling a day is the average pay, while in 1896 it was over 2 shillings per day.

The Native Labor Association has many critics, who predict that before the "boys" can be persuaded to come back in thousands, more money must be offered. They say that the present pay is too small and poor judgment has been shown in the distribution of the kaffir pay. For instance, an air drill runner's boy, who after some months becomes fairly expert, receives the same pay as a raw kaffir just from his home. It is believed to be a poor policy to place all the boys on the same footing. Some say that if the pay for efficient kaffirs was £2 5s. per month, so that the boys, who very much dislike to break into gold sovereigns, could put aside the two gold coins and spend the 5 shillings, there would be less discontent.

When a gang of kaffirs comes to Johannesburg they are generally signed on for three to six months. I am sorry to say that a very large per cent return to their homes as soon as the time is up. The pessimists declare that these boys go back to their homes dissatisfied with the wage, and warn their brethren to stay clear of Johannesburg, where the wage is no higher than it is nearer home, and if in the future it is decided to raise the wage to over £2, it is freely predicted that difficulty will be experienced in getting the kaffirs to believe the statements.

Of course the rate of pay in no way affects the town people. There is just now an enormous demand and a very limited supply of kaffir labor in the city. In consequence the rate of pay has gone up a great deal, kaffirs receiving from £1 to £1 10s. per week. The kaffirs on the mines are naturally attracted by this high wage, and when their time is up on the mines, many go to work in the city instead of returning to their kraals. So one can see what a desperate time we are having on the mines.

The cool headed members of the community declare that the city requires 25,000 kaffirs, and when this number is exceeded the rate of pay in Johannesburg will become practically the same as it is on the mines.

Against the opinion that the present scale of pay is too low, I might mention an interesting fact. The Native Labor Association agreed to procure 500 boys for the town council, in order to enable

it to carry on the absolutely necessary sanitary work of the city. Although 2s. 6d. per day was offered the kaffirs to do this sanitary work, all of them preferred working on the mines for 1 shilling a day. Possibly the objectionable character of the work prevented them from accepting the much higher rate of pay.

There has been some friction between the independent contractors and the Native Labor Association. A few contractors managed to get a few boys and paid them whatever they liked. This has been stopped, and when working for the mines they are only allowed to give the blacks the same wage that the mere kaffirs receive.

I fear it is impossible to introduce the idea of working the kaffirs on the contract system. First, one is only allowed to pay them a fixed wage, no matter how much they do; and then, it is undesirable that the kaffir earn too much money. He is very quickly satisfied, and as soon as he can save enough money to buy himself one or two wives he will leave the mines forever, and go home to spend the rest of his life in idleness. This is one of the reasons why his wage is placed so low.

At present kaffir labor is very scarce, and everything is done to use the natives we have to the best



KAFFIR "BOYS" WITH SAMPLE-BAGS.

advantage. For this reason balanced planes are being used in flat stopes, to get the ore out, numerous air and percussion drills are being used, and in fact labor is being saved wherever it is possible.

On account of the scarcity of native labor some mines are working entire departments with white labor alone. There are quite a number of discharged soldiers and destitute Boers who are made use of in this way. These laborers are paid 5s. to 7s. 6d. per day, with rations. White laborers in many parts of the world do rough labor satisfactorily, but out here there is the color distinction, and a white man, no matter how hard up he is, despises to do what he calls "nigger work."

The fact that on some of the mines white men are doing "nigger work" makes the skilled laborers ask many questions that are hard to answer. Just now skilled labor is being paid at the same rate as before the war, probably the highest rate in the world. Most of the miners are on contract, and if they work hard and intelligently they draw handsome checks every month. Most of the miners see that it is probable that wages will come down if whites do the rough work, but they all seem to think it will last for a year or so, when they hope to have enough money to clear out.

Although it is probable that the pay for rock drill men will fall, I believe that miners will always be the highest paid artisans on the Rand, on account of the high mortality amongst them. Hundreds and hundreds of machine men have gone home to England to die of "miner's complaint," caused by the irritating siliceous dust in the mines. Those

men who have been in the tunnels and raises where the dust is worst, have suffered most. The fact of the slow danger does not diminish the number of applicants for rock drills on account of the high pay. A good deal of discussion is going on in scientific circles here, regarding the prevention of this high mortality, by the use of aspirators, dust settlers, etc.

How many people from different parts of the world do you suppose have signified their desire of coming to Johannesburg? Will you credit it, that 1,000,000 people have expressed the hope of coming to this place? This number might seem large, but I fear it is not far from correct; and shows what we are to expect when the place is thrown open to the world. What is this vast army going to do? I have shown that the bulk of the labor of the mines has been done by kaffirs. On a mine employing 3,000 boys, between 300 and 400 white men are at work. The demand for white men is determined by the number of kaffirs obtainable, and increases slowly. In fact, could natives be obtained in sufficient numbers, they would be used more and more in place of rock drills, etc., and the number of white men working on a mine would grow less and less.

What, then, is to happen if a huge mass of unskilled labor flocks to this place, as will in all probability come about? One or two things, it seems to me. With thousands of white men, out of work, the mines will be forced to take them on as rough laborers, and they will gradually supplant the kaffirs as the laborers on the mines, with a wage perhaps a shade higher than in other parts of the world; or, the whites who arrive with nothing to do, will be pushed out upon the land and outside districts, leaving the kaffirs to the mines.

I need hardly say that the workers now here devoutly trust that the incoming whites will go to the land, so that the high wages on the mines might continue. They have insight enough to see that it will be impossible for the mines to pay the skilled man £1 per day, and the unskilled from 5s. to 7s. 6d. They think the rates will fall to what exists in the Western mining camps in America, about \$1.75 for laborers and \$3 to \$3.50 for skilled men.

The workmen here are devoutly hoping that martial law might continue for a long time, so that it will be impossible to have a mad rush for Johannesburg.

The present feeling of labor can be appropriately described as "nervous." They fear every innovation and are continually jumping at the conclusion that wages are going to be reduced. A good illustration of this is a strike that went on for some time at the Crown Reef Mine. The management placed up a notice that the piece work system would be introduced in the shops, and all the men stopped working. No amount of reasoning could persuade them that it was not the management's intention to bring down wages, but rather to get from each man a fair day's work for a fair day's pay, and prevent loafing. Being British workmen, they declare the system to be one of the worst things introduced from America, and are afraid of it.

I was told that a manager of one of the largest gold mines here, where the men are accustomed to receive so much per shift, did not introduce the contract system in the mine for fear of a strike. For that mine it would be something new, and the men would declare it was being introduced to bring down wages.

It will be unfortunate if any serious misunderstandings between employer and employee come about, for the past has been singularly free from strikes and from the curse of a dictatorial miners' union and work has always been carried on harmoniously. "The easiest managed labor in the world," I heard a distinguished engineer pronounce them the other day.

Some people here are taking too sanguine a view of the future of the Rand gold mining industry, it seems to me. Frequently in the daily papers some one writes describing the enormous strata of gold-bearing reef being left in the mines, too poor for the present conditions, but sure to be worked

some day. These enthusiasts cry out against the prediction made by the celebrated American mining engineer, John Hays Hammond, who has said, I believe, that the cream of the industry will be gone in 33 years. Mr. Hammond is well informed and his prediction is safer than that made by some people here of 100 years and over. These enthusiasts also go into ecstasy over the other minerals of the country, but I fear it will be a very long time before South Africa can compete with the world, except in gold and diamonds.

Johannesburg, S. A., June 5, 1902.

THE ESPERANZA MINE, EL ORO, MEXICO.

The total extent of the underground workings in the Esperanza Mine is somewhat over 12 kilometers. The andesitic overflow or capping is about 300 feet thick, and the first level is run in from the shaft towards the vein at a depth of 354 feet from the surface. Each succeeding level is run in at distances of 100 feet below the first, down to the seventh level.

The main vein averages about 140 feet in width and is 2,600 feet in length. The zones of millable ores running the length of the vein are three—two of 5 feet each and one of 20 feet. The average grade from top of vein to bottom of fifth level is \$15 gold and 5 ounces silver. The large bodies of low-grade ores, averaging \$4 gold and 2 ounces silver, are left standing. The cross-cut from the shaft on the seventh level is now within 25 feet of the vein, and diamond drill holes run in ahead have proved the width and value of the vein to be unaltered at this depth.

The new 4-compartment shaft, situated to the north and in the center of the property, has reached the fourth level, and preparations are being made to run it down to the seventh level at an early date. When the two shafts shall have been connected on this latter level, together with the connection with the Mexico shafts to the north, a nearly continuous orebody of 300 feet in height and 2,600 feet in length will be added to the present ore reserves of the mine. There has lately been installed an Ingersoll-Sergeant

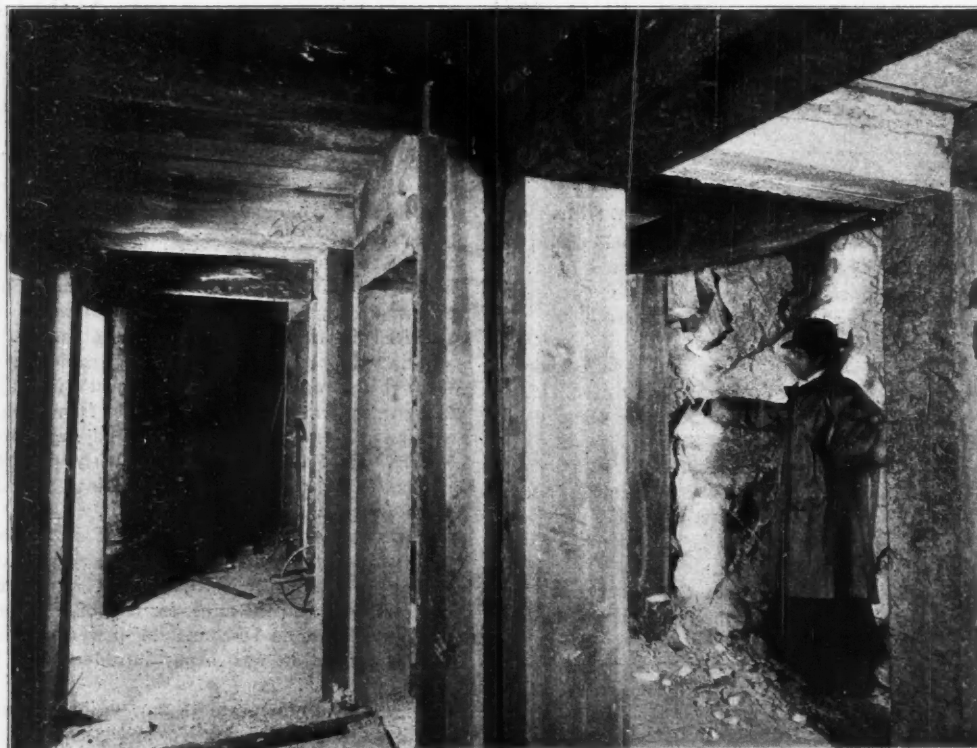
the north shaft, together with two Lidgerwood hoists, one with 14 by 18-inch cylinders, and the other with 18 by 24-inch cylinders. At the old shaft a direct acting flat-rope hoist with cylinders 18 by 24 inches has long been in operation.

At the mill two boilers of the 5 by 18-inch class have just been added, making six in all, which furnish an abundance of power for everything.

this camp, nothing is heard about it on the outside. A steady progress is being made in all the mines, however, and this has practically demonstrated the value and permanency of the veins in spite of the prognostications to the contrary of would-be experts, whose only claim to distinction is that they depreciate or "throw down" any mine they are sent to examine and report upon, so as to be on the safe side.



1,400 STATION, SPECULATOR MINE, BUTTE, MONTANA.



STOPE 50 FEET WIDE, 1,000 LEVEL, SPECULATOR MINE, BUTTE, MONTANA.

compressor of 3,600 cubic feet free air capacity per minute. A 300-kilowatt Westinghouse dynamo, to run pumps, lights and rock breakers, has just been put in operation, together with a large duplex pump, to be run by the same dynamo. This latter is placed on the seventh level and has a capacity of 500 gallons per minute with a 1,000-foot lift.

Six return tubular boilers, 8 by 18 feet, will soon be running at the old shaft and four of the same kind, but 5 by 18 feet, have already been put in at

The 120-stamp mill is running without interruption, crushing about 6,500 metric tons per month through a 40-mesh screen. The Sirio Mine, which was closed down last year, is reported to have been acquired by the Esperanza company, with the view of obtaining right to the numerous springs situated on that property. In effect, a pump has already been installed and a 4-inch pipe line laid over to the Esperanza, which is thus insured against a water famine.

As there is a complete absence of any "boom" in

UNDERGROUND IN THE SPECULATOR MINE AT BUTTE.

In our issue of June 21, page 862, we published a description of the Speculator Mine, one of the important independent copper mines in the Butte District in Montana. We have received two interesting photographs taken underground in this mine, which came too late for use with the article referred to, but are given herewith. The first view was taken on the 1,400-foot level, at present the deepest in the mine. It shows the station at the foot of the shaft. The second shows a stope 50 feet wide, on the 1,000-foot level. This photograph illustrates the system of timbering in use in the mine. Both are excellent specimens of underground photography.

MONTANA METAL PRODUCTION.

The report prepared for the Director of the Mint by the Assay Office at Helena gives the production of metals in Montana for the calendar year as follows:

	1900.	1901.	Changes.
Gold, ounces.....	229,114	232,331	I. 3,217
Silver, ounces.....	14,294,835	14,180,866	D. 113,969
Copper, pounds.....	245,998,365	228,031,503	D. 17,966,862
Lead, pounds.....	16,044,751	11,504,892	D. 4,539,859

The decrease in the output of copper and silver was wholly in the Butte District. Outside of that district there was an increase in all the metals, with the exception of lead.

NEW COAL DISCOVERY IN ENGLAND.—

It is stated that there has been an important discovery of coal near Rowley village in Staffordshire, England, where excavations have been going on for some years. The seam which has been struck is reported to be about 480 feet from the surface. It is calculated that there will be about 15 acres of first-class coal within the mining estate. The discovery, which has been made only after an expenditure of nearly \$100,000, has given the greatest satisfaction throughout the district.

MINES AND METALLURGY BUILDING AT THE ST. LOUIS EXPOSITION.

The Mines and Metallurgy building forms part of the east wing of the fan-like general ground plan of the Exposition, and is the last building on the south side of the esplanade leading to the group of Government buildings, which are to stand on a higher level. It will have a rich background of hillside foliage toward the southeast. Considered as part of the general scheme, it plays a very unimportant role in the spectacular display of the fair, and for this reason no attempt has been made to force attention to it by such means as towers, domes, or similar architectural devices.

The outside dimensions are 525 by 570 feet. The building is divided into eight oblong parts almost

The walls of the building are set back from the facade 18 or 20 feet, forming a covered loggia which surrounds the entire building. The facade of the Mines and Metallurgy Building may be likened to a screen bearing the same relation to this structure as do the colonnades of the adjoining buildings to their structures. The base of this screen consists of sculptured panels illustrating in bold relief mining and metallurgical operations in symbolical representations, the background to the sculptured figures being of a rough golden colored glass which will be illuminated at night and show the figures in silhouette. The figures are more than life size. As a building for housing exposition exhibits it was argued that it should express externally as much friendly dignity as would be compatible with its ephemeral character,

charge of experienced and competent men. The chief of the department is Prof. J. A. Holmes, State Geologist, of North Carolina, a man thoroughly familiar with all branches of the mining industry and who has represented his State at all the recent expositions with exhibits that have attracted every visitor. Dr. W. S. Ward, of Denver, has been appointed field commissioner. Dr. Ward is also an experienced mining man, highly educated, and familiar with exposition work, having been associated with the Mining Departments of the World's Columbian Exposition, at Chicago, and the Universal Exposition at Paris. Dr. David T. Day, of the United States Geological Survey, who has been connected with every important exposition since and including the Centennial, is honorary chief of the department. Mr.



MINES and METALLURGY BUILDING

MINES AND METALLURGY BUILDING, ST. LOUIS EXPOSITION.

equal in area. The division is accomplished with glass covered and ventilated arcades, from 30 to 50 feet wide, which makes it possible that each one of the eight divisions shall receive abundant light from every side and that no skylights shall be necessary directly over any of the exhibition spaces. At the intersection of the two principal arcades through the main axis a colonnaded rotunda is shown with an appropriate monument.

The ground floor will furnish an exhibition space of about 265,000 square feet, and about 150,000 square feet may be gained by the introduction of galleries. A sub-division of the exhibit space into numerous alcoves for each classification is suggested.

but that it undoubtedly should be novel, striking, and full of life.

The style of architecture which it represents has been a source of much speculation. Mr. Theo. C. Link, the architect of the building, suggests the name of "Secession" architecture, which, he says, means architectural liberty and emancipation with a strong plea for individuality. It is a breaking away from conventionality in design; it is more an architecture of feeling than of formula.

It is proposed to make the mines and metallurgy department of the Louisiana Purchase Exposition the most complete exhibition of its kind ever attempted, and to this end the work has been placed in

Victor C. Heikes, also an experienced exposition man and a mining engineer, is chief clerk. The plans are for making a thorough systematic and educational display of mining and metallurgical methods and products.

THE TRANS-CAUCASUS RAILROAD.—

Work has been begun by the Russian Government on the extension of the Trans-Caucasus Railroad from Erivan to the frontier of Persia. The terminus will be at Julfa, on the Aras River. Part of the road will pass through a country said to be rich in manganese ore and other minerals.

A HALF-YEAR IN THE LEADVILLE DISTRICT, COLO.

By J. O. HEIMBERGER.

A review of the work done in the mines of the Leadville District for the first half of 1902 shows a very encouraging condition of affairs. The production was about 360,000 tons of all classes of ore. During January and February, owing to a poor sulphide market, the tonnage fell to about 50,000 tons a month, but it has gradually climbed up again and is now averaging 70,000 tons.

The two most important mining events so far have been the forming of a company to drain the Fryer Hill Mines, which work is well under way, and the big consolidation of the A. M. W., the Mahala and the A. Y. and Minnie mines. The most important future certainties are the immediate increase of capacity of the Arkansas Valley Smelter, the proposed introduction of electric power, the completion of the Ohio and Colorado Smelter at Salida and the new zinc smelter at Pueblo.

In the downtown section, while some propositions are in a comatose state, the general results have been satisfactory and the future outlook is good. The Home is shipping 200 tons a day and the Sixth Street a heavy tonnage for the steel works. The Coronado is leased to a strong company that will develop it and make heavy shipments from the iron bodies exposed. The Caribou is shipping over 100 tons daily and can increase its manganese output as soon as the market opens. The Northern, the Seely and a number of smaller propositions are also developing under lease, while the Valentine, recently reorganized, expects to be working in the near future. It is also expected that Mr. Higgins will resume sinking on his new Homer shaft near the Boulevard and the Cloud City Company announces that it will continue operations.

In the vicinity of Carbonate Hill and Graham Park much headway has been made. The A. M. W. sulphide shoot is shown to be of great size; the recent purchase by Eastern men of the entire combination including the Mahala and the A. Y. & Minnie means that the low grade sulphide bodies of the combination will be developed to an extent never before attempted by small operators. The Small Hopes people, in addition to having a good share of their territory operated by lessees, all of whom are shipping on a small scale a fair grade of ore, have conducted operations steadily through the R. A. M. and have shown their sulphide shoot to be of great extent in the lower contacts. Although they had no market for a long time they are now shipping again from the sulphide ore bodies. The Rialto people did not do much this year owing to differences among the stockholders and a lack of funds, and finally closed down entirely a few weeks ago; but an effort is being made to have the leases transferred and to have new people open up the extension of the ore shoot of the Greenback supposed to be in this ground. The Nubian and the P. O. S. have shipped a good deal of ore during the year, while the same combination has developed considerable territory on its Morocco shaft in the downtown section, but has it closed down awaiting the securing of a lease from the city. The Evalyn people got into the sulphides but are sinking to get under the ore bodies. The Greenback has proved its shoot of iron sulphides to be large, and recently sent a shaft down a further depth in order to be able to mine more advantageously; this work resulted in opening up an entirely new shoot in the ground, and shows the Greenback to be one of the greatest mines on the slope. The Midas is still shipping regularly 200 tons of fine iron ore a day and has not yet found it necessary to go below the first contact, while its iron shoot is opened up in all directions. The Arnold Leasing Company and a number of other companies are carrying on prospecting work with very favorable indications.

One of the greatest strides forward was made by the Fryer Hill section, where 60 days ago the Fryer Hill Mines Company launched its enterprise which covers 150 acres of the best located territory on the

hill, including 15 shafts already opened up. The pumps of the company operating through the El Paso claim are handling 1,200 gallons of water per minute and in 60 days the mines will be drained and ready for the active development laid out for both the upper and lower levels. Work in the upper contacts of a number of properties has already been set under way. In addition to this work there are still dozens of lessees operating on the iron bodies of this locality on different parts of the hill and a good tonnage comes from that locality.

There are a number of lessees working over on Rock Hill and some shipments are made; there is some talk of a combination being formed to put down a deeper shaft. On Iron Hill a large amount of excellent work is under way while a good tonnage is also being made. The Iron Silver Mining Company is shipping 200 to 250 tons a day from its Moyer workings and is also doing development and prospecting work on its Stevens ground. The Yak company and its tributary workings are producing about 200 tons a day, and an important fact is that the tunnel is to be pushed into the Ibex ground, thus opening up the gold belt at a greater depth than ever before attempted. Great bodies of zinciferous ores have been opened up in different parts of the Iron Hill section. The Iron Mine and the A. Y. & Minnie have shipped a large tonnage of this material. A new mill is just being completed at the A. Y. & Minnie which will be of great assistance to the new combination in conducting the work planned for this great property. The Naylor Mining Company has completed its shaft to the lower contacts, has opened up large bodies of low grade sulphides, and is now carrying ahead important prospecting work at the 700-foot level. The Cora, the Montgomery and a number of other claims are in operation, all seeking for the extension of the Iron Hill shoots.

On Breece Hill, in Big and Little Evans' gulches, on Little Ellen Hill and over the rest of the gold belt the first half of the year has seen progress in the way of development. While there have been no new strikes of any great extent, the new work has proved very satisfactory and systematic development has opened up larger ore bodies than ever. In the Resurrection shafts the great sulphide shoots are shown to be of enormous extent and the same can be said of the New Monarch workings; these people will soon have their smelter in operation at Salida and will then ship 200 to 250 tons daily from their ore bodies, which have been extensively developed during the past six months. The Salida and Fortune companies have both started for the extension of these shoots and while no work is now being done, it is likely that before the close of the year both of these properties will be working to open up the sulphide bodies. The recent forming of an Eastern company to operate the Valley combination also promises well for that large acreage which has lain idle for several years. The Ibex people have gone ahead developing and have been shipping about 6,000 tons a month, but this has recently been increased since the company has made its new contract with the smelter. An important and valuable piece of work will be the extension of the Yak Tunnel into the Ibex territory giving them an opportunity to cut the ore bodies at a depth never before attempted. The Diamond Company has put its shaft into lower contacts and is drifting for ore. The Pennsylvania Company has been shipping a steady tonnage of about 1,500 tons a month from its low-grade siliceous bodies; while some prospecting work with the diamond drill has been carried on for the sulphides nothing has been located as yet in the lower contacts. The Ballard has done nothing but a little prospecting work since the first of the year; there are large bodies of low grade ore in sight but the work has been delayed by legal difficulties.

The Gold Basin Mining Company, the La Belle Company, the Antelope Company, the Big Six lessees, the Vinnie lease, the Chippewa, the Lillian lessees and a number of other smaller companies have been mining and making some shipments, and all are carrying ahead important work, while the Ohio, the Forest City, the Banker, and others have announced

their intention of seeking further for the gold belt ore-shoots in their territory.

In the outlying localities there is more work under way and with better results than for years past. There are many properties scattered along the outskirts of the producing sections where something is being done. The most important is the work in Sugar Loaf on the Dinero, the Bartlett, the Fanchon and other neighboring propositions. In Empire and Iowa gulches, Eastern capitalists are carrying on extensive work. In St. Kevin, after years of idleness, some two dozen different lessees are operating. In Alicante, Lake Park, Weston Pass, Horseshoe, Homestake, Big and Little English gulches and other outside localities prospectors as well as lessees are doing good work and are in many instances meeting with success and adding to the known mineralized area of the Leadville District.

AMERICAN COAL IN SWITZERLAND.

The United States Consul at Aarau, Switzerland, reports that there are excellent opportunities for American coal in that country. Switzerland hitherto has been almost wholly dependent on Germany for her coal. During the last year the German mining companies formed a combine and raised the price 2.50 francs (48.2 cents) a ton. The Swiss manufacturers had to accept these conditions. An English firm profited by the situation and shipped coal up the Rhine to northern Switzerland. As the cost of the English coal was 1.50 francs (28.9 cents) per ton less than the German coal, considerable orders went to England, but these orders were badly executed.

In the meantime, the American Consuls in Switzerland sent reports to the United States upon the state of affairs, and a United States concern promptly seized the opportunity and offered coal at a cheaper price than either the English or the Germans. American agents appeared on the spot and solicited orders. In the French ports of Havre and Rouen, ground was bought and storehouses were erected. Agreements have been entered into with the French and Swiss railway companies to secure cheaper freight rates for the transport of coal through France.

The impression seems to prevail that American coal will in the near future take the place of the German and English coal in Switzerland.

PETROLEUM IN CENTRAL ASIA.—According to London *Engineering*, the petroleum deposits in Tergana, the most easterly of the Russian Provinces in Central Asia, are at present attracting considerable attention. Petroleum seems to exist in almost all parts of the province, and it is in many places found together with a black asphalt-like substance, which is called "kurr," and which is already being somewhat extensively exploited for asphalt purposes. The richest deposits appear to be in the Andishan District, along the borders of the river Malu-Su, and in the Margelan District. The former have recently been examined and a number of borings carried out. The latter, known as the Tschinson deposits, are situated some 16 miles from the town of Margelan, and about 12 miles from the railway station of Vannowskoja, on the Central Asian Railway. These deposits have already been worked, in days long gone by, by the Chinese, it is surmised, but when the Russians took possession of the province, the petroleum industry was revived in a primitive manner, although the yield was somewhat important. The matter was again dropped, from want of capital and want of transport, but the building of the Samarkand-Andishan Railway gave a fresh impetus to exploitation, and a company has been formed with a capital of 250,000 roubles. The oil-carrying layers are located at a considerable depth, probably about 1,000 feet. Preparatory work for the construction of a pipe to the Vannowskoja Railway has already been commenced, and the building of large tanks is under contemplation. The petroleum is likely to find a ready sale for the Central-Asian and the Orenburg-Tashkent railways.

DRY CRUSHING OF ORE.

(CONTINUED FROM PAGE 9.)

One of the most interesting parts of Mr. Argall's paper is that in which he outlines the design of a plant capable of crushing 400 tons per 24 hours of ordinary quartzose ore to pass a 26-mesh screen (No. 26 wire) and estimates the cost of its operation. Such a plant is best arranged in duplicate, 200 tons per day making a convenient unit, which will be capable of independent operation. For coarse crushing and sampling, a 12 by 20-inch breaker, reducing to 1.7 inch size is provided, giving an easy capacity of 25 tons per hour with ordinary ore; in case the ore comes mostly in lumps of 12 inches or more, however, two breakers should be used in series with a screen between them. Where talcose and very wet ores are to be sampled in quantity, a drier should be provided, as it is often impossible to crush and sample such ores in their wet state, and in bad cases they should be dried before going to the breakers.

Following the breaker or breakers, a 36 inch by 16 inch roll, at 35 revolutions per minute, will give about 600 cubic feet per hour through a 0.75-inch screen. For sampling purposes, the product of the 36-inch roll is passed over a Vezin sampler, and 25 per cent taken out for the sample, say 120 cubic feet per hour, which should be deflected to a 26 by 15 inch roll to be crushed to 3 mesh 10 wire, 0.1983 inch, or, in round numbers, 0.20 inch. At this size about 6 per cent is ample for a correct sample, but, to be quite safe, one-tenth or 12 cubic feet per hour may be cut out; if the ore does not contain over 5 per cent moisture, the sample, 2½ per cent of the original, can be passed directly to a fine grinder, reducing it to 10 mesh 18 wire, 0.0525 inches, and again cut to one-tenth = 1.2 cubic feet per hour, or 0.2 per cent of the original volume; if damp, the sample is then dried and ground, then passed over a small Vezin sampler, or riffled, as found most desirable, being finally finished in the manner previously described.

The Vezin sampler with the necessary operating gear costs about \$100. It requires a fall of about 6 feet. It can be installed together with one set of rolls, a sample grinder and a riffle sampler for \$500 to \$750.

Such a sampling works should easily handle 200 tons in 10 hours, provided the lots are of 50 to 100 tons each. Time is always lost in cleaning up between two separate lots of ore, and must be allowed for. Two such units will take care of the sampling of 400 tons per day of 10 hours with comparative ease. It is best to do all the sampling in the daytime. The methods of weighing the ore and determining its moisture contents at the works of the Metallic Extraction Company, were as follows: The ore was usually weighed on railroad track scales with self-registering beams; when the beam is balanced, a soft paper card is slipped into a slot and the lever pulled down, stamping the gross weight on the card. The car number, lot number and date are then written on the card, which is filed away until the car returns unloaded, when the same operation is repeated for the tare. The weighmaster enters the weights in his book and sends the card to the settlement clerk, who keeps it until the lot is settled for. The card helps to settle many disputes as well as prevent errors in reading the beam. The moisture sample is taken from the rejected portion of the ore passing the cutters, say three times for each car, taking equal quantities and placing them in a can. When the last is taken, the can is shaken to mix the ore and 1 pound is then weighed up in the presence of the seller, placed in a tray and put in a steam-heated drying closet and kept there, locked up, usually for 24 hours, when it is weighed again in the presence of the seller. In the case of talcose ores, which are difficult to put through the crushers without a preliminary drying, the moisture sample is best taken from the car immediately after weighing.

Each unit of the fine crushing plant will comprise one dryer, three elevators and four sets of 26 by 15 inch rolls, with the necessary screens, etc. The rolls are arranged in series, *a* reducing from 0.75 to 0.25 inch, *b* from 0.25 to 0.1085 inch, *c* and *d* from 0.1085

to 0.02 inch. Roll *a*, at 65 revolutions per minute, will give a finished product of 222 cubic feet per hour, of which 60 cubic feet should pass a 0.1085-inch hole (5-mesh screen) and will, therefore, go directly to rolls *c* and *d*, leaving 162 cubic feet per hour for roll *b*. Roll *b*, at 90 revolutions per minute, will give 160 cubic feet per hour through a 5-mesh screen. Of the material reduced to 5-mesh size, 60 + 160 = 220 cubic feet per hour, 75 cubic feet will already be pulverized to 0.02-inch size, so that rolls *c* and *d* will have to take care of 220 - 75 = 145 cubic feet per hour. These rolls at 110 revolutions per minute, with 0.25-inch choke feed, will each finish 75 cubic feet per hour under ordinary working conditions. The capacity of the four sets of rolls, reducing from 0.75 to 0.02 inch, will be, therefore, 220 cubic feet per hour = 9.5 tons (reckoning 87 pounds per cubic foot), which will correspond to 200 tons in about 21 hours, or at any rate easily in 22 hours. The power required will be as follows: Coarse crushing and sampling, 35 indicated horse-power; fine crushing, 50; friction of engine and shafting, 20; total, 105 indicated horse-power. The coarse crushing and sampling mill require 70 indicated horse-power while running, and a power plant large enough to allow for that must be provided for each unit; this part of the plant will run only half time, however, which gives an average of 35 indicated horse-power per 24 hours. In crushing 200 tons of ore to 0.02-inch size in 24 hours, the work of 1 indicated horse-power is 400,000 ÷ [24 × 105] = 158.73 pounds per hour. In the fine crushing alone it is 400,000 ÷ [24 × 50] = 333 pounds per hour. These data are from actual results in practice. In comparing the efficiency of crushing plants, it is obviously necessary to reckon all the power required; not merely that for the crushing machines themselves, but also for their accessories such as screens, elevators, etc. It will be observed that Mr. Argall's figures are based on the total power requirement. Mr. Argall is also precise in reducing his results to pounds per hour, which is a definite statement, whereas, the expression of tons per day is not. In the latter case the reader is left in doubt as to whether the ton is of 2,000, 2,204.6 or 2,240 pounds, while the day may be anything—8, 10, 12, 20 or 24 hours.

The cost of crushing 400 tons of ore per day to 0.02-inch size in such a two-unit plant will be as follows: Coarse crushing and sampling—Labor, \$0.04325; waste and lubricants, \$0.00620; brooms and brushes, \$0.00060; tools, \$0.00210; sundries, \$0.00060; total operating expense, \$0.05275 per ton. The maintenance will come to \$0.05420, divided as follows: Labor, \$0.0232; fittings, \$0.0006; nails, bolts and screws, \$0.0010; timber, \$0.0015; iron and steel, \$0.0017; belts and lacing, \$0.0041; castings (pulleys, gear, etc.), \$0.0002; brass and babbitt, \$0.0003; elevator buckets and bolts, \$0.0018; chain and sprockets, \$0.0014; conveyors, \$0.0022; roll shells, \$0.0020; crusher repairs, \$0.0114; clutches, \$0.0008; sundry items, \$0.002. The total cost of maintenance and operation, not including power and general expense, is, therefore, 10.695 cents per ton. The labor in operation per shift of 10 hours is as follows: One-half time of foreman, \$2.50; 2 men at breakers, \$4; 2 men at samplers and conveyors, \$4; head sampler, \$3; assistant sampler, \$2; roustabout, \$1.80; total, \$17.30; \$17.30 ÷ 400 = \$0.04325. It is assumed that the ore is delivered to the breakers.

Fine Crushing.—The operating expense per ton of ore is as follows: Labor, \$0.07625; lubricants and waste, \$0.01510; tools, brushes and brooms, \$0.01300; coal for drying, \$0.02140; total, \$0.12575. The cost of maintenance is as follows: Labor, \$0.0446; nails and screws, \$0.0005; lumber, \$0.0004; brick and fire-clay, \$0.0015; iron and steel, \$0.0118; belts and lacing, \$0.0243; pulleys and gears (castings), \$0.0102; babbitt and brasses, \$0.0623; screen cloth and perforated sheets, \$0.0206; elevator buckets and bolts, \$0.0088; chains and sprockets, \$0.0021; conveyors, \$0.0017; roll shells, \$0.0181; clutches and couplings, \$0.0006; sundry fittings, \$0.0025; total, \$0.15000. The grand total is therefore \$0.12575 for operation plus \$0.15000 for maintenance, or \$0.27575. The crew of the fine crushing department per shift of 8

hours is one man at the feeders and dryers, \$2; one man at the 8 sets of rolls, \$2.50; one man oiling and sweeping, \$2; one man attending to screens, \$2; total per shift, \$8.50. Three shifts at \$8.50, together with the wages of foreman at \$5, come to \$30.50, and \$30.50 ÷ 400 = 7.625 cents per ton.

The total cost is, therefore, summarized as follows: Coarse crushing and sampling, 10.695 cents per ton; fine crushing, 27.575 cents; power (estimating \$72 per indicated horse-power per annum, the engine being non-condensing), 10.500 cents; total, 48.77 cents, or, say 50 cents in round numbers. This does not include general expense (administration, insurance, taxes, etc.), or any deduction for amortization.

It is interesting to compare the above figures with the data communicated by Mr. N. F. White as to the results at Mount Morgan, where fine crushing is done both by means of rolls and by ball mills, the installation of the latter for this purpose being perhaps the most complete and extensive that has yet been made. The Mount Morgan ore, which is soft and friable, containing about 10 per cent of hard quartz, is treated by the chlorination process. The first plant installed comprised a Blake breaker, a dryer, and four sets of Krom rolls, together with the necessary screens, elevators, etc. The success of this plant led to the installation of another one, consisting of two units, each equipped with a Krom breaker and four sets of Krom rolls, arranged in series. The dimensions of the rolls and the distance of their faces apart were as follows: No. 1, 26 by 15 inches, ¾ inch; No. 2, 26 by 15 inches, 3-16 inch; No. 3, 30 by 16 inch, 1-16 inch; No. 4, 30 by 16 inches, close together. The ore was crushed to pass a 20-mesh brass wire screen, data not given, but with apertures probably of about 0.025 inch. The cost of crushing per ton of ore was as follows:

Operation.	Mill No. 1.	Mill No. 2.
Wages	2s. 6.40d.	2s. 6.20d.
Stores	2.80d.	3.90d.
Firewood	1s. 2.50d.	2s. 0.50d.
Cartage	2.30d.	.....
Water	0.57d.	0.52d.
Electric light.....	1.43d.	0.59d.
General expense.....	1.18d.	0.57d.
Total	4s. 5.18d.	5s. 0.28d.
Maintenance.....	.....	.....
Wages	3.52d.	5.20d.
Stores	10.67d.	10.80d.
Timber	0.22d.	0.18d.
Mechanics' work.....	6.28d.	5.21d.
Total	1s. 8.69d.	1s. 9.39d.
Grand total.....	6s. 1.87d.	6s. 9.67d.

In the new mill the rolls were driven at 112 revolutions per minute. The wear of the tire steel was 0.108 pound per ton of ore crushed. The capacity was 125 tons per day, and 100 indicated horse-power was required. (It is not stated in this paper whether the tons meant are of 2,240, or 2,000 pounds, but presumably they are the former.) Mr. Argall computes that the work done at Mount Morgan, in crushing to 0.025-inch size, is 116.66 lb. per indicated horse-power hour, as compared with 243.6 pounds per indicated horse-power hour in the plant (of practically the same equipment as to number of machines), which he has outlined, crushing to 0.025 inch, and presents these figures as a comparison between the latest Colorado practice with modern rolls and the Mount Morgan experience with less efficient machines. This assumes of course that the Mount Morgan ore is of about the same weight per cubic foot of finished product and of about the same crushing quality as the Colorado (Cripple Creek) ore. We think, however, that the data are lacking, not merely as to the character of the ore, but also as to the details of the Mount Morgan practice, to justify this deduction of more than double duty per indicated horse-power, inasmuch as the Krom rolls, although now greatly improved upon by others, are, nevertheless, a high class of machine. It is obvious that Mr. Argall recognizes the deficiency in data as to the Mt. Morgan practice and makes his computations rather for the purpose of illustrating the high efficiency of modern American roll crushing than as an absolute comparison of types of rolls.

In a year's run with the 8-roll mill at Mount Morgan, during which 45,844 tons of ore were crushed, the average cost of operation and maintenance, not including electric light, water supply,

RECENT DECISIONS AFFECTING THE MINING INDUSTRY.

SPECIALLY REPORTED.

LIABILITY FOR MONEY ADVANCED FOR MINING COMPANY.—The act of one stockholder of a mining company in furnishing money from his private means to another stockholder for the immediate relief of such company and to keep it "a going concern," is a sufficient consideration to support a promise to repay the same.—*McKinney v. Armstrong* (97 *Illinois Appellate Court Reports*, 208); Appellate Court of Illinois.

LIABILITY OF IRON COMPANY FOR TERM EMPLOYMENT.—A discharged employee who claims a hiring by the year will not be precluded from recovering his wages accruing for the balance of the year by applying for and receiving a letter of recommendation from his employer, where he notifies such employer that he claims under a yearly contract, and intends to enforce it.—*Wright v. Elk River Iron Company* (89 *Northwestern Reporter*, 1,053); Supreme Court of Michigan.

SUFFICIENCY OF ALLEGATION OF NEGLIGENCE OF MINING COMPANY.—The complaint in an action by a miner for injuries from an explosion of dynamite, which alleges that the superintendent of the mining company was negligent in failing to warn such miner of the existence of dynamite at the place where he was working, is sufficient without also alleging that the superintendent had notice of the dynamite being at that place.—*Robinson Mining Company v. Tolbert* (31 *Southern Reporter*, 519); Supreme Court of Alabama.

EVIDENCE THAT JUSTIFIES FINDING AGAINST MINING COMPANY.—Where a miner was injured by the falling of rock from the roof of a mine, and it appeared that it was not propped or timbered, and that there had been a heavy fall of rock from the same place a month before and that small pieces fell therefrom occasionally, it justified a finding that the defect had existed for such a length of time that the company had constructive notice of its condition.—*Cushman v. Carbondale Fuel Company* (88 *Northwestern Reporter*, 817); Supreme Court of Iowa.

PROOF OF LONG EXISTING DEFECT JUSTIFIES FINDING OF NEGLIGENCE.—Where a trestle used to supply coal to locomotives had been constructed for nearly 12 years and some of the boards out of which the floor of it was made were half decayed, a jury will be justified in finding that such floor was rotten and dangerous, and had been so for a sufficient length of time for the proprietor in the exercise of reasonable care to learn of its dangerous condition and to have repaired it.—*McLean County Coal Company v. Simpson*, (97 *Illinois Appellate Court Reports*, 21); Appellate Court of Illinois.

SUFFICIENCY OF NOTICES OF PLACER MINING CLAIM.—A sufficient location of a placer mining claim is made by notices upon a stump in a creek, of a claim running 1,500 feet along the creek bottom and extending 300 feet each way from the center of the creek, adding that it is an extension of another claim named, a certain distance from the first falls on said creek. The location of a mining claim by an alien, and the rights following from same, are not void but voidable, and are therefore free from attack by any one other than the Government.—*McKinley Creek Mining Company v. Alaska United Mining Company* (22 *Supreme Court Reporter*, 84); Supreme Court of the United States.

SUFFICIENT DESCRIPTION OF LOCATION OF QUARTZ VEIN.—A location certificate, reciting that the locators have located 600 linear feet along a quartz vein, by 300 feet on each side of the middle of the vein, and giving the name of the mine located, and the county and territory, and describing it as commencing at a stake situated 300 feet northwesterly

from a known mine, and stating that it is an extension of another known mine, and running thence along the vein in a southerly direction to a similar stake and notice, is a sufficient description, under section 2,324 Revised Statutes of the United States, and section 3,102 of the Laws of Idaho.—*Morrison v. Regan* (67 *Pacific Reporter*, 955); Supreme Court of Idaho.

WHEN SELLER OF COAL LAND WILL ONLY BE LIABLE FOR NOMINAL DAMAGES.—Where an owner of coal land gives a written option to another to purchase the land, and agrees to furnish a complete abstract of title, and the buyer shortly before the expiration of such option notifies the owner of his intention to take the land, and requests the abstract, and nothing further is done for 2½ years, when a second request for an abstract is made, and the same is refused, and thereafter the owner sells to another party, and the evidence tends to show that in doing so he acted in good faith, on the assumption that the first party had abandoned his contract, the owner will be liable only to nominal damages, in an action against him for breach of contract.—*Emeru v. Regester* (17 *Pennsylvania Superior Court Reporter*, 482); Superior Court of Pennsylvania.

AMENDMENTS OF LOCATION CERTIFICATES.—Under the laws of Idaho a location certificate may be amended, and such amendment relates back to the original location, provided it does not interfere with the existing rights of others at the time the amendment is made. An agent or any one authorized to do so can make an amended or additional location of a mining claim without authority in writing. Descriptions in mining claims referring to natural objects and permanent monuments should be liberally construed, and a reference to a known mine as being so many feet distant will be a sufficient reference to such object or monument. Where it is shown that the location was made in good faith any reasonable construction of the language used in the notice in the description and reference to objects will be sufficient.—*Morrison v. Regan* (67 *Pacific Reporter*, 955); Supreme Court of Idaho.

LIABILITY OF MINING COMPANY FOR GAS IN MINE.—In an action for the death of a boy caused by the explosion of gas in a mine, a verdict against the company will be sustained on appeal where the evidence tended to show the presence of explosive gas in the mine at least four days prior to the accident, in dangerous quantities; that such gas had accumulated in a room within about 30 feet from the entry where the boy was killed, and where naked lights were used by the miners without objection on the part of the superintendent; and that a person who was not a certified fire boss had been employed as such by the mine foreman with the knowledge of the superintendent.—*Kless v. Youghiougheny Mining Company* (18 *Pennsylvania Superior Court Reports*, 551); Superior Court of Pennsylvania.

MERE MAKING OF RULES WILL NOT PROTECT MINING COMPANY.—The mere making of a rule by a mining company that "every person accepting employment in the mine does so with full notice of the danger from falling roof and coal, is one of the usual risks of his service, and he will govern himself accordingly," and posting the same in the mine, with a notice that "all employees must read and understand the rule, which is required by law and made to secure their safety, and which every employee by remaining in the service of the company agrees to abide by and obey as a contract between him and the company," will not constitute a contract between the company and its employees to assume the danger of falls from the roof of the mine as one of the usual and ordinary risks and hazards of his employment. For an employer cannot by a contract with his employee, in consideration of the employment, exempt himself from liability for injuries sustained through the negligence of the employer.—*Consolidated Coal Company v. Lundak* (97 *Illinois Appellate Court Reporter*, 109); Illinois Appellate Court.

RISK THAT IS NOT ASSUMED BY MINER.—A mining employee, who, at his foreman's direction, engages in picking a hole in the side of an entry, near the roof, into which a cross-timber is to be inserted for the support of the roof, and who is injured by the fall of the roof during his work, is entitled to recover from the company, the risk not being one assumed by him, where the foreman knows that the roof is cracked, and fails to support it by temporary props, as should be done, and where the employee himself does not know and is not advised of the condition of such roof.—*Wahlquist v. Maple Grove Coal and Mining Company* (89 *Northwestern Reporter*, 98); Supreme Court of Iowa.

DUTY ON GROUND SULPHIDE OF ANTIMONY.—Ground sulphide of antimony is not entitled to free entry under paragraph 476, act of July 24, 1897. Grinding operates to take such merchandise out of the provisions of that paragraph, which is limited to sulphide of antimony in a crude state. Crude sulphide of antimony ore is that product produced by separating the sulphide of antimony from the gangue and slag. Such advanced antimony is dutiable under section 6 of said act as an unenumerated manufactured article.—*Appeal of Schieffelin & Co. from Collector of Customs at New York*; Board of General Appraisers.

ABSTRACTS OF OFFICIAL REPORTS.

Compagnie du Boleo, Mexico.

This company operates extensive mines and smelting works at Santa Rosalia, in Lower California. Its report is for the year ending December 31, 1901. During that year the quantity of ore taken out was 275,635 tons, against 261,170 tons in the previous year. The production in fine copper was 10,956 metric tons, against 11,297 tons in 1900, showing a decrease of 341 tons. The average tenor of the ore in copper was 3.95 per cent, against 4.29 per cent in 1901.

In accordance with the programme which was laid out two years ago, the company has gradually developed the system of stoping out the pillars of ore left in the first exploitation. While advantage has been found in economy of working and in the better utilization of the deposits, on the other hand, the tenor of the ore was somewhat lower than it would otherwise have been. There has been practically no change in the condition of the mine, and the tonnage of ore in sight has been somewhat increased by exploration work. It is quite probable that the fall in the price of copper will make it advisable to modify the method somewhat, and to practice a certain selection of the ores, as was done when the mine was first opened. It would be imprudent, however, to go too far in this way, since this would sacrifice the future of the mine to the present, and would involve possibly the exhaustion of the richer ore which is needed to make the proper mixture for the smelters.

In the smelting works, the old buildings in which the company had gradually built up a number of units of small capacity, have been entirely demolished, and the material which could be used has been added to the stores. All the smelters are now of new model, having a capacity of 150 tons per day each. There are eight of these in service, while two others are under construction. Other improvements have been made and are still in progress, which will very much improve the methods of handling ore, fuel, etc., and of disposing of the furnace slags. There are still some of these improvements to be completed.

The company's railroad transported 490,470 tons during the year. The cost of maintaining the road was somewhat increased by a heavy washout in September. The equipment was increased by 10 ore cars, 6 coke cars, 1 special car and 8 large eight-wheeled platform cars, which were built in the shops at Santa Rosalia. The material handled at the port amounted to 104,722 tons, besides 7,235,000 feet of lumber. This was an increase of about 10,000 tons and 165,000 feet of lumber over 1900. The cost of

handling this freight was reduced, notwithstanding eight cargoes of coke were discharged into the stock heaps.

The contract for the transportation of copper having expired, new agreements were made by which shipments of matte and bars are now made by rail from Guaymas to New Orleans, and are loaded at the last named port on steamers for Europe. In order to assist in the transportation from Santa Rosalia to Guaymas, the company purchased a sailing vessel of 357 tons register.

The improvement of the port was continued and the jetty has been extended to a length of 384 meters. It is intended to make this jetty 500 meters in length. The stone is supplied from a quarry opened by the company. The sum of 375,000 francs has been set aside for the construction of buildings, chiefly houses for the working people. The water service of the port has also been improved and several reservoirs have been built on the Yaqui plateau with new pumps at Santa Aguede and at Santa Rita. A good deal still remains, however, to be done, to procure a sufficient and satisfactory supply of water for the company's employees, as well as for the machinery. One of the steps to be taken is the building of a new conduit from Santa Agueda to Santa Rosalia. The number of workmen employed by the company at the close of the year, was 3,324. The highest number employed at any time during the year was 3,871, in July. The electric light service has been extended and arrangements have been made for pumping sea water in case of fire.

The company has purchased a tract of 11,920 hectares lying southwest from the mine, which will be used principally for the raising of cattle to supply food for the employees.

No decision has been reached as to working the mines at Inguaran. The exploration done so far has not resulted so well as was expected. There is an abundance of ore, but it is not sufficiently rich to be worked with profit under present conditions, especially in view of the high rates of transportation. The point to be decided, is whether the construction of a railroad will pay, and without the railroad it will be difficult to operate these mines.

The financial statement shows that there were paid for improvements and new machinery, 1,744,235 francs. Depreciation amounted to 208,844 francs. Charges for amortisation and reserve funds amounted to 1,191,925 francs. The total profits after deducting these charges amounted to 1,206,502 francs, showing a large reduction from the preceding year. This reduction was due, partly, to the lower tenor of the ore, and the smaller production of copper, partly to the higher cost of fuel and supplies, but chiefly to the fall in the price of copper and the consequent lower value of the stock remaining on hand at the end of the year. From these surplus earnings after paying the interest on bonds and other necessary charges, it is proposed to pay a dividend of 20 francs per share on the ordinary stock, and 15.58 francs per part of the founders' shares.

Some difficulties have been encountered during the year in maintaining the force of workmen at the mines. The chief reason for this is found in the general prosperity existing in Mexico, and the demand for labor elsewhere, and at many points where the conditions are more favorable than at this company's mines.

Mount Lyell Mining and Railway Company, Tasmania.

The directors' report of this company for the half-year ending March 31, 1902, says that operations at the mine has been systematically carried on, resulting in an output of 134,170 tons. The grade of ore produced has been well maintained, being somewhat higher in assay value than that mined during the previous half-year. Work of an exploratory nature has been carried on in the lower levels with a view of defining the trend and extent of the high grade ore proved in the upper working, and of ascertaining the position of the main pyritic body. In addition

to the above operations, considerable quantities of metal-bearing flux have been obtained from the company's South and Royal Tharsis properties, the former being the principal source of supply of this siliceous flux during the half-year.

At the reduction works during the half-year 136,799 tons of pyritic ore have been treated, the metallic contents showing a slightly increased value over those for the preceding six months. In addition to the output from the mine, the furnaces have treated 32,411 tons of ore purchased from the North Mount Lyell, Lyell Tharsis and Mount Lyell Blocks companies, as well as 14,182 tons of metal-bearing fluxes from the company's South and Royal Tharsis flux mines. The total was 183,392 tons. The output of blister copper has been 5,163 tons, containing 5,108 tons of copper, 342,589 ounces of silver, and 10,652 ounces gold, being an increase of 103 tons of metallic copper, 28,274 ounces silver and 247 ounces gold over the previous period. The average result was 2.79 per cent copper, 1.87 oz. silver and 0.06 oz. gold per ton.

Since the close of the half-year the contract with the North Mount Lyell Company for the delivery of 50,000 tons of ore has terminated. The supplies of ore from the Lyell Tharsis and Lyell Blocks companies have been suspended during the greater part of the half-year, owing to the low prices for copper which have ruled during the period.

The profits from the company's railway during the period under review were £4,404, being £1,984 less than for the previous half-year, which may be attributed to the general depression in the district during the past twelve months.

The Tasmanian Government having reduced the freight rates on its Strahan-Zeehan line, it became necessary for the company, under the terms of the act, to submit its rates to arbitration with a view of determining whether such reduction should be applied to them. The award of the arbitrators was that it was not necessary for the company's rates to be reduced.

The output of the Port Kembla coke works has been maintained to meet smelting requirements, and several sales to outside sources were made from stocks on hand, the profit on these sales going to reduce the cost of the company's coke.

During the half-year advantage has been taken of the opportunity to acquire several leases in immediate proximity to the company's own property. The properties purchased were those owned by the Mount Lyell Reserve Copper and Gold Mines, and the Glen Lyell Copper Mining Company for the sums of £750 and £70 respectively. The former property offers favorable opportunities for exploration work, which has already been undertaken. The Glen Lyell leases were acquired with a view of consolidating the company's property.

The profit for the half-year amounted to £53,049 after writing off £3,814 for dividend and income taxes, £18,939 for depreciation on the company's plant, and of £5,404 for prospecting work. The marked disparity between the profits of the previous half-year and those now submitted is entirely due to the very heavy fall which occurred in the copper market and the low prices which have ruled during the half-year. The average price ruling for G. M. B. copper during the half-year ended March 31 was £56 12s. 6d., as against £68 for the previous six months. During the half-year two dividends have been paid, 2s. 6d. per share on October 1, and 2s. 6d. per share and 1s. 6d. bonus on January 3, aggregating £89,375; the dividend paid on October 1 being derived from profits earned during the previous half-year. A further dividend of 1s. 6d. per share, amounting to £20,625, was declared during the half-year, but was payable on April 2.

The cost of producing blister copper during the half-year was £1 1s. 3.21d. per ton of ore treated; being 1.14d. less than in the preceding half-year. The costs per ton for the half-year under review were as follows, reduced to United States currency: Mining, \$0.5578; removal of overburden, \$0.5000; smelting operations, \$3.5234; converting operations, \$0.5230; total, \$5.1042 per ton.

BOOKS RECEIVED.

In sending books for notices, will publishers, for their own sake and for that of book buyers, give the retail prices. These notices do not supersede review in a subsequent issue of the ENGINEERING AND MINING JOURNAL.

The Creswick Gold-field (Australia) and its Mining. By William Bradford. Ballarat, Victoria; E. E. Campbell. Pages, 62; illustrated. Price (in New York), 35 cents.

Subject Matter Index of Mining, Mechanical and Metallurgical Literature for the Year 1900. Prepared for the North of England Institute of Mining and Mechanical Engineers by M. Walton Brown, Secretary. Newcastle-upon-Tyne, England; published by the Institute. Pages, 222. Price (in New York), \$14.75.

Mineral Resources of the Province of Quebec, Canada. By J. Obalski, Inspector of Mines. Newcastle-upon-Tyne, England; reprinted from the *Proceedings of the Institution of Mining Engineers*. Pamphlet, 8 pages.

Register of Mines and Minerals of Inyo County, California. Prepared under direction of Lewis E. Aubury, State Mineralogist. San Francisco; published by the State Mining Bureau. Pamphlet, 14 pages; with map.

Bureau of Provincial Information, Bulletin No. 6. The Finances of British Columbia. By Hon. J. D. Prentice, Minister of Finance. Victoria, B. C.; Public Printer. Pages, 24.

Production of Antimony in 1901. By Joseph Struthers. Extract from *Mineral Resources of the United States*. Washington; Government Printer. Pamphlet, 10 pages.

Directory of American Cement Industries and Handbook for Cement Users. Second Edition, 1902. Edited by Charles Carroll Brown. Indianapolis and New York; the Municipal Engineering Company. Pages, 740. Price, \$5.

American Industrial Conditions and Competition. Reports of the Commissioners Appointed by the British Iron Trade Association to Inquire into the Iron, Steel and Allied Industries of the United States. Edited by J. Stephen Jeans, Secretary. London, England; published by the British Iron Trade Association. Pages, 590; illustrated.

BOOKS REVIEWED.

Twenty-fourth Annual Report of the Bureau of Statistics of Labor and Industry of New Jersey. William Stainsby, Chief of Bureau. Trenton, N. J.; State Printers. Pages, 516.

This report contains much information about the extensive and varied industries of New Jersey. Special attention is paid in it to labor statistics and labor conditions in the different trades. Strikes and labor troubles are also considered at length.

The Statistical Year Book of Canada for 1901. Seventeenth Year of Issue. Prepared and issued by the Department of Agriculture. Ottawa, Canada; Government Printing Bureau. Pages, 680.

This work contains, as usual, a large number of statistical tables, showing the progress of the Dominion of Canada in various lines, with comments and explanations in the text. It is a complete and convenient manual of the industries and commerce of the country.

Wilson's Hand-book of South African Mines, Etc. A Guide to the Kaffir Market. London, England; Fredc. C. Mathieson & Sons. Pages, 400. Price (in New York), \$1.75.

This is a convenient hand-book, containing a list of all the mining companies operating in British South Africa. It contains condensed accounts of the property owned, capitalization and dividends paid, with lists of directors and officers and such other information as can be given in a condensed form. The directory is prefaced by a few pages of general information and statistics of mining in the Transvaal and Rhodesia.

Transactions of the Association of Civil Engineers of Cornell University. Volume X, 1901-1902. Ithaca, N. Y.; published by the Association. Pages, 136; illustrated.

This volume contains a record of the proceedings of the Association, which is composed of students and graduates of the Engineering Department of Cornell University. There are a number of papers, principally on subjects relating to civil engineering and bridge construction, which will be found of interest in their special fields.

Tables for Obtaining Horizontal Distances and Differences of Level from Stadia Readings. Computed by Alfred Noble and William T. Casgrain. New York; Engineering News Publishing Company. Pages, 28. Price, \$1.

This is a new set of tables for use in connection with stadia work. The tables give distances and heights, and are prefaced by some directions as to the use of the transit in stadia work, and some illustrations of the method of employing the tables.

Statistics of the Colony of New Zealand for 1900. Compiled in the Registrar-General's Office, Wellington, N. Z.; Government Printer. Pages, 556.

This is a complete and useful compendium of the statistics of the Colony of New Zealand, presenting a variety of informations as to its people, government, industries, trade and other matters. It has evidently been prepared and arranged with much care.

Topographical Record and Sketch Book for Use with Transit and Stadia. By Daniel Lawrence Turner. New York: Engineering News Publishing Company. Pages, 92. Price, \$0.75.

This is a sketch and record book which, the author says, he has found of a very convenient form in his own work and with students. In each two consecutive or facing pages, the left-hand page is ruled vertically and horizontally, and may be used for level and other notes. The right-hand page has concentric circle and radial rulings, upon which sketches are drawn. The concentric circles are $\frac{1}{4}$ inch apart, corresponding conveniently to the ordinary scales used. The radial lines are 10° apart, the position of a point being easily interpolated to the nearest degree. The book is a very neat and convenient arrangement.

Report on the Kiandra Lead, New South Wales. By E. C. Andrews. Sydney, N. S. W.; Government Printer. Pages, 32; illustrated.

This is one of the detailed reports on different districts which the New South Wales Department of Mines prepares from time to time, with the object of assisting in the development of mining districts. The gold deposits of Kiandra were discovered in 1859, and quickly attracted about 15,000 persons to the locality; but the rich shallow alluvials were soon worked out, and the greater part of the population then departed. The deep Tertiary lead, from which the shallow gold deposits had been shed, was known to occur in close proximity to the first settlement, and its exposed edges, on the slopes of the hills, received some attention from the pioneer miners, and have been worked in a desultory manner by hydraulic sluicing almost ever since; but it is not practicable to work the central portions of the lead by that process, because of the thick overburden, consisting of beds of lignite and clay, and a capping of basalt, amounting to several hundred feet in the aggregate. Some parts of the deep lead have also been exploited by tunneling. It is evident, however, that a considerable amount of capital is required to systematically work these deposits, which are of great length and width, have a rather irregular bottom, and are troubled with a considerable quantity of water. With the object of attracting attention to this important but comparatively neglected goldfield, it was thought advisable to have a geological survey of it made, and the course of the lead defined. One of the results of

Mr. Andrews' work has been to show that there are two distinct Tertiary river deposits, which he has named respectively the "Kiandra Lead" and the "Round Mountain Lead."

Grundzüge der Siderologie. By Hanns Freiherr von Jüptner. Second part. Leipzig, Germany; Arthur Felix. Pages, 404; illustrated.

On the publication of the first volume of this excellent work, we referred to its great usefulness to all those interested in the important question of the internal structure of iron and steel, and the relation which the structure bears to the mechanical qualities of these metals. The second volume, now under review, deals with the constitution and properties of the iron alloys as affected by the thermal and mechanical treatment to which they are subjected. It is divided up into three books.

Part I reviews the researches of Roozeboom, Stansfield, Roberts-Austen and other eminent metallurgists on the separation of the several alloys by the cooling of the molten metal, and the influence the thermal treatment has on the constitution of the alloys. The cooling curves showing the points of separation of the entectics are given for all classes of iron and steel.

Part 2, which is devoted to the study of the physical properties of the alloys in their relation to the chemical composition, morphological structure and the thermal and mechanical treatment, opens with an extract from Prof. H. Wedding's discourse to the Vereins zur Beförderung des Generbfeisses emphasizing the necessity for absolute accuracy in analytical methods and advocating the adoption of a universal system. The effect of the several elements used in association with iron in steel manufacture on the iron, as regards the physical properties, is described at some length, each property being taken in turn. Part 3 discusses the relation between the constitution and the mechanical properties of the iron alloys.

Volume 2 of the "Grundzüge der Siderologie," is in every way up to the standard of the first. The difficult and manifold theories are set forth in plain straightforward language, and the results of the researches of the many experimenters are given in a comprehensive manner. The subject as a whole is ably dealt with, and if the third volume compares with the two already published, Herr von Jüptner will have done much to place this great subject on a sound footing by bringing together the opinions of the iron metallurgists and embodying them in his great work.

CORRESPONDENCE.

We invite correspondence upon matters of interest to the industries of mining and metallurgy. Communications should invariably be accompanied with the name and address of the writer. Initials only will be published when so requested. Letters should be addressed to the MANAGING EDITOR. We do not hold ourselves responsible for the opinions expressed by correspondents.

The Thunder Mountain District, Idaho.

Sir: I have lately seen your JOURNAL of May 24, containing my letter from Thunder Mountain. There is a little discrepancy in the date which I should like explained; the letter was written from near Thunder Mountain on May 7. I see my postoffice address was given at Mackay, but we afterwards changed our plans and came out by Salmon.

The same people who are booming a route as open, which will not be open for some time yet, published an article within 24 hours of reading my letter, saying that I did not go in the Dewey Mine, because no permit had been issued to any one of my name. Where did this reckless writer get his news so quickly from Thunder Mountain? There was no telephone or telegraph connection at that time, and it would take a good week to reach there and another to return.

The fact is that I took the samples myself, from within the tunnel, and gave them a fair test. I have no animus against the district and would be as glad to see it succeed as any one, but the facts at the time of my visit were as I have stated.

S. H. BROCKUNIER.

Reno, Nev., June 23, 1902.

The Geological Relations of the Potosi Limestone of Southern Missouri.

Sir: Your recent reproduction of Mr. Frank Nason's article on the "Geological Relations of the St. Joseph and Potosi Limestones" is a valuable contribution by a keen observer on a district that has received very little attention from able field geologists. It is a district in which the geological knowledge is largely like its technical or industrial development, or like Topsy, "it has growed," and very slowly and from a very humble origin. It is true that as a mining district it is almost entitled to veneration for an American field, as lead mining has been carried on continuously in the surface or shallow diggings on a small scale for about two centuries, making it one of the oldest mining camps in this country. But its modern development in the deeper disseminated lead ores only dates from their discovery in 1869, and real activity on a broad scale may be said to date back only ten years. In fact, capital is only just beginning to recognize its value and its bright future, as the heavy investments of Eastern capital that are now being made there is a very recent matter.

The old surface or shallow diggings were either confined to the mantle of surface clays, or to shallow work in the crevices or openings in the limestone, as working in the solid rock was rarely if ever attempted by the pioneer miners, or rather "diggers" as they were appropriately called. While occasional rich finds would make this clay digging temporarily quite remunerative, as a whole the yield was small and gave only very low wages on an average, so that capital was not attracted to the surface workings. They were worked by local labor, who were usually farmers during the farming season, and "gophered" for lead after the crops had been gathered. These shallow workings did not give much geological information, nor was any thorough study ever attracted to it, so that only very broad and even vague geological data was ever collected by the earlier State surveys.

As the deeper, disseminated lead deposits have slowly become better known, more attention has been given to the local geology, and the comparatively recent activity with its consequent innumerable diamond drill cores have greatly increased the available geological data that now awaits a broad, thorough master hand to evolve the geology of this very interesting and important district. When Mr. Arthur Winslow, as State geologist, was working on this district 1890-1894, there were few data available, and his studies were abruptly terminated by the besetting sin of most State geological work; so that his results have mainly the value of a reconnaissance. About the same time Dr. W. P. Jenney also worked over this field to some extent under the auspices of the United States Survey, but his main attention was devoted to the zinc fields in Southwestern Missouri, known as the Joplin District.

When Mr. Nason made his studies in 1901, he was handicapped by not only being confined to the limited area of his client's territory, but the local jealousies of competing corporations prevented him from securing the data and results of other older companies, a most unfortunate hiatus. Mr. Nason was the first to observe the very peculiar conglomerate that is well developed on the property he studied, which has since been called the "edgewise" conglomerate, as the flattened pebbles of limestone mostly stand on edge. This conglomerate bed he makes of still greater importance by using it as the dividing line between what is locally known as the "Potosi" and "Bonne Terre" limestones.¹

For there is a vertical range of about 1,000 feet in thickness, varying from 800 to 1,200 feet, under what is known as the second sandstone, and resting on what is called the Third or La Motte Sandstone.

¹This "Bonne Terre" has also been called the "St. Joseph," as it is in this formation that the St. Joseph lead mine occurs, but as this term is liable to be confused with a very different and much younger limestone that occurs about the city of St. Joseph, Mo., and as the St. Joseph Lead Company now has mines scattered all over St. Francis County, the term "Bonne Terre" is used, as it is so well and characteristically developed at the town of Bonne Terre, where the original St. Joseph Mine is still being worked.

This has been called the Third Magnesian limestone, and has been designated as Lower Silurian and also as Cambrian in age. It is the formation in which occur all the productive lead mines of Southeastern Missouri. This Third Magnesian limestone has been divided into two members of about equal thickness, the "Potosi" or the upper member, and the "Bonne Terre" or lower member. The dividing line between these two members has hitherto been drawn at the top of the shaly measures, from whence to the overlying second sandstone it is a well defined deep-sea magnesian limestone of light color that is rich in chert and quartz crystals in certain horizons. This old line Mr. Nason does away with and lowers it from 100 to 200 feet, so as to include in the Potosi a mixed series of shales, thin limestones, and limestone conglomerates, among which latter is the edgewise bed previously referred to.

While the proper place to draw this line may seem to be a purely scientific matter that should be discussed in a geological congress, since it is a repetition of all the problems of nature as to where to draw empirical lines, it is a very important matter to the local mining engineer. For thus far all the disseminated deposits have been confined to the lower or "Bonne Terre" division, while the pipe vein and stockwerke deposits occur in the upper or "Potosi" member. It is also of great importance in determining horizons and probable depths of drilling.

While the paleontologist may subsequently draw several lines through the Third Magnesian limestone series where the engineer and field geologist now only draws one, after the fossils have been carefully studied, this old line of demarcation at the top of the shaly series seems to the writer to have been well founded and the one that should still be retained in the light of present knowledge in working out the local problems.

For lithologically it is sharp and clear, and can be readily and promptly drawn in the field, which is impossible with Mr. Nason's line, as shales and conglomerates extend to the base of the Bonne Terre. This lithological difference is of unusual importance when the detailed structure of the two members is considered. For the upper or Potosi member is evidently a deep-sea magnesian limestone, as it is free from shale beds or shaly layers; it is also free from organic matter, as it is white to light gray in color, and it is very rich in siliceous matter as chert or drusy quartz crystals (called "mineral blossom"), which towards the middle, and upper portions are very abundant—exceeding 30 per cent of the formation in some beds. The Potosi limestone is thick bedded, very often gnarly, and usually has such a marked individuality, aside from the absence of shale or the presence of siliceous matter, as to be readily distinguished from the Bonne Terre, even though it is usually free from siliceous matter in the lower portions.

The Bonne Terre limestone is also magnesian, though to a less marked degree; it occurs both as thick and thin beds, and while often dark colored from organic matter, it is also light colored to even pink. But it is always free from chert, quartz crystals or other forms of free quartz, it is always associated with intercolated shale—either as shale beds or shaly layers—and it is often oolitic. Towards the base the Bonne Terre limestone is always associated with green chlorite, frequently in large amounts, whereas the Potosi never is, and it always contains some ferrous carbonate towards the base that oxidizes or "sunbeams" to brown on exposure, which the Potosi does not. The Bonne Terre formation also weathers, in certain horizons, into the cavernous form so well known as "petrified wasps' nests"—while the Potosi does not—and often shows sink-hole and open gash drainage on the surface, which are very rare in the Potosi.

The Bonne Terre limestone is a shallow sea or estuary limestone, as the intercolated shales are very irregular in their thickness, frequency, and color. For while they vary from 0.1 inch to 20 feet in thickness, they make up from 5 to 30 per cent of the formation, and while usually green, they are also blue to black in color.

Conglomerates occur in the lower portion of the Bonne Terre series, but are not as frequent nor as thick as in the upper 100 feet or so, where they form from 10 to 25 per cent of the formation. These conglomerates are always limestone pebbles in a calcareous paste, or matrix, and in the "edgewise" bed that made such an impression on Mr. Nason the pebbles generally stand on edge. These conglomerates emphasize the shallow character of the waters in the Bonne Terre period of formation, in marked distinction to the later deep submergence when the Potosi limestone was formed in deep quiet seas and at such a distance from the land that there were no currents to introduce conglomeratic material and no land washings to form shale beds. These upper or "mixed-beds" differ only in quantity and richness in conglomerates from the lower portion of the Bonne Terre, being similar and identical with the lower material conformable, and evidently formed under similar conditions. They are totally unlike in character, material and fossils with the immediately overlying Potosi limestone, yet Mr. Nason separates them from the similar deeper portion of the Bonne Terre, and calls them the basal member of the Potosi.

As the only definite line that can be drawn between the shallow-sea formed Bonne Terre and the deep-sea formed Potosi is when the sea-bottom became too deep and too distant from the land to receive land accumulations, and this means the disappearance of the shales. Hence the old line of demarcation that was drawn at the top of the shales seems to the writer to be the only logical and practicable position to separate this thick Third Magnesian limestone series into an upper or "Potosi" member, and a lower or Bonne Terre group. It has the further very eminent value of being a decisive line that can be readily drawn in the field.

As regards the evidence of fossils on this line being drawn at the top of the shales, it is even more favorable than the lithological evidence. For fossil remains are rich in the "mixed beds" or the upper portion of the Bonne Terre, as would naturally be expected when it is remembered that it is a shallow deposit of an estuary, gulf or shallow sea. They are less frequent lower down in the Bonne Terre, and in the basal portion where metamorphic action from chemical conditions have converted the shaly matter more or less completely into green chlorite, all fossil forms disappear except the lingulas, which with their highly resistant phosphatic shells have been able to survive the chemical action. As one rises above the shales into the Potosi limestone, the fossils disappear and none occur as far as the writer is aware in this great thickness of 300 to 600 feet of magnesian limestone, although the metamorphosed remains of the siliceous spicules of sponges, etc., are very abundant in the middle and upper portions of the Potosi as chert or quartz crystals—especially the latter.

As the fossils of the Bonne Terre series have not received thorough study as yet, it is premature to discuss its time equivalent, though Mr. Nason has provisionally placed it in the Cambrian. This time equivalent is not so essential to the technologist as there is no doubt it is very old—being at least in the base of the Lower Silurian if not older, so there is an ample time factor to permit the enormous concentration of lead that has occurred in the ore bodies of the Bonne Terre formation.

H. A. WHEELER.

St. Louis, June 30, 1902.

QUESTIONS AND ANSWERS.

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

Baryta, or Barium Oxide.—Will you kindly give me the names of parties manufacturing baryta

(BaO), anhydrous or hydrated, of commercial purity?—H. A. H.

Answer.—Barium oxide was formerly imported, chiefly from Germany. It is now made by the United Barium Company, at Niagara Falls, N. Y.

Manganese Ore.—Would an ore containing 48 per cent manganese dioxide, 14 per cent ferric oxide, 8 per cent silica, alumina, lime and magnesia have any market value. Location, Eastern Pennsylvania. For what is such ore used.—J. E. T.

Answer.—Manganese ore is now used chiefly in making ferro-manganese as spiegeleisen, for use in making steel. Your ore is not high grade, but there is a considerable demand for manganese, and a deposit in Eastern Pennsylvania should be of value, if it is of any extent. The customers for the ore are the large steel companies.

Witherite.—Please let me know the market price of witherite, prepared for the trade; also, please let me know if it has a ready sale.—J. C. S.

Answer.—The market price for witherite, or carbonate of barium, is quoted each week in THE ENGINEERING AND MINING JOURNAL. Lump carbonate of barium from 80 to 90 per cent, is quoted at from \$25 to \$27.50 per short ton, delivered in New York. Lump 92 to 98 per cent is quoted at from \$26 to \$29. Powdered barium carbonate, from 80 to 90 per cent, is quoted at from 1¼ to 2 cents per pound. There has been a considerable inquiry for deposits of this material, and there seems to be a very good demand for it.

Monazite.—Can you give me some particulars as to monazite? What is it used for? What is clean high-grade monazite worth? Who are the consumers? What is the annual consumption and the probable future demand?—L. N. W.

Answer.—Monazite is of value for the thorium and cerium oxides contained, which are used in making the incandescent mantles for the so-called Welsbach gas burners. The Welsbach Company is the chief or almost the only consumer. As there is practically only one buyer, it is impossible to ascertain or to give any market price. In such cases the buyer generally fixes prices and does not make them public. The production of monazite from North Carolina in 1900 was 908,000 pounds; in 1901 about the same. This may be taken to represent nearly the consumption. Formerly some was exported, but recently the European demand has been supplied chiefly from Brazil, where large deposits exist. As to the probable future demand, there can hardly be a great expansion, unless some new uses for the mineral are found.

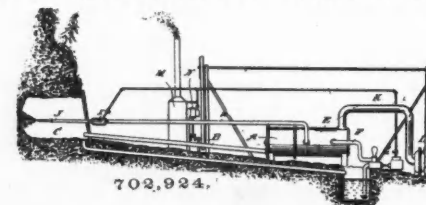
PATENTS RELATING TO MINING AND METALLURGY

UNITED STATES.

The following is a list of 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 ENGINEERING AND MINING JOURNAL upon receipt of 25 cents.

Week Ending June 24, 1902.

702,924. **APPARATUS FOR THAWING FROZEN GROUND.**—George R. Clarke, Dawson, Canada. An apparatus for thawing frozen ground, comprising a furnace, a water-compartment into which pass the products of combustion from said furnace, an exhauster of said water-compartment, for removing the products

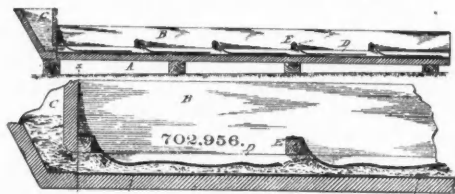


of combustion from the water-compartment after their passage through the water, means for drawing the water from said water-compartment and discharging it upon the frozen ground in the drift, and a pipe leading from the drift to the furnace, for supplying the latter with heated air.

702,943. **ART OF TREATING ORES CONTAINING SILICA OR SILICATES.**—Gustave Guiraud, Cripple

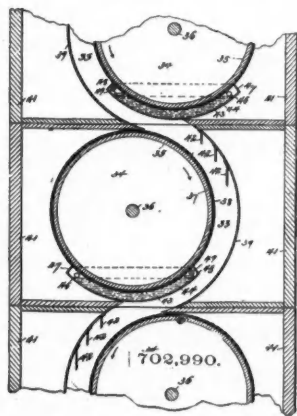
Creek, Colo., assignor to Robert McKnight, Philadelphia, Pa. The art of treating ores, which consists in roasting with free access of air and agitation, a charge containing the ore, silicon in an oxygen combination, and a haloid salt of an alkaline or alkaline-earth metal, the quantities being substantially those quantitatively requisite to form a stable silicate of the alkaline or alkaline-earth metal, and a haloid of the precious metal and continuing the heating of the ore until the haloid of the precious metal is volatilized and collecting the precious metal values as haloids or oxyhaloids

702,956. SLUICE-BOX.—Frederick M. Johnson, San Francisco, Cal., assignor to Rose Gold Reclamation Company, San Francisco, Cal., a corporation of Arizona. The combination with a separating-surface provided with means for holding and retaining precious material passing over it,



of one or more floating flexible sections of fibrous or textile material separated from said surface, so that the flow of material is caused to pass beneath it or them, such sections having a rough or open lower surface to retain material mechanically, but having a waterproof impenetrable upper surface.

702,990. ORE SEPARATOR.—Frank C. O'Brien, Chicago, Ill. In a separator of the class described, the combination with a closed passage or conduit, of a mercury-



coated cylinder forming a portion of the wall of said conduit, means for rotating said cylinder, and means for effecting the passage through said conduit of pulverized ore.

702,996. ALLOY.—Wladyslaw Pruszkowski, Schodnica, Austria-Hungary. A process of producing alloys containing two or more metals of the iron group, which consists in alloying one atomic weight of aluminum with two atomic weights of any two of said metals.

703,064. SUBSTANCE AND MANTLE FOR INCANDESCENT GAS-LIGHTS.—Louis Hicks, Englewood, N. J. A hood or frame for an incandescent gas-light, consisting substantially of oxide of thorium, a comparatively large percentage of oxide of lanthanum and a comparatively small percentage of oxide of cerium.

703,081. MACHINE FOR MOLDING ARTIFICIAL STONE.—Noyes F. Palmer, Brooklyn, N. Y. In a machine for molding artificial stone, the combination of a mold with a slotted supporting-plate, a core, means for clamping the core to the plate, and a perforated false bottom which embraces the core and covers the slot beyond the core.

703,084. ORE SEPARATOR.—Cyrus C. Platt, Portland, Oregon. Assignor of one half to Thomas Holland, Portland, Oregon. In an apparatus for separating metals from ore, gravel, loam and the like, a sluice adapted to be connected with a suitable source of water-supply and having a riffle comprising a board provided with openings, longitudinal zigzag walls interposed between the board and the bottom of the sluice and forming tortuous channels in communication with the openings in the board, means for retarding the flow of water through said channels, and a screen arranged upon the upper side of the board for causing the pulp to drag along the riffle and preventing large particles from entering the openings of the board.

703,151. COMPOSITION OF MATTER.—Theodore O. Pause, Atlanta, Ga., assignor of one-half to John S. Clarke, Atlanta, Ga. As a new article of manufacture, a plurality of layers or sheets of burlap, which have been treated to a solution of magnesium chloride, magnesite, and a mineral powder, a plastic compound applied to the backing and consisting of magnesium chloride, magnesite, and a mineral powder, and a final surfacing compound applied to the plastic compound.

703,170. PROCESS OF CASTING CHAINS.—Frederick Baldt, Sr., Chester, Pa. A process for casting chains, which consists in embedding a fusible pattern, for links and

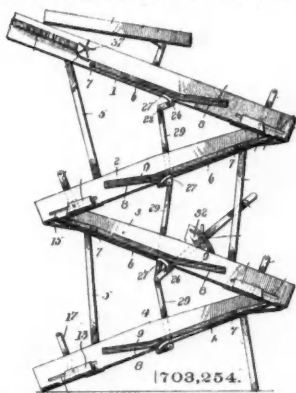
headers extending therefrom in a mold with the links interlocked and separated, next fusing said pattern of the links and headers and removing the fused material from the mold, whereby the links and headers are removed, and next pouring molten metal separately into the spaces formerly occupied by the fusible links and headers, whereby the links of the chain are disconnected when removed from the mold.

703,200. METHOD OF PREPARING ASBESTOS FOR USE AS AN INSULATION FOR METALLIC SURFACES.—John A. Heany, Philadelphia, Pa., assignor to the Teter-Heany Developing Company, Philadelphia, Pa., and Charleston, W. Va., a corporation of West Virginia. A method of preparing asbestos for use as an insulation for metallic surfaces, which consists in impregnating asbestos with sulphate of ammonia, boracic acid, sulphate of soda and chlorides of ammonia and soda in liquid form and picking the impregnated asbestos into fibrous or flakey form prior to application by adhesion to the metallic surface.

703,201. METHOD OF INSULATING METALLIC SURFACES WITH ASBESTOS.—John A. Heany, Philadelphia, Pa., assignor to the Teter-Heany Developing Company, Philadelphia, Pa., and Charleston, W. Va., a corporation of West Virginia. A method of insulating metallic surfaces with asbestos, which consists in first applying to the metallic surface a paste or cement, second, in embedding asbestos in fibrous or flakey form in said cement, and finally covering the asbestos with a solution of chemical or metallic salts combined with a gluey or albuminous substance containing lime.

703,222. ELEVATED-CABLE SYSTEM OF TRANSPORTATION.—Tony Alexander, Bismarck, Miss., assignor of one-half to Gideon Alexander, New Orleans, La. In an overhead-cable system of transportation, the combination of a cable and a series of supports therefor around which the cable is wound, the cable crossing and diverging from the upper side of said supports.

703,254. COAL-SEPARATOR.—William J. Hamilton, Carbondale, Pa., assignor to two-fifths to Thomas R. Hughes, Scranton, Pa. In a separator of the class described, a



series of chutes each having an adjustable bottom section, and means for simultaneously effecting an adjustment of all said sections.

703,267. MACHINE FOR CUTTING SLATE.—Charles R. Huston, Morgantown, W. Va. In a machine of the class described, a base, a knife, a gage, a carrier for the gage upon the base, bolts, one of which passes through the carrier, and the other of which passes through the carrier and gage, nuts on the bolts, and a clamp-plate having perforations to receive the bolts and adapted to bear against the gage, and one of the nuts serving to hold the carrier against longitudinal movement, and the other nut serving to prevent angular movement of the gage.

703,276. COAL AND GRAIN CAR.—Spencer Kellogg, Buffalo, N. Y. A car comprising a separately-mounted carrying receptacle or tank having a pendant ring or extension around its discharge-opening and rails supported therefrom, a closure or plate fitting against the lower edge of said ring or extension and having lateral racks upon its upper surface, and rolls or trucks upon its lower surface engaging with said rails, and an actuating rod or shaft provided with pinions gearing with said racks.

703,282. CRUDE-OIL BURNER.—John A. Landis, William A. Johnston, and Lee W. Bosley, Gainesville, Tex. A crude-oil burner comprising an outer casing, an escape-flue, a drip-pan in said casing and around which pan said flue passes, a drip-plate, to discharge into said drip-pan, means to feed oil to said drip-plate, and an air-inlet flue passing over and under said drip-plate and communicating with said escape-flue.

703,289. PROCESS OF PRODUCING CAUSTIC.—Hugh K. Moore, Lynn, Mass., assignor to Moore Electrolytic Company, Portland, Me., and Boston, Mass., a corporation of Maine. A process of electrolyzing the chlorides, chlorates or sulphates of alkali metals consisting in bringing an aqueous solution thereof into contact with one face of a diaphragm of sufficient porosity to permit free flow of the solution; passing an electric current through said solution and diaphragm to an unsubsmerged foraminous cathode in contact with the other face of the diaphragm; thereby converting the metal into hydrate by the water of the undecomposed percolated solution and confining the liberated

hydrogen gas in contact with the outer face of the cathode and thereby excluding atmospheric air, whereby the cathion solution flows by gravitation from said cathode without evaporation and without the carbonating of the hydrate.

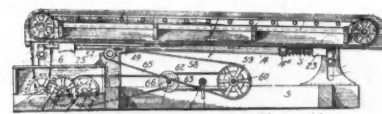
703,302. METHOD OF RAISING SHEETS OF STONE.—Alexander W. Pratt, North Jay, Me., assignor of one-half to Samuel H. Venable and William H. Venable, doing business under the firm name of Venable Brothers, Atlanta, Ga. A method of raising a sheet of stone consisting in drilling a hole to the depth necessary to receive the desired thickness of that sheet of stone to be raised; then initially starting a bed-seam in the rock by the explosion of a blasting charge, and subsequently extending the bed-seam by subjecting a strata or layer of the rock to fluid-pressure which is maintained in the initially-formed bed-seam, whereby said initial blast haloids or oxyhaloids, area affording great purchase for the subsequently effective fluid pressure.

703,309. OPEN-HEARTH STEEL-FURNACE.—Francis L. Saniter, Seaton-Carew, and John L. Smith, Eaglescliffe, England. In an open-hearth furnace for the manufacture of steel and characterized by a division of the hearth into compartments separated by dams, one or more channels or gutters in the dams.

703,322. COVER MECHANISM FOR PIT-FURNACES.—Francis H. Treat, Pittsburg, Pa. A pit-furnace cover, a supporting lever therefor, a cam device arranged to act upon the lever, and mechanism for moving the cover back and forth.

703,329. MAGNETIC SEPARATOR.—James C. Winder, East Point, Ga., assignor of one-half to Daniel C. Lyle, East Point, Ga. In a device of the class specified, the combination with the feed-board having on its upper face two slots arranged transversely of the natural flow of the material crossing the board, pole-pieces arranged in said slots with their working faces flush with that of the board, there being a plurality of sets of pole-pieces, each having oblique ends and the adjacent ends being arranged in such contiguity as to insure contact with said pieces of all of the material passing over the board, magnet-cores, side plates connected to the cores and to the pole-pieces, and core-windings connected in series.

703,356. DRY ORE CONCENTRATOR.—Robert E. Waugh and Eugene Waugh, Denver, Colo. The combination with a suitable stationary frame, of a vibratory apron-frame constructed to form an air-chamber, an endless traveling apron through which the air from the chamber passes, the apron



closing said chamber at the top, an auxiliary air-chamber arranged in suitable proximity to the main air-chamber, means for introducing air under pressure to the auxiliary chamber, and means for vibrating the apron-frame.

Reissue No. 12,003. PROCESS OF HEATING METAL PARTS.—Robert Deissler, Treptow, near Berlin, Germany, assignor to Clarence B. Schultz, Berlin, Germany. A process of heating parts of metallic objects consisting in subjecting the same to the heat resulting from the chemical reaction taking place in an ignited mass of finely-divided aluminum and an oxygen or sulphur bearing compound.

CALCIUM CARBIDE FROM NON-ELECTRIC FURNACES.—London *Engineering* says: "Recent experiments on the heat of formation of calcium carbide once more direct our attention to the use of mixtures of air and oxygen in metallurgical furnaces. The unsatisfactory condition of the carbide industry has various causes, as electric furnaces are undoubtedly wasteful, and many attempts have been made to prepare the carbide in ordinary furnaces. The experiments with peat are not likely to prove successful. But Rothmund has shown that carbide can be formed at so low a temperature as 1620° C., and he further demonstrated that at 1560° finely powdered calcium carbide is split up again into lime and carbon by carbon monoxide gas. . . . But we return to the formation of carbide in furnaces burning air, artificially enriched with oxygen. Such air can be made in various ways, and is much less expensive than anything approaching a high percentage oxygen. Linde machines, it is stated, yield 1 cubic meter of a 50 per cent oxygen, or 8 cubic meters of a 35 per cent oxygen, per horsepower hour. If we feed metallurgical furnaces with such oxygen, we could attain much higher temperatures than we produce at present with the aid of powerful blowing engines. We are quite aware that rich oxygen is not likely to become cheap, and that laboratory reactions of pure oxygen have not much importance for the practical metallurgist. But we might try oxygenized air."

PERSONAL.

Mr. W. S. Brown, of Fremont, Neb., recently inspected the Consolidated Mercur Mine in Utah.

Mr. J. A. Cizek recently returned to Salt Lake, Utah, from a 6 weeks' trip to Warren, Idaho.

Mr. W. H. Paul, a mining man of Central City, Colo., is making a business trip to Chicago, Ill.

Mr. B. L. Thane, of Berkeley, Cal., is to be superintendent of the Ebner mines, Juneau, Alaska.

Mr. F. H. Minard has left Denver, Colo., to examine certain mines north of Revelstoke, B. C.

Mr. Ross E. Browne has returned to San Francisco, Cal., after a trip to Spokane and the Northwest.

Mr. Charles T. Arkins has returned to Denver, Colo., after a professional visit of 60 days to Mexico.

Mr. J. P. Polin is now assistant superintendent of the Grand Central Mine, Minas Prietas, Sonora, Mex.

Mr. Ben. B. Lawrence and Mr. Arthur Winslow passed through Denver a few days since on their way to Telluride, Colo.

Mr. William Braden, mining engineer of New York City, has just returned from a trip to Wyoming on professional business.

Mr. G. H. Greenwell, a mining engineer of Manchester, Eng., is now visiting the United States. He is at present in Pittsburg, Pa.

Mr. George H. Dern, treasurer of the Consolidated Mercur Company, has been in Jersey City, N. J., to attend the annual meeting of the company.

Mr. Edgar Rickard sailed from Seattle, Wash., on June 28, on his way to Cape York, Alaska. He expects to be absent about 3 months.

Mr. W. E. Pasmore, of Idaho, Springs, Colo., has been appointed secretary of the State Mine Managers' Association, to succeed Dr. Colman, resigned.

Prof. S. W. Beyer, of the Iowa Agricultural College, with a large class of geological students, is engaged in field study in Central Colorado.

Mr. S. F. Emmons, chief geologist of the United States Geological Survey, was in Denver on July 7. He is visiting Leadville, Silver Cliff and Ward, Colo.

Mr. T. H. Oxnam has resigned as general manager of the Palmarejo & Mexican Gold Fields, Limited, on account of ill-health and is now at Avalon, Cal.

Mr. Llew. Humphreys, mining engineer of Central City, Colo., has gone with Denver parties to Guadalupe y Calvo, Mex., to examine mining properties.

Mr. Percy Sharpe, of Nogales, Ariz., is now general manager of the El Verde Grande Copper Company, Magdalena District, near Imuris, Sonora, Mex.

Mr. Percy L. Fearn was in Denver, Colo., last week, en route from Boise City, Idaho, to Prescott, Ariz. He expects to return to New York City at the end of July.

Mr. B. O. Kazaki, of Sappora, Japan, is now in the United States on behalf of the Hokkaido Government, studying American methods of hydraulic engineering principally.

Mr. G. H. Greenwell, nephew of Mr. Allan Greenwell, editor of the *Colliery Guardian*, is visiting the United States for the purpose of studying American methods of producing coal.

Mr. J. Jenkins, a member of the well-known firm of Parsons & Pettit, New York City, importers and dealers in brimstone and nitrate of soda, has gone to Richfield Springs, N. Y., for his health.

Mr. Frank Janney, of Salt Lake, Utah, will, it is said, be superintendent of Bamberger's De La Mar mines, possession of which is reported surrendered to the new purchasing syndicate.

Mr. Charles E. Hudson, of Salt Lake, Utah, passed through Houghton, Mich., last week on his way to Jersey City, N. J., to attend a meeting of the board of the Consolidated Mercur Mining Company.

Mr. Ernest Gayford, metallurgist of Salt Lake, Utah, has gone to North Carolina to take a position with the Colossus Gold Mining Company, of which Mr. Gill S. Peyton recently secured control.

Mr. M. H. Kauffman, formerly with the Helen Mining Company, Graham, N. M., has accepted the position of chief chemist for the American Smelting and Refining Company, at Durango, Colo.

Mr. Don H. Bacon, president of the Tennessee Coal, Iron and Railroad Company, during the past week visited the various properties of the company accompanied by the various department managers.

Messrs. C. W. Baldwin and F. I. Packard, the latter the cashier of the State National Bank of Chicago, Ill., are visiting in Central City, Colo., being interested in the New National Tunnel Mining Company.

Mr. Hudson H. Nicholson, mining engineer, recently returned to Denver, Colo., from mine examinations in Utah. He is now in Wyoming, goes thence to Oregon and will visit the Thunder Mountain District of Idaho.

Mr. Carl Heinrich Wolf, inventor of the Wolf safety mining lamp, has been decorated by the King of Prussia with the Order of the Red Eagle, on account of his great services in the field of safety lamps.

Mr. R. H. Terhune, of Salt Lake, Utah, has been engaged to take charge of the new 30-ton smelter being erected in Spruce Mining District, White Pine County, Nev., for the Black Forest Mining and Smelting Company.

Mr. A. R. Bennie, recently of Cananea, Sonora, Mex., has been employed by the Shannon Copper Company, Clifton, Ariz., as superintendent of the smelting department, to take the place of Mr. P. O. Wells, resigned.

Governor Aycock has appointed Col. A. H. Boyden, Capt. E. B. C. Hambley and Capt. R. Eames, Jr., of Salisbury, as delegates from North Carolina to the coming sessions of the International Mining Congress in Butte, Mont.

Mr. Samuel Newhouse, of the Boston Consolidated and Cactus properties, has been visiting various Utah mining properties accompanied by Mr. A. B. Lewis, of the Majestic Company. He inspected the copper mines in Beaver County.

Prof. J. A. Holmes, State Geologist of North Carolina and Chief of the Department of Mines and Metallurgy at the Louisiana Purchase Exposition, was in New York City during the past week in the interests of the exposition.

Mr. H. B. Sturtevant, a mining engineer of St. Louis, Mo., who has recently been inspecting properties in Arizona for Chicago, Ill., men, has gone to Shasta County, Cal., for a short engagement in the interests of St. Louis investors.

Mr. H. Heffron has resigned the management of the Sierra Pinta Mining Company, Altar, Sonora, Mex., and has been succeeded by Mr. E. Holland, proprietor of the mines at Quitovac, 7 miles from Sierra Pinta. Mr. Heffron is to return to California.

Mr. E. Gybbon Spilsbury, of 45 Broadway, New York City, has returned from a four months' visit to Europe. It is understood that the friendly relations established between the Virginia-Carolina Chemical Company and the German Kali Syndicate were largely the result of Mr. Spilsbury's trip.

Mr. J. Taylor Boyd, for years superintendent for the Cornwall Ore Banks Company, Limited, has resigned and is now treasurer of the company, with offices at Lebanon, Pa. His place has been filled by Mr. J. B. Shilling, who has had charge of iron mines on the Mesabi Range, Minn., for a number of years.

Mr. Ralph Nichols, formerly superintendent of De La Mar's Nevada gold mines, has been in Salt Lake, Utah, on his return to Kalgoorlie, West Australia, where he is managing the Great Boulder Perseverance properties. Mr. M. J. Flynn, formerly of the Sacramento at Mercur, Utah, is Mr. Nichols' mine superintendent.

Mr. J. Stanley James, engineer of the Caucasus Copper Company, of South Russia, is now in the United States, and will place contracts for equipment to be installed in a water power plant for working the company's mines. Mr. James is at present inspecting American mining methods in the West. While in New York City he will stay at the Waldorf-Astoria.

Mr. J. E. Spurr, of the United States Geological Survey, who was to have undertaken the work of surveying the Grand Encampment District of Wyoming during the present season, is now ill with typhoid fever. The work in the Grand Encampment District will be carried out by Mr. Arthur C. Spencer, who will be assisted by Mr. J. Volney Lewis, of Clemson College, S. C.

Prof. R. A. S. Redmayne, of the University of Birmingham, England, who has been making a short visit to some of the mining schools of this country and also to the copper regions of Lake Superior, passed through New York City last week on his return to Birmingham to receive a well-earned degree. Prof. Redmayne was deeply impressed with the excellence of such institutions as Columbia University, the Massachusetts Institute of Technology, the Michigan School of Mines, etc. He was also struck with the welcome he received in each place visited and the willingness of mining companies to admit visitors and to furnish information. To this freedom of intercourse and exchange of ideas between technical men he attributes much of the great progress made by the United States in mining and metallurgical industries during the last few years. Prof. Redmayne, in the organization of the new college of mining and metallurgy at the University of Birmingham, will make use of suggestions he got from his trip.

INDUSTRIAL NOTES.

The H. K. Porter Company, of Pittsburg, Pa., has just made a shipment of 4 locomotives to Balbao, Spain, for use on a coal road.

The Overlook Mining Company, of Boise, Idaho, has placed an order with the Allis-Chalmers Company for a 65-ton Chilean mill.

The Lorain Steel Company is about to make a fair sized shipment of rails for the Auckland electric traction system of Auckland, New Zealand.

The Rand Drill Company has established an office in the Commercial Club Building, Salt Lake, Utah, in charge of George W. Topliff, of New York City.

The Electrical Equipment Company, of Chicago, Ill., has been awarded the contract for an addition to the Whiting Electric Light Company's plant at Whiting, Ind.

The Fred J. Rowland Machinery Company, of Butte, Mont., has sold the Crooked River Mining and Milling Company, of Idaho, a 10-stamp gold mill, complete with vanners.

P. J. Qualey, of Kemmerer, Wyo., manager of the Kemmerer Coal Company, has placed an order with the Acme Mining Machine Company, of Salt Lake, Utah, for a Frisbe Lu Cop pulverizer.

The mills of the National Tube Company, in June, sent abroad through Eastern ports, 3,500 tons of iron pipe. Exports to Continental Europe were 2,193 tons, chiefly to Rotterdam. Australia took 395 tons and Mexico 282 tons.

The Link-Belt Engineering Company, of Nicetown, Philadelphia, Pa., has completed an addition to its drafting department. The company reports numerous inquiries recently for coal storage plants. All departments are working at full capacity.

The George V. Cresson Company, of Philadelphia, Pa., reports much work on hand, and all departments running at full capacity. Power transmission machinery is being shipped to all parts of the United States and to foreign countries.

The Brown Hoisting Machinery Company, of Cleveland, O., is steadily rebuilding its plant destroyed by fire in the fall of 1900, but it will be some months before all the new buildings are completed. The handsome new office building is in use.

The Mexican Ore Company, of San Luis Potosi, Mex., has secured from the Government certain modifications of its concession, granted some years ago, which permit the company to increase the present works by a plant capable of reducing 200 tons of copper ore daily. The new plant must be ready within one year.

The American Steel and Wire Company sent abroad through Eastern ports in June nearly 7,000 tons of iron and wire nails, the wire shipments being over 5,000 tons, of which South American countries took 2,290 tons, Australia 1,028 tons, China and Japan 212 tons and South Africa 210 tons. China and Japan took 806 tons of wire nails, and Europe 593 tons.

The Chicago Pneumatic Tool Company, through its Pittsburg, Pa., office, has secured a contract to furnish the William B. Pollock Company, Youngstown, O., with a 1,600-ft. cross compound steam and compound air compressor of the Franklin type. The company is to supply the Standard Steel Car Company, of Butler, Pa., with 150 Boyer long stroke riveting hammers and 50 Boyer pneumatic hammers.

J. W. Peterson, who was formerly connected with the Chicago Sales Department of the Stanley Electric Manufacturing Company, and the Northern Electrical Manufacturing Company, has been elected vice-president and general manager of the Electrical Equipment Company, with offices in the Monadnock Block, Chicago, Ill. This company now has on hand several large contracts for complete light and power plants.

The American Blower Company, of New York City and Detroit, has obtained an order for the mechanical draft apparatus to be used by the United Railways of San Francisco. It consists of 2 320-in. full housed fans direct connected to 12 by 16 in. vertical engines. The power station will be the largest on the Pacific Coast. Charles C. Moore & Co., of San Francisco, are placing the orders.

The United States Pump and Supply Company has been incorporated under the laws of New Jersey. The companies to be taken in are said to be the Standard Pump Company, of Toledo, O., and the Bean-Chamberlin Manufacturing Company, of Hudson, Mich. The new company proposes to erect a large plant in Toledo. The officers are: President, Roscoe Bean, of Hudson, Mich.; vice-president, D. J. Nyswander, Toledo; secretary, J. H. Close, Toledo; treasurer, George N. Pomeroy, Toledo.

The International Cement Company, of Pittsburg, Pa., incorporated last year with \$1,000,000 capital stock, has let contracts for the machinery to be used in a 1,000 bbl. plant in the Pittsburg district to make cement from blast furnace slag. The process employed is the invention of Dr. Otto V. uth, of Pittsburg. The company has a temporary organization with J. B. Graham, of Pittsburg, president; W. H. Johnston, Philadelphia, vice-president; F. A. Voltz,

Philadelphia, treasurer, and Samuel G. Stafford, Pittsburgh, secretary.

The Twentieth Century Portland Cement Company of Fenton, Mich., is buying its machinery equipment. The plant is to have a capacity of 1,000 bbls. daily, and is to use a wet process. The structure steel for the buildings is also about to be purchased, as well as 380 tons of 60-lb. steel rails for a private railroad connecting the works and lands with the main lines of the railroad. The company was incorporated with a capital of \$75,000, and recently obtained \$600,000 on mortgage for the erection of the plant. J. H. Logan, of Fenton, Mich., is general manager.

The Pittsburg Gage and Supply Company, of Pittsburg, Pa., says that the great demand for the White Star oil filter is shown by recent sales in every section of the country, including: Rockingham County Light and Power Company, Portsmouth, N. H.; Nashville Electric Light Company, Nashville, Tenn.; Hamburg Railway Company, Blaisdell, N. Y.; Superior Electric Light Company, Superior, Neb.; Kankakee Water Supply Company, Kankakee, Ill.; Carnegie Tube Company, Carnegie, Pa.; Silver King Mining Company, Park City, Utah; Seattle Electric Light Company, Seattle, Wash.

The Pelton Water Wheel Company, of New York City and San Francisco has closed with the Bellevue Mining Company, of La Porte, Cal., a contract for a power plant and pipe line. The water wheels will generate 200 h. p., to drive an air compressor, a generator and a blower for ventilating the mine. Among some of the most recent orders under completion at the Pelton Company's works are mentioned: Salvador Mining Company, Rix Compressed Air and Drill Company, Pacific Portland Cement Company, Ledge Mining and Milling Company, Cumerka Mining and Milling Company, Mitchell Mine, Clark Electric Company, Ouray Electric Light and Power Company and the Bishop Light and Power Company. These orders call for water wheels to operate all classes of mining and electrical machinery.

Among the many orders received lately by the Colorado Iron Works, of Denver, Colo., were the following: A 10-stamp wet crushing mill, stamps of 1,000 lbs. each for the Eureka Exploration Company, of Silverton, Colo., a 60-stamp cyanide plant, erected complete, for the Hidden Fortune Gold Mining and Milling Company, of Lead City, S. D.; a Nesmith crude oil hot blast stove for the Mond Nickel Company, of Ontario; a reverberatory roasting furnace for the Metal Volatilization Company, of Denver; a silver-lead smelting plant with roasting furnace, etc., for Jose S. Diaz, of Guadalupe, Mex.; a 42-in. by 120-in. hot blast copper smelting plant with a U pipe stove and concentrating plant, complete, for the New York & Nevada Copper Company, of Ely, Nev.; 3 automatic dumping slag trucks for the Cananea Consolidated Copper Company, of Mexico; 2 carloads cast iron water jackets for the American Smelting and Refining Company, of Monterey, Mex.

The Central California Electric Company recently purchased 2,000 k. w. Westinghouse alternating-current generators, to be direct connected to water-wheels and used for supplying power to Grass Valley, Nevada City, Sacramento and adjacent California towns. This is the third station to be installed by the company, 2 other stations having been in operation for a number of years. The Central California Electric Company's system is a part of that of the South Yuba Water Company, which controls 400 miles of main ditch line in the heart of the Sierra Nevada Mountains. Formerly the water was used for hydraulic mining, but this having been stopped on account of the filling up of the rivers with silt, the water is now sold to ranchers and fruit growers for irrigation purposes. Before being sold to the farmers, however, it is transmitted in pipes to stations at different points along the system where electric energy is produced and conducted 35 to 50 miles to adjacent cities.

TRADE CATALOGUES.

Circular No. 3, published by Webster, Camp & Lane, of Akron, O., describes that company's self-contained geared hoists. These hoists are made with one or two drums, and range in capacity from 18 to 230 h. p.

The Iron-Clad Manufacturing Company, of New York City, issues a series of catalogues describing its products, which include brazing tanks, steel barrels, steel and iron shipping drums, gas tanks, powder cans, engineers' and mill supplies and enameled ware for all purposes.

A circular sent out by the H. Zering Manufacturing Company, of Cincinnati, O., describes the company's trucks, hand-barrows and scales. The trucks are made in a variety of patterns and sizes for use about mills, factories and warehouses. The barrows are made with wooden or steel bodies and wheels.

The Joseph Dixon Crucible Company, of Jersey City, N. J., continues to send out for free distribution leaflets and other printed matter calling attention to the excellence of its well-known products, including graphite crucibles and retorts, pencils, lubricating graphite and graphited oils and greases, also silica graphite paint.

A series of finely printed and illustrated folio booklets sent out by the Phoenix Glass Company, with offices in Pittsburg, New York and Chicago, describes the company's products. Catalogue No. 11 gives the prices of a very large variety of globes, in plain and fancy glass for gas and electric lights. Catalogue No. 13 illustrates and gives the prices of glassware for incandescent gas-lamps.

The Municipal Engineering and Contracting Company, of Chicago, Ill., has issued a 14-page pamphlet describing its portable gravity concrete mixer and its improved cube mixer. The pamphlet points out the good features of these devices and their low cost of operation. The cube mixer is built in three sizes, the largest having a capacity of a batch of 2 cu. yd. in 2 minutes' time, and the smallest having a capacity of 1/2 cu. yd.

The C. W. Hunt Company, of West Brighton, Staten Island, N. Y., calls attention in a little circular to its storage battery electric locomotives for handling cars in manufacturing establishments, and for switching ordinary cars in and about mills and works. These locomotives are recommended for their simplicity, cheapness of operation, and general handiness, being capable of running around curves of 12 ft. radius. The motors are iron-clad and the gearing is enclosed in an oil-tight case.

Catalogue No. 329, published by E. & T. Fairbanks & Company, St. Johnsbury, Vt., describes the standard scales the company makes. These scales are made in the portable platform type or with permanent platforms for mines, mills, railroads and general use. The company also manufactures special scales for rolling mills, steel works, locomotive works, chemical works, blast furnaces and for weighing buckets on overhead tramways. The company states that it will construct scales to indicate weights used in any part of the world, and that all platform scales, with iron weights, will be made to weigh to any two standards of weights desired.

The Superior gasoline motor is described in a 36-page pamphlet sent out by the Lake Shore Engine Works, of Marquette, Mich. This motor is built in a variety of sizes and types. The single cylinder engines range from 1/2 to 6 h. p. The twin-cylinder from 6 to 30 h. p. and the triple-cylinder from 12 to 45 h. p. The company also makes a special 4-cylinder 32 h. p. engine for high speeds. The touch spark system of ignition is used in all the company's engines. The governor is suspended within the fly-wheel and is of the centrifugal type. A speed-controlling device permits of running at any desired speed. With engines above 18 h. p., a reversing gear of special design, which contains no spring, is used.

An unusually artistic catalogue is that sent out by the Sullivan Machinery Company, of Chicago, Ill., entitled, "Modern Methods of Producing Coal." It is a pamphlet of 154 pages, neatly printed and containing some remarkably fine half-tone cuts. It describes the coal-mining machines manufactured by the Sullivan Company. These include the Sullivan pick machine, the Sullivan shearing machine, both of which are driven by compressed air, and the Sullivan electric chain machine. The last machine, though of comparatively recent introduction, is already making an enviable reputation for itself. Its construction is described at length. The pamphlet also gives tables showing relatively the cost of machine and hand mining; the bituminous production of the United States and the proportion mined by machines in each State, the approximate analyses and heating values of American coals and the average net prices for coal at the mines since 1886. The pamphlet in addition contains a description of the Sullivan straight-line air compressor, with dimensions of the different sizes, and gives tables showing the efficiency of air compressors at different altitudes, the cubic feet of free air required to run from 1 to 40 machines, losses in pressure due to friction in pipes, etc.

GENERAL MINING NEWS.

ALASKA.

CAPE NOME.

Pioneer Mining Company.—It is asserted that this company, controlling 26 claims in the Nome District, will do a large amount of hydraulic work this year and will employ 400 men. The company is capitalized at \$5,000,000, and has headquarters at Seattle, Wash. The officers are: J. Lindeberg, president; E. O. Lindblom, vice-president; J. E. Chilberg, secretary, and E. Chilberg, treasurer.

ARIZONA.

GILA COUNTY.

Yo Tambien.—A small gasoline hoist has been installed at the tunnel level at a depth of 230 ft. The shaft is down 100 ft. below this level, and sinking is resumed. The company is figuring on the erection of a concentrating plant. L. M. Teale, of Globe, is superintendent.

MOHAVE COUNTY.

(From Our Special Correspondent.)

F. W. Phillips is figuring on a new concentrator for his mines at Hackberry.

Homestake.—This mine, near Kingman, is reported to have good ore in the cross-cut.

Keystone Group.—This group, at Mineral Park, is about to change hands. The Keystone, the principal working claim, has produced a large amount of shipping ore.

Occidental.—About 1,200 lbs. of ore from this mine, at White Hills, recently sold to the Halsey Sampling Works at Kingman, netted the lessees, it is said, over \$800 in gold and silver.

Oro Plato.—Water is being pumped out of this mine, in Todd Basin, near Chloride, and the first level reached. It is expected by August 1 the mine will be ready for sampling.

Pinkham.—There is a large tonnage of ore in the bins of this mine at Chloride waiting for the starting up of the new Vulcan smelter. The ore comes from a vein 25 ft. thick at the 100 ft. level.

Silver.—Ed. Williams has men at work on this mine, at Signal.

Sunrise.—George Cliquet has closed a contract with the owners of this mine in Chimehuevis District to sink 100 more ft. on the shaft and run the tunnel another 100 ft. H. K. Rosenberger is general manager.

Vulcan Smelter.—The gasoline pump for the well at this new smelter, at Chloride, is installed. The assay office is completed. T. H. Nelson is assayer.

PINAL COUNTY.

Troy Copper Company.—A special meeting of the stockholders will be held in Boston, Mass., Tuesday, July 15, for the following purposes: To see if the stockholders will vote to sell the property and assets of the company; to see if the stockholders will vote to discontinue the business of the company, and to surrender its charter and franchises, or act in any manner in relation thereto; to see if the stockholders will vote to place all or any assets of the company in trust for distribution or other purpose, or act in any manner in relation thereto.

CALIFORNIA.

Empire Consolidated Quicksilver Company.—At the annual meeting in Jersey City, N. J., this week the old management was forced to retire, and a new board of directors was elected, as follows: James L. Board, R. A. Boggess, H. G. Atwater, A. L. Kempert, Eugene H. Wilson, J. P. Thomson, James L. Wilson. The company will be reorganized, and the plan is to reduce the capitalization from \$5,000,000, par value \$10 per share, to \$2,000,000.

AMADOR COUNTY.

(From Our Special Correspondent.)

Imperial.—This mine near Sutter Creek has started. A 10 stamp mill is being hauled in from Lone.

Mahoney.—In this mine at Sutter Creek the ore is very low grade and work has stopped temporarily.

Zumwalt.—This mine, near Volcano, is to be opened by W. E. Adams, of Oakland, and several Stockton men.

BUTTE COUNTY.

(From Our Special Correspondent.)

Big Butte Gold Mining Company.—The gravel channel on the west fork of Butte Creek is to be worked by a company composed largely of San Jose men. M. J. Jordan, of San Jose, is secretary. A ditch 7 miles long is nearly completed through a very rough country. The property has been undeveloped owing to lack of water.

Crystal Hill.—H. P. Sophey, of San Francisco, has men at work on this mine near Enterprise. The mill is now in good order.

Golden Trout.—At this mine, near Lumpkin, J. F. Waterhouse, manager, the old stamps will be taken out and the mill will be changed to 20 stamps. Electric power may be used.

CALAVERAS COUNTY.

(From Our Special Correspondent.)

Big Six.—A 3-ft. vein of good ore has been uncovered in this mine at Jenny Lind by McAfee & Williams.

Ennis.—Work will shortly start at this mine, Wm. Hamilton, of Mokelumne Hill, superintendent. Development work is to begin on the Dolphin and many improvements are being made on the Blue Jay Mine.

its main office in the Equitable Building, Denver, and is figuring on installing electric drills.

Edinburgh Gold Mining and Milling Company.—This company has been incorporated with a capital stock of \$300,000 in \$1 shares, to operate the East Centennial and Eleventh Hour mines in Russell District. Developments are confined to the East Centennial shaft. Some excellent surface ores are being taken out at 70 ft. The property will be cut at a depth of nearly 1,400 ft. by close connections with the Newhouse Tunnel, and the company expects to carry on heavy developments. E. M. Messiter, Central City, is superintendent.

Grand Central Mining Company.—Manager McMasters has commenced shipments to the Golden Smelter, and developments are encouraging.

Nevada Consolidated Mining Company.—Denver and Eastern parties are interested in this large group of claims in Nevada District, and are unwatering the King shaft, which is 600 ft. deep. The property is credited with a production of over \$100,000. George C. Moore, Central City, is manager.

Stewart Gold Mining Company.—A run of 11 cords at the Gilpin Mill cleaned up 36 ozs. of gold, with 10 tons of tailings which sold for \$13.52 per ton, an average of 4 ozs. of gold per cord. New Englanders who are interested are figuring on erecting a 25-stamp mill at the property in Stewart Gulch, saving a 6-mile haul to the Black Hawk mills. J. A. Gilmour, Central City, is superintendent.

GUNNISON COUNTY.

Colorado Consolidated Mines Company.—This Cripple Creek concern is erecting a 50-ton concentrating plant on the Cochetopa, about 20 miles southeast of Gunnison. The plant will be completed by fall. Besides employing a force on the mill, the company has men at work in the mine.

Tomichi Valley Smelting Company.—This company's smelter at Cosden, a few miles below White Pine, is in blast, after a shut down of several months. A shortage of ore caused the suspension.

LAKE COUNTY—LEADVILLE.

(From Our Special Correspondent.)

Leadville Ore Output.—The output of all ores for June was 70,000 tons, the greater portion being low grade iron and iron and lead sulphides. Over half of the tonnage came from 4 properties: The Ibez producing 8,000 tons; the A. M. W., 10,500; the Midas, 6,500; the Home, 6,000; the Moyer of the Iron-Silver combination, 8,000. The zinc tonnage was over 5,000 tons of crude material. The probabilities are that the New Monarch and the Greenback, neither of which is now producing, will be shipping heavily before July 31.

Arkansas Valley Smelter.—This plant is being further improved at an expense of several hundred thousand dollars. The plant is now handling 1,000 tons of ore daily, but with increased roasting capacity, etc., will be able to handle 1,300 tons a day.

Big Six Mining Company.—Different lessees are working and shipping siliceous ore.

Catalpa-Crescent.—The shaft has been sunk another 50 ft. and is down 450 ft., where a drift has opened up the third contact, showing an excellent iron ore. Twenty-five tons daily are shipped.

Corona.—Condon & Co. are to erect machinery.

Doris Mining Company.—An attempt is being made to raise money by selling stock to resume operations.

Gold Basin Mining Company.—This new shaft on the old Big Four property is showing remarkable gold values in a small vein. The last shipment returned 18 per cent copper and 60 ozs. gold.

Helen Gould.—Development continues on the copper vein.

Horseshoe Prince.—This combination has virgin territory adjoining the old Continental Chief group. A tunnel being run through the Horseshoe Prince is in 550 ft., and another tunnel is started. In a new drift started towards the old workings a vein has been cut heavily impregnated with chlorides. It is a siliceous ore and assays 200 ozs. silver.

Lillian Mining Company.—This combination is operated by 12 sets of lessees. Some mineral is shipped, and occasional rich streaks of gold ore are encountered.

London.—Mrs. D. Sinnott and others are adversing on this mine, claiming that their old patents have been relocated. A dividend was recently paid of \$1.03. Interesting developments are looked for.

Midas.—The surface plant has been overhauled and shipments of 200 to 250 tons daily resumed from the iron shoot.

Mike & Starr.—Shipments of 30 tons daily are made to the Buena Vista Smelter. A large body of low grade copper sulphides is being developed.

New Monarch Mining Company.—A large force is blocking out sulphide bodies in the Lida, Winnie and

Monarch shafts. The siliceous and carbonate bodies of the upper levels are also being developed, and as soon as the Salida Smelter is completed the combination will ship 250 tons daily, one-third being siliceous and carbonate ores and the rest sulphides.

Penn Mining Company.—Large deposits of low grade siliceous ores are blocked out, but as smelter charges are heavy only 40 tons daily are shipped.

Price Shaft.—The property has resumed operations after an idleness of 7 years. It is located on the north side of Big Evans.

Ready Cash.—Al Wirth & Co., the lessees, have opened up a large siliceous body which the smelters can use. The stuff averages \$15 a ton.

Triumph.—New lessees headed by John Pale have started this gold belt property near the Ibez.

Yak Mining, Milling and Tunnel Company.—Two hundred tons of ore daily come from the different workings, while the work of driving into Ibez territory is well under way.

SAN MIGUEL COUNTY.

(From Our Special Correspondent.)

Blue Lake Mining Company.—This company, recently organized for the purpose of mining in Bridal Veil Basin, is erecting a boarding house and blacksmith shop. The company now employs but a small force. The home office is in Kansas City, Mo., and the officers are: Dr. C. E. Wilson, president; L. N. Brown, vice-president; R. E. Bruner, secretary; C. L. V. Hedrick, treasurer, all of Kansas City. W. W. Cramer, of Telluride, is general manager. A tunnel on the Lake View, the principal claim, is in over 100 ft. The veins are from 3½ to 5 ft. wide and have a 14-in streak of smelting ore. The values are said to be ½ to 1½ oz. gold; 150 oz. silver, and 30 per cent lead per ton.

Japan Tunnel.—This enterprise is breaking all records in tunnel driving in the San Juan country. The formation is diorite. During June the average distance per day was 9 ft. Next month the management says it will break the record held by the Newhouse tunnel at Idaho Springs. Walter Beam is manager.

Nellie.—This mine, in Bear Creek Basin, is employing a few men on preliminary development, as the mine is not in condition to permit the employment of a larger force. The manager, Cooper Anderson, of Telluride, expects to have everything in shape by August 1.

Ophir Consolidated Mining Company.—The compressor, recently purchased from the Meldrum Tunnel Company and installed at the Silver Bell Mine, has started, and machine drills are at work in the Silver Bell and Ida veins. The Ida is an extension of the Ida of the Butterfly-Terrible group. It was cut in the 6th level in the Silver Bell Mine about 6 weeks ago. The new addition to the mill will be equipped to treat the ore, while the old section of the mill will run on the Silver Bell and Butler ore, which is strictly a concentration proposition. The equipment of the new mill will consist of a head end sampler, a 16 by 22-in. jaw crusher, a belt conveyor, 30 1,050-lb. stamps, 6 12-ft. amalgamating plates, sizers and Frue vanners. The manager expects to have the mill running by September 1. W. S. Buckley, the manager, will soon move to Ophir, but the main office will remain in Telluride.

Tomboy Gold Mines Company.—The company has completed grading for its new mill site, and the foundation for the batteries is being constructed. The erection of the superstructure for the concentrating room has started. Development in the Argentine, Cincinnati and Columbia mines is being pushed, and when the mill is ready to start an immense amount of ore will be blocked out. John Herron, the manager, is in London, where he will spend the summer.

TELLER COUNTY—CRIPPLE CREEK.

(From Our Special Correspondent.)

Cripple Creek Ore Output for June.—During June there were shipped from the different mines and leases of the Cripple Creek District 56,870 tons of ore, with a gross value in gold of \$2,024,270. The production is again over the \$2,000,000 mark, though the several mines on Bull Hill and Battle Mountain were practically closed for 10 days, as a result of the accident to the compressor at the La Bella plant at Goldfield.

Doctor-Jack Pot Company.—Operations have ended on company account, because there is no more ore in sight, and the company has not enough money to sink to a new level. Since the company announced that it would cut the property up into blocks and lease there have been a very large number of applications received. These will be carefully considered, and within a couple of weeks it is likely that a large number of men will be busy in the different levels. It is stated that after the lessees start work the development will be on a scale larger than anything yet done by the company itself.

Elkton Gold Mining Company.—It is understood that there will be no fight between the three factions

of the company. A compromise will enable the forthcoming meeting to be harmonious and allow such change of management as will be to the best interests of all concerned. President Bernard states that the water in the 8th level is under control.

Golden Cycle Company.—In the bottom level of the La Bella claim of this company, Stebbins and associates have opened an excellent shoot of ore, averaging 30 in. wide, with values between \$40 and \$50 in gold to the ton.

Hoosier.—This mine, on Tenderfoot Hill, has sent 2 cars of ore to the new Telluride plant at Colorado Springs. The ore is not especially low grade, but many lessees are eager to test the results of the process, as profits will be much greater if they can save in values.

Jack Pot Gold Mining Company.—At the annual meeting at the offices of the Woods Investment Company \$50,000 out of 1,000,000 shares voted for the following directors: Warren Woods, H. E. Woods, F. M. Woods, J. M. Allen and S. L. Caldwell. The officers will not be elected until all the directors can get together.

Last Dollar.—A shipment of 7 cars of ore has been made from the Last Dollar on Bull Hill. The consignment was sent to the Pueblo smelters. The ore is coming from the bottom levels of the mine, where a very large amount of development work is now in progress. The company is expending the larger portion of its work in opening the mine, and taking out only a small amount of ore by stoping.

Lexington Company.—A big output is coming from the Clara D. of this company, where Kirk and associates have a lease on the main workings, and those in which the ore was first opened. There is not another mine on this part of Gold Hill making the production of the Lexington.

Little Puck Company.—One of the best showings on Squaw Mountain is now held by the Nevada Mining and Leasing Company, operating the Climax claim of the Little Puck Company. At a depth of 300 ft. it has developed an excellent shoot of ore, from which it is making regular shipments. The lessees are in good shape to go on with development.

Mary McKinney Gold Mining Company.—The directors at the regular meeting declared the usual quarterly dividend of 3c. per share. The dividend amounts to \$30,000, and will be paid on July 10. The company has been accustomed for 2 years to pay an extra 3c. dividend once during the year, but it is not believed that it will this year. The company, while exceedingly prosperous, is under unusually heavy expenses cutting a new level and buying new machinery. The mine is developed only to 500 ft., and even at this depth there is enough ore in sight to keep the company busy for over 2 years.

Mountain Boy Gold Mining Company.—Work has been resumed on the property on Raven Hill. The company is planning to sink a deep shaft and develop the vein opened. The company is in fairly good condition, and the money for development can be had.

Practical Gold Mining Company.—This company, operating the Trachyte, on Bull Hill, has started its new plant of machinery, consisting of an 80 h. p. boiler, a new hoist, and a 4-drill air compressor.

Roanok.—The shaft house on Mineral Hill was destroyed by fire recently, the loss being about \$500. The property is owned by a Boston company, promoted by W. F. Burns, and was not operated.

IDAHO.

BLAINE COUNTY.

Rosetta.—There has been a complete change of management at this mine, on the South Boise and Big Smoky Divide. Major Fred R. Reed has been elected general manager, has assumed charge of the property, and has ordered work discontinued until he has planned operations.

CUSTER COUNTY.

(From Our Special Correspondent.)

White Knob Copper Company.—The mines, smelter and other enterprises at Mackey have been ordered closed indefinitely. The 300 employees, it is announced, have been paid off and discharged. Construction work on the smelter started last fall, and the plant is to have a capacity of 600 tons per day. It is estimated that fully \$1,000,000 have been spent on the enterprise.

IDAHO COUNTY.

Silver King.—Ambrose Stewart, manager of this mine, at Warren, and Fred S. Meyers, of Richmond, Va., an owner, are arranging for extensive work on the mine. The 10-stamp mill on the Iola, near Warren, has been purchased, and will be removed to the Silver King. A number of buildings will be built. The owners have sunk a 360-ft. shaft, and have a 6-ft. ledge of ore. A tunnel will be started to tap the ledge.

Elkton sold down steadily from 62½ to 55¼c. El Paso declined slightly during the week, selling off from 52½ to 51c. in sympathy with Elkton. There have been no new developments at the mine during the week, nor are any likely to be reported until deep mining is resumed after September 1 with the new equipment. Isabella weakened from 28½ to 27c., the loss being attributable to the softness of the market generally.

Salt Lake City. July 5.

(From Our Special Correspondent.)

Prices ruling during the week have been a shade lower than those of last week. Fewer sales have been recorded, but in some instances a higher price. The feature of the week has been Daly-West. Those on the Exchange, who some months ago began shorting this stock, have ever since been attempting to cover, and the scramble that took place on Thursday succeeded in pushing the price to \$50.10 per share. Some 2,077 shares were transferred on the Exchange at prices varying from \$47.75 to \$50.10.

Daly-Judge has advanced to \$7 per share, and many prophesy a much higher price; 125 shares exchanged hands at \$6.70@7. Daly advanced to \$2.05 per share on 300 shares. Of the producers of Tintic Grand Central leads at \$3.01½ per share, with sales of 100, while the Lower Mammoth shows 900 at \$1.25 @ \$1.24, and May Day ruled a shade lower, 19¼c. for 6,200 shares.

South Swansea resumed activity, marketing 6,600 shares at 33½@33¼c., while Uncle Sam sold 3,000 shares at 26½@31¼c. Yankee Consolidated remains quiet at \$1.15@1.13; 600 shares sold. California marketed 11,400 shares at 14@12¼c. Sacramento scored an advance of 2c. per share, 2,200 being sold at 28@26¾c. The Exchange closed for the holiday, adjourning until Monday.

San Francisco. July 5.

(From Our Special Correspondent.)

Only three business days were left this week, the Exchange adjourning on Wednesday afternoon until next Monday. In the half-week business was very quiet, though there was no special drop in prices.

Consolidated California & Virginia sold at \$1.35; Ophir, \$1.30@1.35; Mexican, 48@49c.; Best & Belcher, 25@27c.; Sierra Nevada, 26c.; Potosi, 19@20c.

On the Oil Exchange business was very dull. Apparently both buyers and sellers anticipated the holiday, or rather extended it over the whole week. The only demand was for Reed Crude, which brought 32c.; while Junction was quoted at 22c. on small transactions.

The monthly record of sales on the Producers' Oil Exchange this year is as follows:

	Shares.	Value.
January	187,854	\$81,633
February	288,562	76,447
March	214,293	109,364
April	442,231	239,938
May	213,483	185,594
June	110,435	54,140
Totals	1,456,858	747,116

The business in June was the lightest reported for any month this year, being less than one-fourth of that transacted in April.

COAL TRADE REVIEW.

New York. July 11.

ANTHRACITE.

The operators have evidently decided that the time for attempting to resume work at certain mines has not arrived, inasmuch as their policy of inaction has restricted rioting and bloodshed, and is causing a steady gain in the number of men who are asking to be taken back. The present outlook is that the strike will disintegrate gradually. The talk of the operators starving the miners into submission is very largely nonsense. The operators know that the strike order was unpopular, that nothing but a certain loyalty to their union and the fear of violence or social obloquy are holding the men out, and that in the absence of any real general grievance the rank and file will not remain idle long enough to suffer from hunger. The chances are that some of the leaders, as in the case of the steel strike last year, will be making impossible claims weeks after some of the mines are working full forces. Certain small mines that supply local trade solely are preparing to start work, and one, the Oxford, at Scranton, is in operation. People in the coal mining towns want coal, and any attempt to interfere with these mines will likely arouse a powerful anti-strike sentiment. On the other hand, if these small mines run, the miners at the large operations will hardly care to remain idle.

Trade continues very light at all points. In the Northwest what coal was on the docks at the head of the lakes when the strike was declared is being slowly cleaned up. In Chicago territory the week has shown no new developments. A considerable tonnage is yet on hand, but dealers are not seeking business, and are turning down inquiries; only favored customers are allowed to place orders. Business is chiefly confined to small orders of a few hundred tons

and less. Along the lower lakes there is probably coal enough available to last in a way until fall. At Atlantic seaboard points falling prices for bituminous makes the market easier, though little anthracite is changing hands. Gas and oil are being used for domestic purposes as never before, while bituminous has the call for steam production. But for the activity of the health department officials at New York the anthracite market would be much quieter. Supplies at Boston are thought to be sufficient for some weeks yet.

BITUMINOUS.

The Atlantic seaboard soft coal trade is in an easier condition. Consumers are receiving their monthly quotas called for on contracts better than a few weeks ago. The railroads are giving quick, though irregular, transportation from the mines to the shipping ports, and are getting a great deal of service out of the available car supply. The demurrage circular recently issued is effecting prompt discharges at tidewater, and no doubt tends to lower prices on speculative coal by forcing speculators to get rid of the tonnage at shipping ports promptly. The nominal speculative price is now \$4 for Clearfield grades, f. o. b. New York Harbor shipping ports, but it is generally believed that any speculator having coal that has been standing at tidewater until the four days' limit is about up will take \$3.75 if offered.

At the mines the labor situation is improving. At most workings the men continue to return to work slowly. This is particularly true of the Pocahontas field.

The good supply of vessels for coastwise business has helped speculation considerably, as they have been able to charter vessels of almost any desired size, and freight rates are going down. Quite a number of vessels that have been at the loading ports have gone back light, where return cargoes of ice, stone, etc., were available.

A good supply of coal is arriving at ports beyond Cape Cod. Some of it is speculative, but much has been shipped on contract orders. Along Long Island Sound consumers are calling for a great quantity of coal, but the supply arriving about satisfies wants. It is believed that more coal is being used in this territory than in former years, in spite of the good supply of water for plants partly dependent on water power. Consumers at New York Harbor points are fairly well off. Those having contracts are cared for, those buying speculative coal can get good supplies if willing to pay the price. All-rail consumers are having an insufficient supply, and are trying to get coal.

Transportation from the mines to tidewater is up to schedule, though irregular. Car supply is fairly up to producers' demands. In the coastwise vessel market vessels are in plentiful supply; rates are weak, and for large craft and quick loading the figures given below can be scaled. We quote current rates from Philadelphia as follows: Providence, New Bedford and Long Island Sound, 60@65c.; Boston and Salem, 70@75c.; Wareham, Portland and Portsmouth, 75c.; Lynn, 80@85c.; Newburyport and Bangor, 85@90c.; Saco, 90c. and towages; Bath, 75@80c.; Gardiner, 80c. and towages. Rates from the further lower ports are 10c. higher.

Birmingham. July 9.

(From Our Special Correspondent.)

Mines in Walker County are at work, except the Pocahontas, Gamble, Brown and McDonald mines. In Jefferson County only the New Castle and Woodward Iron Company mines and those in which the State convicts labor, produced coal during the past week. The trouble will be settled this week, from all indications, and work will be resumed. If there should be a longer suspension than one week, the difference in production is not going to be felt to any extent, as new mines being opened will more than make up for the loss during the suspension. In all, 11,000 men at the mines were idle during the past week. Of this number about three-fifths are coal diggers.

Coke is not plentiful and is bringing a good price. Coke from the Virginias is coming into the State. All the coke ovens in the State are in full operation and are making a larger amount of coke than ever before. The Buck & Lacey Company, at Trussville, where there is a furnace, is building 100 coke ovens, 50 of which are nearly finished now. Other ovens are being constructed in the district. That the demands for coke will be met in the fall or winter, is the opinion of many of those interested.

Cleveland. July 9.

(From Our Special Correspondent.)

The coal trade is passing through other vicissitudes just now that are testing the patience of the shippers with the railroads. Last week all of the shippers reported that their coal supply had fallen short again. The railroads did not give a very clear excuse, but placed the blame on the shortage of cars. Toward the latter part of the week they promised better things, and while they fulfilled that promise in part shippers are still far short of their usual needs. A good many

of the docks have been doing only about half duty therefore, and a good portion of the boats that otherwise would have engaged in the coal trade have been going to the head of the lakes light. The shipment, therefore, has been short of the actual requirements.

Chicago. July 8.

(From Our Special Correspondent.)

Wholesale dealers report very satisfactory trade in bituminous coals, the lag of last week having quickened into brisk demand for all grades obtainable. The action of the railroads in pouring coal from Illinois and Indiana mines into Chicago, anticipating the possibilities of the future extension of strike conditions, has had the effect of assuring users there will be coal of some sort to be had in Chicago for several months at least. Trade is most brisk in the higher-grade coals, the few smokeless grades being in especial demand. Hocking is selling well at the July prices—\$3.10 for Chicago and \$2.90 for the country, in carloads; smokeless Pocahontas is quoted as last week, lump and egg, \$3.50; nut, \$3.25; run-of-mine, \$3.10. Other bituminous coals continue: West Virginia, \$3.15; Youghiogheny, \$3.20; Indiana block, \$2.45; Indiana semi-block, \$2.10; Clinton lump, \$1.90; Indiana lump, \$1.85; Northern Illinois run-of-mine, \$1.80; Southern Illinois run-of-mine, \$2. Blacksmith's coal is a little more plentiful, but still in active demand at \$3.35.

The anthracite stocks are getting low, but there is no scrambling, and wholesalers are supplying their customers to a limited extent, having filled orders that were on hand at the beginning of the strike. There is as yet no uneasiness over the anthracite situation among dealers or consumers.

Pittsburg. July 9.

(From Our Special Correspondent.)

Coal.—An advance in the price of coal has been decided upon by the principal coal companies in this district, but the amount will not be made public for a few days. A meeting of a number of independent coal companies and representatives of the combines was held during the week, at which it was agreed to maintain the fixed price established two years ago. The increase will probably be 10c. a ton. The present prices are: \$1.45 for 1¼-in.; \$1.35 for ¾-in., and \$1.25 for run-of-mine. These prices are f. o. b. at mine. So far 17,000,000 bushels of coal have been sent out on this rise, and more will go. Of this amount the independent companies sent 3,000,000 bushels and the rest was sent by the Monongahela River Consolidated Coal and Coke Company. The combine expects to send fully 5,000,000 bushels more on the rise.

Connellsville Coke.—Prices are unusually firm. For furnace \$3@3.50 a ton is quoted. Some is still being delivered on contracts based on the price fixed at the opening of the year, which is \$2.25 a ton. The Courier in its last issue gives the production for the previous week at 249,164 tons. The shipments for the week were 12,432 cars, distributed as follows: To Pittsburg and river tipples, 4,091 cars; to points west of Pittsburg, 5,702 cars; to points east of Connellsville, 2,639 cars.

San Francisco. July 5.

(Special Report of J. W. Harrison.)

Since the Sierra sailed there have been the following deliveries of Australian coal: *Louis*, 1,299 tons; *Rufus E. Wood*, 2,106 tons; *Battle Abbey*, 2,300 tons; total, 5,696 tons. The amount of Colonial coal tonnage already chartered for this market will foot up about 94,000 tons. Of this amount there are fully 12 vessels due this month, with a carrying capacity of about 35,000 tons, hence there is plenty of Australian grades in sight for all our immediate requirements. A large amount of Colonial coal is being utilized for household purposes because the character is adapted for that purpose, and because of the low prices ruling. Freights from Australia show no improvement, and from present appearances will remain so the balance of this year, as there is very little outward business offering for sailing vessels from Australian ports. Nearly all the exports of Australian products are shipped by steam. Notwithstanding the low prices quoted here for foreign and domestic steam coals, they are unable to compete with fuel oil as a steam producer. New oil discoveries are being made weekly, throughout the State, so that the question of permanency has become an established fact. Low prices for fuel oil still prevail. There seems to be no unity among producers, and each vender makes his own tariff for his own product.

Prices.—Our special correspondent reports yard prices to dealers at San Francisco for Pacific Coast coals as follows: Roslyn, \$6.50; Wellington, \$8; Seattle, \$6.50; Southfield, \$8; Coos Bay, \$6.50; Bryant, \$6.50; White Ash, \$5. Rocky Mountain coals are quoted as follows: Castle Gate, \$8.50; Clear Creek, \$8.50; Rock Springs, \$8.50; Sunnyside, \$8.50; Colorado anthracite, \$14. Cargo lots of Eastern and foreign coals are as follows: Welland, \$7.50; Bryanbo, \$7.50; Cannel, \$11; Welch anthracite, \$14; Cumberland, \$12; Pennsylvania anthracite, \$14.

matter of new tracks and of relaying portions of its lines with heavier rails. The company has under contemplation several branches on different divisions of the system which include improvements in the Pittsburg District. The entire cost of this rail order at the established price of \$28 a ton is \$5,796,000. With contracts which must hold over the rail mills now have for 1903 more than 1,000,000 tons of orders. The probable production of the year is estimated at 3,000,000 tons. It is now generally conceded that the output of the rail mills for next year will not reach the demand. The reasonable price put on rails by producers despite the fact that raw material is higher than it was a year ago has resulted in the placing of estimates by the railroad companies ahead of time.

There has been but little opportunity for heavy buying in any line, as manufacturers are almost fully sold up for this year. Some large purchases of foundry iron have been made for delivery into 1903. The production is less than in May, and there will be a continued scarcity, due to the troubles among the coal miners in different States and the big strike of the anthracite coal miners. The Connellsville and adjacent regions are unable to supply the deficiency. As a result pig iron prices are irregular. It is reported, but not confirmed, that a sale of 10,000 tons for delivery in the fourth quarter was made at \$21.75, Valley furnaces. The producers are about six weeks behind, and are making but little progress toward catching up. Basic iron is in limited supply at the Valley furnaces. A sale is noted this week of 1,000 tons of Virginia basic at about \$20.50, Pittsburg, for December delivery. Forge iron is firm at \$21 for any delivery this year. Foundry iron for second half delivery cannot be quoted, as it is oversold. Many of the large foundry interests are converting for at least a part of their requirements for the first quarter or half of next year. The general tendency of prices of pig iron and finished material has been upwards, while crude steel and scrap are somewhat lower. The pig iron production this year has been seriously interfered with by labor troubles, and it is now doubtful if any of the furnaces will catch up in deliveries.

No mill was closed the first of this month on account of scales of the Amalgamated Association of Iron, Steel and Tin Workers not having been signed. For the first time in the history of the organization the mills have kept in continuous operation without the full scale having been signed. A number of mills are closed, however, in some cases for repairs and because the men desire a vacation. All of the plants of the Republic Iron and Steel Company have been shut down since July 1, and will be closed for two weeks. The American Sheet Steel Company has suspended operations at about 100 of its mills for two weeks, all of the mills in the Kiskiminetas Valley and some in Ohio being down. A number of independent sheet mills also are closed.

Pig Iron.—For prompt delivery \$22, Valley, could easily be obtained for Bessemer iron. For extended delivery the quoted prices range from \$21 to \$21.75. Gray forge can be had for the third and fourth quarter at \$20.75 to \$21.25, Pittsburg. There is no actual quotation for foundry No. 2 for this year, but for the first half of 1903, \$21.50 to \$22, Pittsburg, is quoted.

Steel.—While there have been no sales of any consequence, Bessemer steel billets are quoted and can be had at \$32@33, and open hearth sheet bars are held at \$33. There is a big demand for steel plates. The American Shipbuilding Company, which has taken contracts for six vessels, is in the market for 20,000 tons, deliveries to begin at once and to be completed by next February.

Sheets.—The sheet market continues very unsatisfactory and prices are weaker. The American Sheet Steel Company is holding strictly to its price of 3c. for No. 28 gauge in small lots and 3.10c. in car-load lots, but the independent mills are shading these prices. Galvanized sheets are, if anything, weaker than black sheets. Heavy gauge sheets continue in good demand. No. 28 is still quoted at 4 1/2c. in car-load lots.

Ferro-Manganese.—There is no change in the situation, sales of domestic being limited. The price of the English product remains at \$52 to \$55 and German at \$50.

New York. July 11.

Pig Iron.—Prices are now determined by needs of each individual buyer. The demand is greater than the available supply, and there are reports of sales of No. 1X at Northern furnaces for \$26 per ton. Nominal quotations for tidewater delivery are: No. 1X foundry, \$22@23.50; No. 2X, \$21@22; No. 2 plain, \$21. For Southern iron on dock, New York, No. 1 foundry, \$22@23; No. 2, \$21@22; No. 3, \$20@21. These quotations are for delivery up to 1903.

Bar Iron and Steel.—Local demand continues active. We quote on large lots on dock: Refined bars, 1.95@2.05c.; common, 1.85@1.95c.; soft steel bars, 2c. Small lots for prompt delivery are considerably higher.

Plates.—Demand continues strong. We quote for tidewater delivery in car-loads: Tank, 1/4-in. and heavy,

ier, 2.05@2.15c.; flange, 2.10@2.20c.; marine, 2.20@2.40c.; universal, 2@2.10c.

Steel Rails.—Orders amounting to 175,000 tons are reported placed by the Pennsylvania Railroad. Standard sections are quoted at \$28 for 1903 delivery; light rails \$30@35, according to weight.

Structural Material.—New contracts for important local work next year continue to be placed, and the total tonnage will be heavy. We quote for forward delivery on large lots at tidewater as follows: Beams, 2@2.30c.; tees, 2@2.25c.; angles, 2@2.25c.

Cartagena, Spain. June 22.

(Special Report of Barrington & Holt.)

Iron and Manganiferous Ores.—Shipments since last report have been one cargo, 1,930 tons, to Maryport; one cargo dry ore, 3,000 tons, to Philadelphia. Total shipments to date, 151,680 tons. The demand for all classes of iron ore has been active, and several contracts are reported having been made at 3d. per ton better price than paid early in the month. The improvement in price, however, is somewhat counteracted by the fall in exchange. Among the new sales several contracts are reported for the United States running into 1903. Although the shipments during the past week have been few, the mines are actively employed and heavy shipments are anticipated.

Quotations are per ton, f. o. b. shipping port: Ordinary 50 per cent iron ore, 6s. 6d.@6s. 9d.; special low phosphorus ore, 50 per cent iron, 7s.@7s. 6d.; special ore, 50 per cent iron, 3 per cent manganese, 6 per cent silicon, 8s. 6d.; specular ore, 58 per cent iron, 9s.; magnetic ore, 60 per cent iron, 5 per cent silicon, 11s. 6d. for lumps and 9s. 6d. for smalls. For manganiferous ores quotations are: No. 1, 20 per cent iron and 20 per cent manganese, 14s. 3d.; No. 1 B, 25 iron and 17 manganese, 11s. 3d.; No. 2, 30 iron and 15 manganese, 10s. 3d.; No. 3, 35 iron and 12 manganese, 9s. 6d. All grades of manganiferous ores are rated at 11 per cent silicon and under 0.03 phosphorus.

CHEMICALS AND MINERALS.

New York. July 10.

Heavy Chemicals.—Warmer weather has quieted this market. Business is principally in forward contracts at practically unchanged prices.

Domestic chemicals, we quote, per 100 lbs., f. o. b. works, as follows: High-test alkali, in bags, 80@85c. for prompt shipment, and 75@77 1/2c. for forward; caustic soda, high-test, \$1.90@1.95 for early delivery, and \$1.85@1.87 1/2 for futures; bicarb soda, ordinary, 95c., and extra, \$3; sal soda, 65c.; chlorate of potash, \$7.75; bleaching powder, off-test, \$1.35; best grades mostly under contract. For foreign goods we quote per 100 lbs. in New York: Alkali high-test, 90@92 1/2c.; caustic soda, high-test, \$2.25; sal soda, 67 1/2@70c.; chlorate of potash, \$10 1/4@10 3/4; bleaching powder, prime brands, Liverpool, \$1.75; Continental, \$1.37 1/2@1.65.

Acids.—Sulphuric and muriatic acids are in better request. Other acids are quiet. Prices are unchanged.

Quotations per 100 lbs., are as below, unless otherwise specified, for large lots in carboys or bulk (in tank cars), delivered in New York and vicinity.

Table with 2 columns listing various chemicals and their prices per 100 lbs. including Blue Vitriol, Muriatic acid, Sulphuric acid, Oxalic acid, and Sulphuric acid.

Brimstone.—The trade is interested in the speculation of a large importer, who sold short, some say 25,000 tons, at lower prices than were generally quoted. In order to cover, the importer has opened negotiations with the Sicilian Sulphur Trust with the view of getting a 4s. rebate. At present spot best unmixed seconds are nominal at \$23.25 per ton, and shipments \$22@22.25, while thirds are about \$2 less.

The average prices of brimstone as quoted by importers at New York during June were \$23.03 per ton for spot best unmixed seconds, and \$22.40 for best thirds; both prices being lower than any month since October last. In the 6 months ending June 30, 1902, the average price of spot best unmixed seconds was \$23.64, and shipments, \$22.79, while best thirds were quoted at \$2@2 1/2 less than seconds. In the corresponding period last year spot best unmixed seconds averaged \$22.68 per ton, and shipments \$21.55, while best thirds were \$2 less than seconds. Thus it will be seen that prices in 1902 have advanced nearly 5 per cent.

Exports of brimstone from Sicily in May amounted to 37,089 tons, making 231,611 tons in the 5 months this year, showing a decrease of 23,581 tons as compared with the same period last year. Stocks at Sicilian ports on June 1 were 262,272 tons, as against 172,509 tons last year, showing an increase of 89,763 tons, or 52 per cent. The decreased exports and heavy stocks are the result of high prices, which have

curtailed the consumption of brimstone, since pyrites are much cheaper.

Pyrites.—The Pennsylvania Salt Manufacturing Company received 3,900 tons Spanish pyrites at New York this week. Present ocean freight from Huelva, Spain, is 10s.@1vs. 3d. to Southern Atlantic ports, and 10s. 3d.@10s. 6d. to Northern ports, depending on time of shipment. Prices of foreign pyrites are firm, and some sellers quote 13@13 1/2c. per unit for 50 per cent ore. Domestic pyrites are quiet.

Quotations are f. o. b. Mineral City, Va.; Lump ore, \$5 per ton, and fines, 10c. per unit; Charlemont, Mass., lump, \$5, and fines, \$4.75. Spanish pyrites 12 1/2@13 1/2c. per unit, New York and other Atlantic ports. Spanish pyrites contain 46 to 51 per cent of sulphur; American, from 42 to 44 per cent.

Sulphate of Ammonia.—Featureless. Spot gas liquor (24@25 per cent) is quoted at \$3.10 per 100 lbs., and shipments at \$2.97 1/2@3.

Nitrate of Soda.—Quiet. The steamer Cuzco arrived with 27,000 bags, while the Capac is due July 14 at Baltimore with 28,500 bags, and the Borderer on July 12 at Charleston with 28,500 bags. Spot and July arrivals are held at \$2 per 100 lbs., with sales at this figure. Futures are nominal and quiet at \$1.90 @1.92 1/2, according to position. The steamer Valencia sailed from Chile on July 4 with 38,000 bags.

In June the average prices of nitrate of soda in New York were \$2.03 per 100 lbs. for spot and \$1.93 for futures. In the 6 months this year the averages were \$2.18 for spot and \$2.02 for futures, showing a substantial advance over last year.

The statistical position of nitrate of soda in the 6 months ending June 30 is shown below in long tons, comparison being made with the corresponding period last year:

Table comparing nitrate of soda exports and stocks for 1901 and 1902, categorized by Chile, Europe, and United States.

Calculating on the above figures, which are only approximate, the consumption this year shows a material falling off as compared with 1901, due partly to the continued high prices.

Phosphates.—The market is seasonably quiet, as comparatively little is being done either for domestic or foreign consumption.

The shipments of Florida high-grade phosphate rock in the 5 months ending May 31 are reported by Messrs. Auchincloss Brothers at 167,048 long tons, against 164,080 tons last year, and 174,210 tons in 1900. The increase this year of 2,968 tons was credited to exports to United Kingdom and Mediterranean ports. There have been no domestic shipments this year, nor has any rock gone to far Eastern countries.

Exports of high-grade Florida phosphates from Savannah in June were 15,403 tons, making 83,759 tons in the 6 months this year, against 77,574 tons in the same period last year, showing an increase of 6,185 tons.

We quote prices below:

Table of phosphate prices per ton, categorized by location (Florida, Tennessee, etc.) and grade (hard rock, land pb., etc.).

METAL MARKET.

New York. July 10.

GOLD AND SILVER.

Gold and Silver Exports and Imports.

At all United States Ports in May and Year.

Table showing gold and silver exports and imports for 1901 and 1902, with excess and deficit figures.

These figures include the exports and imports at all United States ports, and are furnished by the Bureau of Statistics of the Treasury Department.

Gold and Silver Exports and Imports, New York. For the week ending July 10, and for years from January 1, 1902, 1901, and 1900.

Table with columns: Period, Gold (Exports, Imports), Silver (Exports, Imports), Total Excess Exports or Imports. Rows for Week, 1902, 1901, 1900.

The gold exported this week went to South America, and the silver, chiefly to London. Imports were from Central and South America, and the West Indies.

Financial Notes of the Week.

Crop conditions are still a little uncertain, but general business continues good, especially for this time of year. Money in New York is less easy, owing to the heavy demand from the West for currency, and withdrawals of funds from the banks.

The statement of the New York banks, including the 63 banks represented in the Clearing House, for the week ending July 5, gives the following totals, comparison being made with the corresponding weeks of 1901 and 1900:

Table with columns: 1900, 1901, 1902. Rows: Loans and discounts, Deposits, Circulation, Specie, Legal tenders, Total reserve, Legal requirements.

Changes for the week this year were increases of \$17,011,400 in loans and discounts, \$2,818,100 in deposits and \$227,800 in circulation; decreases of \$517,700 in specie, \$1,671,400 in legal tenders and \$2,893,635 in surplus reserve.

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

Table with columns: 1901, 1902. Rows: N. Y. Ass'n, England, France, Germany, Spain, Netherlands, Belgium, Italy, Russia. Sub-headers: Gold, Silver.

The returns of the Associated Banks of New York are of date July 5 and the others July 3, as reported by the Commercial and Financial Chronicle cable. The New York banks do not report silver separately, but specie carried is chiefly gold.

The silver market has advanced this week, owing to a French Mint order, and closes firm on small supply for prompt deliveries. Forward deliveries are under spot prices.

The United States Assay Office in New York reports receipts of 57,000 oz. silver for the week.

Indian exchange continues steady, and all the Council bills offered in London were taken at 15s. 9d. per rupee. A small amount of silver is reported taken for Indian account. Accounts from that country are very unfavorable, however, owing to the probable failure of the rains.

The Treasury Department statement of the money in the United States on July 1 is as follows:

Table with columns: Totals, In Treasury, In Circulation. Rows: Gold coin, Gold certificates, Silver dollars, Silver certificates, Subsidiary silver, Treasury notes of 1890, U. S. notes, Currency certificates, National bank notes.

Population of the United States July 1, 1902, estimated at 79,117,000; circulation per capita, \$28.40. For redemption of outstanding certificates an exact equivalent in amount of the appropriate kinds of money is held in the treasury, and is not included in the account of money held as assets of the Government.

credit of the Treasurer of the United States, and amounting to \$119,814,695. The total amount in circulation shows a decrease of \$7,886,563 from June 1; but an increase of \$69,263,132 as compared with July 1, 1901.

Prices of Foreign Coins.

Table with columns: Bid, Asked. Rows: Mexican dollars, Peruvian soles and Chilean pesos, Victoria sovereigns, Twenty francs, Twenty marks, Spanish 25 pesetas.

OTHER METALS.

Daily Prices of Metals in New York.

Table with columns: Silver, Copper, Spelter. Rows: July, August, September, October, November, December. Sub-headers: Sterling E. change, N. Y. Cts., London Pence, Lake Cts. per lb., Electrolytic per lb., London £ per ton, Tin, cts. per lb., Lead cts., N. Y. cts., St. L. cts.

London quotations are per long ton, (2,240 lbs.) standard copper, which is now the equivalent of the former g. m. b's. The New York quotations for electrolytic copper are for cakes, ingots or wirebars; the price of electrolytic cathodes is usually 0.25c lower than these figures.

Copper.—The market is dull. Consumers are covered for the time being, and at the moment are not laying in supplies for the future. On the other hand, producers are well sold, and there is not much pressure to effect sales. Some transactions have taken place at slightly lower prices, and we quote Lake copper at 11 1/2 @ 12c.; electrolytic in cakes, wirebars and ingots at 11 1/4 @ 11 3/4c., in cathodes at 11 1/2 @ 11 3/4c.; casting copper at 11 3/4c.

The London market, which closed last Thursday at £53 2s. 6d., opened 5s. higher on Monday. On Tuesday, however, it went down to £53, on Wednesday to £52 15s. On Thursday the closing quotations are cabled as £53 2s. 6d. for spot, £53 7s. 6d. for three months.

Refined and manufactured sorts we quote: English tough, £57 @ £57 10s.; best selected, £57 10s. @ £58 10s.; strong sheets, £68; India sheets, £67; yellow metal, 6 1/4d.

Exports of copper from New York and Baltimore in the week ending July 9 are reported by our special correspondent as follows: Great Britain, 654 tons; Germany, 215; Holland, 460; Austria, 340; Belgium, 98; France, 50; Italy, 50; total, 1,867 tons. Imports were 275 tons copper and 2,780 tons ore, the latter being from Tilt Cove.

The imports and exports of foreign copper in Germany for the 5 months ending May 31 are reported as below, in metric tons:

Table with columns: 1901, 1902, Changes. Rows: Imports, Exports, Balance.

These figures include scrap and old copper as well as fine copper, and copper in ores. The increase in imports was chiefly from the United States.

Tin.—Business was interrupted the end of last week by the holiday. This week a fair business was done at advancing prices. Consumers, generally, are not well supplied, and are taking more interest than for some time past. We quote spot at 28 1/2c., July at 28 1/4c., August 28 1/4c.

The London market, which closed last Thursday at £126 5s. for spot, £124 for three months, opened on Monday at £125 15s. for spot, £123 15s. for three months. It ruled the same on Tuesday, on Wednesday advanced 15s., and on Thursday scored a further advance to £127 15s. for spot, £125 10s. for three months.

Lead.—The market remains unchanged, and we quote 3.97 1/2 @ 4.05c. St. Louis, 4.05 @ 4.10c. New York. The foreign market is higher, Spanish lead being quoted at £11 5s. @ £11 6s. 3d., English lead 5s. higher. Cables report a large business doing at the advance.

St. Louis Lead Market.—The John Wahl Commission Company telegraphs us as follows: Lead is uninteresting. Missouri metal still sells at 3.97 1/2c., while desilverized lead brings 4.05c.

Spanish Lead Market.—Messrs. Barrington & Holt write from Cartagena, Spain, under date of June 22, as follows: The price for silver during the week has been 13 reales per oz. Exchange on London has gone up 17 centimes, making it 34.40 pesetas to £1. The local quotation for pig lead on wharf has been 62.50 reales per quintal, which on above exchange is equal to £10 3s. 5d. per ton of 2,240 lbs. f. o. b. Cartagena. Exports of pig lead have been 410,880 kgs. to Newcastle; 67,000 kgs. to Marseilles; total, 477,880

kgs. Other exports were 976 kgs. silver bars to Marseilles.

Spelter.—The market continues strong and advancing, and a large business has been done at about 4.95 @ 5c. St. Louis, 5.15 @ 5.20c. New York.

The London market has scored a large advance, good ordinaries being quoted at £19 2s. 6d., specials 5s. higher.

St. Louis Spelter Market.—The John Wahl Commission Company telegraphs us as follows: Spelter continues scarce and very strong, prices ranging from 4.90 @ 4.95c., according to brand and delivery.

Silesian Spelter Market.—Herr Paul Speier reports from Breslau, under date of June 27, that the demand for spelter has been better, owing to the large business done by the galvanizers chiefly. Exports have increased, and prices are somewhat firmer, current quotations being 18.25 @ 18.75 marks per 50 kgs., f. o. b. cars at Breslau. This is equivalent to 3.90c. per pound. Imports and exports in Germany for the 5 months ending May 31 were as follows, in metric tons:

Table with columns: Imports, Exports. Rows: Spelter, Zinc sheets, Zinc scrap, Zinc white, Lithophone, Zinc ores.

The large gain in exports was chiefly due to heavy shipments of spelter to Great Britain.

Antimony.—We quote Cookson's at 9 1/4c.; Hallett's at 8 1/4c.; Hungarian, Italian, Japanese and United States Star at 8c.

Nickel.—The price continues firm at 50 @ 60c. per lb., according to size and terms of order.

Platinum.—Consumption continues good. Ingot platinum in large lots brings \$19 per oz. in New York. Chemical ware (crucible and dishes), best hammered metal from store in large quantities, is worth 76c. per gram.

Quicksilver.—The New York price continues \$48 per flask for large orders, with a slightly higher figure for small lots. In San Francisco prices have varied slightly, and the quotation is \$45.50 @ \$46.50 per flask for domestic orders. Special rates—about \$3.50 lower—are made on export business. The London price remains £8 15s. per flask, with the same figure quoted from second hands.

Quicksilver receipts at San Francisco in June are reported by our special correspondent at 1,536 flasks, against 1,373 in June, 1901. The total for the 6 months ending June 30 was 10,307 flasks, against 10,095 in the corresponding period last year. These figures cover only actual receipts, and do not include shipments from mines direct to consumers. Exports by water were 230 flasks in June and 2,375 flasks for the 6 months of this year.

Minor Metals and Alloys.—Wholesale prices, f. o. b. works, are as follows:

Table with columns: Per lb., Per lb. Rows: Aluminum, Ferro-Tungsten (37%), Magnesium, Manganese, Alum-bronze, Nickel-alum, Bismuth, Chromium, Copper, Ferro-Molybdenum (50%), Ferro-Titanium (10%), Ferro-Titanium (20 @ 25%), N. Y.

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

LATE NEWS.

A terrific explosion of fire damp occurred shortly after noon on July 10 at the rolling mill mine of the Cambria Steel Company, under Westmont Hill, near Johnstown, Pa. The last accounts received place the total number of casualties at 125. The mine has been operated for nearly 50 years, its output is nearly 3,000 tons daily, and it has miles of underground workings, but this is the first serious accident in its history. The explosion occurred at what is known as the "Sixth West of the South Main Heading," nearly 2 miles from the main entrance. It is thought to have been caused by a careless miner using a naked lamp in a heading known to be gassy.

Average Prices of Metals per lb., New York.

Table with columns: Month, Tin, Lead, Spelter. Rows: January, February, March, April, May, June, July, August, September, October, November, December, Year.

Average Prices of Copper.

Table with columns: Month, Electrolytic (1902, 1901), New York (1902, 1901), Lake (1902, 1901), London Standard (1902, 1901). Rows: January to December, Year.

New York prices are in cents, per pound; London prices in pounds sterling, per long ton of 2,240 lbs., standard copper. The prices for electrolytic copper are for cakes, ingots or wire bars; prices of cathodes are usually 0.25 cent lower.

Average Prices of Silver, per ounce Troy.

Table with columns: Month, London (1902, 1901), N. Y. (1902, 1901), Y. Y. (1902, 1901). Rows: January to December, Year.

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

DIVIDENDS.

Table with columns: Name of Company, Date, Latest Dividend (Per Share, Total), Total to Date. Rows: American Cement, Alaska-Treadwell, American Cement, Bartolome, Bunker Hill & Sull., Central Coal & Coke, Central C. & C., Central Lead, Colo. Fuel & Iron, Doe Run Lead, Empire-State, Federal Chem., Gold Coin, Gwin, Helena, Home Oil, Homestake, Homestake S. Dak., Iowa, Mary McKinney, Monongahela C. I. & C. K., Penoles, Philadelphia Gas, Pittsburg Coal, Providencia, Sta. Maria de la Paz, Susquehanna I. & S., Texas & Pacific Coal, United Zinc, United Zinc pf., U. S. Steel Corp., U. S. Steel Corp. pf., Va. Car Chem.

ASSESSMENTS.

Table with columns: Name of Company, Location No., Delling, Sale, Amt. Rows: Andes, Annandale, Baker Divide, Ben Butler, Best & Belcher, Caledonia, Challenge, Chollar, Confidence, Con. Golden Trout, Crown Point, Diamond Creek, Elise, Emerald, Humboldt, Larkin, Mexican, Monte Cristo, National Con., New Montezuma, Old Indian, Petroleum Center Oil, Pioneer, Potosi, Reward, R. G. W., Skylark Copper, Snowflake, Star, Tetro, Union Con., United Sunbeam, Utah-Wyo. Oil, Willietta.

STOCK QUOTATIONS.

NEW YORK.

Table with columns: Company and Location, par val, July 3, July 4, July 5, July 7, July 8, July 9, Sales. Rows: Alice, Mont., Almo, Amalgamated c., Mont., Anaconda c., Best & Belcher, Nev., Brunswick, c., Comstock T., Nev., Comstock Bonds, Nev., Con. Cal. & Va. g. s., Nev., Creede & C. C., Colo., Elkton, g., Colo., Greene Con., c., Mex., Iron Silver, Colo., Isabella, g., Colo., Jack Pot, g., Colo., Justice, Nev., Little Chief, s. l., Colo., Mexican, s., Nev., Mine Securities, U. S., Mollie Gibson, c., Colo., Ontario, s. l., Utah, Ophir, s., Nev., Pharmacist, g., Colo., Portland, g., Colo., Potosi, g., s., Nev., Quicksilver, Cal., Sierra Nevada, c., Small Hopes, Colo., Standard Con., g., Cal., Tenn. c., N. C., White Knob, g. s., Ida, Work, g., Colo.

*Per cent.

Coal, Iron and Industrial Stocks.

Table with columns: Company, par val, July 3, July 4, July 5, July 7, July 8, July 9, Sales. Rows: Am. Agr. Chem., U. S., Am. Agr. Chem. pf. U. S., Am. Sm. & Ref., U. S., Am. Sm. & Ref. pf. U. S., Col. Fuel & I., Colo., Col. & H. C. a. l., Colo., Crucible Steel, U. S., Crucible Steel, pf. U. S., Int'l S. Pump, U. S., Int'l S. Pump pf. U. S., Mong. R. Coal, Pa., Mong. R. Coal pf. Pa., National Lead, U. S., National Lead pf. U. S., Phila Nat. Gas, pf., Pittsburgh Coal, Pa., Pittsburgh Coal pf. Pa., Republic I. & S., U. S., Republic I. & S., pf. U. S., Sloss-Shef. s. l., Ala., Sloss-Shef. s. l., pf. Ala., Standard Oil, U. S., Tenn. C. I. & R. R., Ala., U. S. Cast I. Pipe, U. S., U. S. C. I. Pipe, pf. U. S., U. S. Red. & Ref. Coic., U. S. Red. & Ref. pf. Colo., U. S. Steel Corp., U. S., U. S. Steel Corp. pf. U. S., Va.-Car Chem., U. S., Va.-Car Chem. pf. U. S., W. house Elect., Pa., W. house Elect. pf. Pa.

Total sales, 218,069 shares. †Ex-dividend

BOSTON, MASS.*

Table with columns: Name of Company, par val, Shares listed, July 3, July 4, July 5, July 7, July 8, July 9, Sales. Rows: Adventure Con., c., Actna, U. S., Allowez, Amalgamated, c., Am. Z. L. & Sm., Anaconda, c., Arcadian, c., Atlantic, c., Bingham Con., g. s., Bonanza Dev., Cal. & Hecla, c., Centennial, c., Con. Mercur, g., Copper Range Con., Daly-West, g. s., Dominion Coal, Dominion Coal, pf., Dominion I & S., Elm River, Franklin, c., Granite, c., Isle Royale Con., c., Mass Con., c., Mayflower, c., Michigan, c., Mohawk, c., Mont. Coal & Coke, National & Boston, c., National, U. S., N. E. Gas & Coke, New Idria, Old Colony, c., Old Dominion, c., Osceola, c., Parrot, s. c., Phoenix Con., Quincy, c., Rhode Island, c., Santa Fe, g. c., Shannon, c., Tamarack, c., Tecumseh, c., Tennessee, Trimountain, c., Trinity, c., United States, g., U. S. Oil, Utah Con., g., Victoria, c., Washington, c., Winona, c., Wolvener, c., Wrandot, c.

* Official Quotations Boston Stock Exchange. *Holiday. Total sales, 37,300 shares. †Ex-dividend.

PHILADELPHIA, PA. §

Table with columns: Name and Location of Company, par val, July 3, July 4, July 5, July 7, July 8, July 9, Sales. Rows: Am. Alkali, Mich., Am. Cement, Cambria Iron, Pa., Cambria Steel, Pa., Susq. I. & S., Pa., †United Gas I., Pa.

§Reported by Townsend, Whelen & Co., 306 Walnut St., Philadelphia, Pa. Total sales 17,938 shares. †Ex-privileges. *Holiday.

STOCK QUOTATIONS.

COLORADO SPRINGS, COLO.*

Table of stock quotations for Colorado Springs, Colo. listing companies like Acacia, Alamo, Am. Con., Anaconda, etc., with columns for par value, high/low prices, and sales.

*Colo. Springs Mining Stock Exchange. All mines are in Colorado. Total sales 216,417 shares.

Colorado Springs (By Telegraph.)

Table of stock quotations for Colorado Springs via telegraph, listing companies like Acacia, Alamo, Anaconda, etc., with columns for par value, high/low prices, and sales.

*Holiday

MEXICO.

June 28.

Table of stock quotations for Mexico, listing companies like Durango, Angustias, Guanajuato, etc., with columns for shares, last dividend, and prices.

ST. LOUIS, MO.* July 7.

SPOKANE, WASH.* July 3.

Table of stock quotations for St. Louis, Mo., listing companies like Am. Nettie, Cathine Lead, Central Coal, etc., with columns for shares, par value, and prices.

Table of stock quotations for Spokane, Wash., listing companies like American Boy, Black Tail, Lone Pine, etc., with columns for shares, par value, and prices.

*From our Special Correspondent.

Total sales 38,385 shares. *Reported by Hunner & Harris.

LONDON.

June 25.

Table of stock quotations for London, listing companies from various countries like Anaconda, Copiapo, De Lamar, etc., with columns for authorized capital, par value, last dividend, and quotations.

c.—Copper. d.—Diamonds. g.—Gold. l.—Lead. s.—Silver.

PARIS.

June 19.

Table of stock quotations for Paris, listing companies like Acieries de Creusot, Firminy, Huta-Bank, etc., with columns for country, product, capital stock, par value, latest dividend, and prices.

SALT LAKE CITY.* July 5.

TORONTO, ONT. July 7.

Table of stock quotations for Salt Lake City, listing companies like Ajax, Ben Butler, California, etc., with columns for shares, par value, high/low prices, and sales.

Table of stock quotations for Toronto, Ont., listing companies like Ontario, Olive, British Columbia, etc., with columns for shares, par value, high/low prices, and sales.

All mines are in Utah. *By our Special Correspondent. Total sales, 2,802 shares.

Total sales, 23,600 shares.

