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CONTENTS.

*Illustrated.

DEPARTMENTS.

THE INCREASING use of fuel oil in California is shown by the statement that in the past 10 months the city authorities of San Francisco have granted over 150 permits to use oil in place of coal, nearly all of them being issued to large consumers of fuel. Oil has not come into use for household purposes as yet, but in factories, large buildings, electric light and power plants it has supplanted coal to a very considerable extent. In the waters around San Francisco also its use on steamboats and tugs is rapidly increasing, while several ocean steamers have been or are being fitted up to use liquid fuel. In fact, California oil has already had a marked effect on the coal trade, and this promises to increase steadily.

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IN APRIL 56 companies identified with the mineral industry of the United States paid dividends aggregating $7,460,935, showing an improvement over the two previous months. This makes a total for the four months this year of $54,984,816 paid by 113 concerns, led by the industrial combinations. This is an excellent return on the capital invested, but it is somewhat short of the amount that would have been paid had not the market value of copper and certain other metals fallen below the average of recent years.

In addition to these dividends there has been reported to the ENGINEERING AND MINING JOURNAL in the 4 months ending April 30, Mexican dividends of $450,031; Central American, $60,000, and Canadian, $541,044; a total of $1,051,075 by 18 companies.

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THE DIVIDEND just declared by the Calumet & Hecla Mining Company for the first quarter of the year is $5 per share only. Comparing with $10 paid in December, and $20 a year ago, it is somewhat of a disappointment, though some reduction had been expected. Unfortunately the company publishes no statements, so that we do not know what its earnings and expenses have been, nor what prices have been realized for copper sold during the past year. Some information of the kind would doubtless be welcome to stockholders, but none is forthcoming. From such information as is available, it seems probable that the company could have paid $10, as in December, but that its managers have preferred to hold a large surplus in hand; which is probably a prudent policy in the present condition of the copper market.

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THE NEW management which took charge of the French company owning the Huanchaca Mine in Bolivia some time ago has been engaged in making some improvements which, it is hoped, will make the great mine once more a source of profit to its owners. The first and most important of these is the utilization of water power. An electric plant has been installed by the Société Alsacienne which will supply 2,000 horse-power. This will be transmitted a distance of 80 kilometers to the mine, and will be used to operate the pumps and other machinery. The expense of handling the enormous flow of water from the mine will be largely reduced by this plant. As fuel is very costly at the mine, the item of pumping has heretofore constituted a formidable part of the expenses. Many improvements are being made in the reduction works also and the Huanchaca will doubtless be a great silver producer again before the end of the present year.

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THE ESTABLISHMENT of an iron industry in New South Wales, which has been often proposed and discussed, seems at last to be probable. A syndicate, headed by Mr. W. Jamieson, is arranging to build extensive works, and to take up the offer made by the State of a long-time contract to furnish rails, bridge work and other material for the State railroads. The new company proposes to use some New South Wales ores, but the bulk of its supply will be drawn from the Blythe River deposits in Tasmania, upon which very favorable reports have been made. The works are to be located on the Parramatta River, near Sydney, where supplies of fuel and flux are to be had and where the Tasmanian ore can be delivered by water. The company is arranging for the erection of works to turn out about 150,000 tons of finished iron and steel yearly, a considerable part of which will be required to fill the Government contracts.

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THE ORGANIZATION of a new company in New Jersey to control and operate the Montana Ore Purchasing Company and the other copper properties in the Butte District, which are owned by Mr. F. A. Heinze and his associates, is noted in our news columns this week. The new concern is a proprietary company, which will hold the stocks of the subordinate companies, the latter retaining their present organizations. While we doubt the policy of this modern plan of organization, and do not believe that it is the best for the interests of stockholders and the public, the formation of the new company seems to be a logical and natural step. It puts the Heinze interests in Butte into a compact, consolidated form, in which they will be in better shape than at present to continue the contest with the Amalgamated Copper Company, or to negotiate with it. That the former course will be adopted seems most probable at present, but there have been many surprises in copper, and especially in Butte.

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REPORTS COME from Seattle of the organization of expeditions to prospect for gold on the coast of Siberia. It seems difficult to believe that this should be done in view of the existing conditions, but there is little doubt that such plans have been formed. In this connection, Mr. R. T. Greener, the United States Commercial agent at Vladivostok, gives a timely warning. He calls attention to the proclamation of the Russian Government, issued in July last, which closes against prospecting and exploitation the entire coast of the Maritime Province of Siberia for a distance of 100 versts (66 miles) back from the sea. This covers the whole region from the Manchurian border to Bering Strait, including Sakhalin and other islands. There can be no doubt that this decree will be strictly enforced, and that prospecting parties landing on the Siberian coast will find themselves in serious trouble with the Russian authorities, who are not given to trifling with intruders.

The only possible exception to the decree is that the Governor-General of the Maritime Province at Khabarovska can grant permits to mine, but only to such parties as may have received concessions and completed titles before the issue of the decree in July last.

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THE EXPORTS of mineral products and manufactures (except precious metals) for the first two months of the present year, as exhibited in the statement on another page of this issue, show a decrease as compared with the corresponding period for 1901 of $400,803. This decrease is comparatively insignificant, as it amount to less than 1 per cent of the total for the year. Some of the items in the table, however, are interesting as reflecting the industrial conditions at the beginning of this year. The exports of metallic copper are shown to have increased 60 per cent, from about 40,000,000 pounds in 1901 to 65,000,000 in 1902, but it is uncertain whether this increase was due to actual sales or to shipments for speculative purposes; and although the exports of copper increased 60 per cent in amount, the value of these exports increased not quite 20 per cent. Had the same prices prevailed this year as last, the returns to the shippers would have been better by about $2,500,000. The exports of steel rails decreased 58 per cent the first two months of this year; sheet iron over 65 per cent, and sheet steel over 85 per cent, while bar and rod steel decreased nearly 70 per cent, and bar iron exports fell off 55 per cent. These decreases have been due simply to the extraordinary home demand.

There was, however, an increase of about 25 per cent in the exports of iron and steel wire, and in the exports of illuminating and lubricating oils there was an increase of about 11 per cent. Salt increased about 50 per cent. The exports of pig lead for the first two months of 1902 only amounted to 0.25 per cent of the exports of 1901.

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WHILE THE parties in interest in the Newhouse Tunnel at Idaho Springs have not yet reached an understanding, it will be of value to other tunnel proprietors and the owners of lode claims to note the terms of a recent agreement between the owners of the Yak Tunnel at Leadville, and those of the locations along its line. The Yak Tunnel may be regarded as second only to the Cowenhoven Tunnel at Aspen in its scope, purpose and range. Originally projected to drain and develop the mines on Mike & Starr and Iron Hills, its value to the Breece Hill District, if extended, soon became apparent. Especially did this relate to the property of the Ibex Company, known as the Little Jonny Mine. After protracted negotiations and estimates of value, the following agreement was reached, and its terms will prove most suggestive and valuable as a basis for kindred operations elsewhere. These are substantially as follows: The Yak Tunnel Company agrees to extend its tunnel to the south boundary line of the Glengarry claim. The tunnel will enter the Ibex at a depth below 1,100 feet. The Yak people retain the original right of way through the tunnel and through all its connections in the Jonny property. In consideration of the extension of this tunnel to the Jonny Mine the Ibex Company agrees to pay $1,000 per month for the drainage of the property providing that the output of the mine exceeds $25,000 per month, and 4 per cent on the net smelter returns when the output does not exceed $25,000 per month. The company also agrees to pay an additional 2 per cent on all ore taken out below the 1,000-foot level.

THE MINERAL RESOURCES OF SPAIN.

Spain has, from very early days, been noted for the variety and extent of its mineral resources. Its copper mines are the oldest in the world; and its lead, silver, quicksilver and iron deposits have been exploited for long periods, and with much success. From this point of view the country is a most interesting one, though it has received less attention than its importance deserves.

The best known among the mineral developments of Spain are its copper mines. The great mines of Rio Tinto have been worked since Roman times, and are still active producers. Besides these, the Tharsis, the Calañas, the Sevilla and other mines are large producers. The copper of the Iberian Peninsula comes mainly from pyritic deposits of large extent, which are valuable for their sulphur as well as for the copper. These copper-bearing pyrites are not only worked in the country, but are exported in large quantities, and are used in the United States, as well as in Europe, for their sulphur. The exports include, besides copper-bearing pyrites, iron pyrites, sterile, or free from copper, which are valued for their sulphur contents. The extent of several of these pyritic deposits makes them notable among the great mineral deposits of the world. The copper output of the country is from 45,000 to 50,000 tons yearly, and exceeds that of any other country in the world, except the United States.

The Spanish mines were long the greatest producers of lead in the world. Up to 1898 their total output had never been exceeded by that of any other country, though since that year the United States has reported a greater total. In 1899 the lead produced reached a total of 182,500 tons; in 1900 there was a slight decrease, followed by a recovery last year. In lead metallurgy the Spanish miners are specially expert, and nearly all the ores mined are reduced at home, the large exports being made as metal. In the producing districts Jaen, Cordova, Ciudad-Real, Budajoz and Murcia are many lead smelting works, some of which are of large capacity, such as those of the Escombrera-Bleiberg, the Mazarron and the Penarroya companies. Less than 10 per cent of the lead made is used in the country, Spain having long furnished the chief supplies of Europe.

The silver produced in Spain is mainly found in connection with lead, more than half of that metal produced being argentiferous. There is, however, some silver produced from the dry ores of Hiendelaencina. With the exception of that district there is no mining of ores for their silver values only.

A specially valuable product of the Spanish mines is quicksilver. The great Almaden Mines have long been famous, and there are several smaller mines in the province of the Asturias. About one-third of the quicksilver supply of the world comes from Spain, and its mines are still large producers, notwithstanding the many years they have been worked. The Almaden and other mines are supplied with excellent metallurgical plants, and many improvements in the reduction of ores have been tested and applied there.

The iron mines of Spain are among its more valuable mineral resources, and the country ranks high among the nations of the world as a producer of iron ore. The production has been decreasing somewhat in recent years, as some of the larger and more easily worked deposits are being exhausted. There are very large reserves in existence, but most of them are at present remote from transportation, though they will doubtless be exploited hereafter. The province of Vizcaya has been the largest producer, as a number of its mines are near tidewater and can ship their product at moderate cost. Santander, Murcia and Almeria are large producers also and present many opportunities for increase.

Although so large a producer of iron ore, comparatively little of it is used in the country, chiefly because supplies of fuel are not at hand. Less than one-tenth of the ore mined goes to Spanish works; but the blast furnaces of Great Britain are largely dependent on Spanish ores, while those of Germany and Belgium use them largely. Most of the ores mined have been of high grade, and generally well adapted to the making of bessemer pig, and for this reason they have been in demand.

The coal production of Spain is comparatively limited, the yearly output having been below 3,000,000 tons, and changing little from year to year. The coal mined is of every grade, from lignite to anthracite. A large proportion of it is of excellent quality, and good coking coal, which furnishes excellent metallurgical fuel is found in several provinces. The supply is not sufficient, however, and considerable imports are made.

Zinc ore—both blende and calamine—is mined, and some spelter is made at the Arnao Works of the Compañia Real Asturiana. Most of this ore, however, goes to French or Belgian works for reduction.

Among the minor mineral products of Spain are manganese ores, asphalt, limestone and cement material. Salt is an important product, and is exported in large quantities. The building stones and clays of the country are also worked profitably and add to its mineral production.

Upon the whole it may be said that the mineral resources of Spain present many opportunities for profitable expansion in the future. The excellent qualities of the Spanish mines are recognized, but the people have been successful as miners and prospectors rather than metallurgists. An increasing use of the output of the mines at home, and the export of metals and finished products rather than of ores and raw products will be of incalculable benefit to the people. A country which stands first in the world among the producers of lead, second among those of copper, and very high among those of iron ore and other minerals, should certainly have a prosperous future before it.

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PIG IRON CONSUMPTION IN GERMANY.

The consumption of pig iron in Germany for the past year is estimated as below by the statistician of the German Iron and Steel Makers' Union:

	1900.	1901.		Changes.
Blast furnace output	8,520,541	7,860,893	D.	659,648
Imports of pig iron and scrap	827,095	293,866	D.	533,229
Pig iron in wrought iron, steel, etc., imported	338,980	232,624	D.	106,356
Total supplies	9,686,616	8,387,383	D.	1,299,233
Exports, pig iron and scrap	190,505	303,846	I.	113,341
Pig iron in steel, wrought iron, machinery, etc	2,118,772	3,000,224	I.	891,452
Total exports	2,309,277	3,304,070	I.	994,793
Consumption	7,377,339	5,083,313	D.	2,294,026

In estimating the pig iron contained in steel, wrought iron and machinery exported and imported, the statistician makes an addition of 33 1-3 per cent to the net weights to provide for losses in manufacture, etc. That is, the total pig iron given as equivalent to such exports is 133 1-3 per cent of the actual weight of these various finished products. The quantities of pig iron produced, and imported or exported as such, are, of course, the actual weights. In estimating the approximate production no allowance is made for changes in stocks on hand from year to year.

On the basis of the statements given in the table

the average production of pig iron in Germany, which was 152.1 kilograms per unit of population in 1900, fell to 137.9 in 1901; while the consumption fell from 131.7 to 89.2 kilograms per unit. This drop of 32.3 per cent shows very plainly the industrial depression which existed in Germany last year. At the same time the statement shows, in the increase of nearly a million tons in exports, to how great an extent the German makers succeeded in pushing their foreign trade; making up in part for the heavy falling off in the home demand. While the year 1900 showed the largest production and the largest consumption ever reported in Germany, the year 1901 showed by far the largest exports.

Pig iron production in Germany grew steadily—with only occasional halts—from 1871, when the total was 1,563,682 metric tons, to 1886, when it was 3,528,628 tons; having more than doubled in 15 years. Between 1886 and 1890 there was a rapid increase, and in the decade from 1891 to 1900 there were more moderate gains, each year showing some advance. The decrease from the previous year's output shown in 1901 is the first drop in production reported since 1876. This is a record which no other great iron-producing country can show.

In imports of iron the course has been largely the reverse of that of production. In 1873 the total imports were 1,114,322 tons; and from that date they fell off steadily to 1886. From that year they fluctuated slightly until 1898, when there was a sharp increase under the influence of the boom in manufacturing. These imports reached their maximum —1,166,075 tons—in 1901, and last year decreased nearly one-half.

The increase in exports has been gradual, though Germany has always sold a considerable proportion of its iron output abroad. The gain last year over 1900 was nearly one-half; and this shows what formidable competition the German ironmasters can be when it is an object to them to press their foreign sales.

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THE UNITED STATES STEEL CORPORATION.

The circular given out by the United States Steel Corporation this week with regard to the proposed issue of $250,000,000 in bonds is a very well put plea in favor of the plan. It states the reasons very clearly and deserves credit as an excellent specimen of special pleading. It does not, however, alter the opinion which we recently expressed, that the placing of an additional lien upon the properties of the corporation is a departure from the comparatively conservative course which has heretofore marked its management. The new issue, it is true, will apparently reduce the charges for a time, but in so doing it substitutes a fixed charge, which must be paid if the company is to continue solvent, for a liability the payment of which depends upon the profits earned. So long as business continues in its present condition there will be no difficulty, of course, in making all the payments required; but slack times are sure to come in the course of the next few years when fixed charges will be a burden which may seriously impair the credit of the company, as the passing of a dividend could not do.

It is, moreover, not a good sign that the company should need the $50,000,000 additional capital, which is to be part of the new issue, so soon after its organization. We do not doubt that the additional funds provided will be well used and that the expenditure will enable the company to work to better advantage and to reduce its costs in several directions. The need of this expenditure ought to have been recognized in the original organization; or, at least, the money required should have been provided out of the very large earnings of the past and the current years. This would have been much more in accord with a conservative policy than the issue of new securities, especially bonds secured by a mortgage lien.

We are not anticipating trouble; but all past experience shows that the high degree of prosperity which we are now enjoying cannot last forever. There will certainly be a period of dull trade and depression—not this year, nor, perhaps, next year, but in due course of time—when the financing of the great concerns formed during the present season of prosperity will form a problem much more difficult of solution than any we have had to meet heretofore, as the size and amount of capital of our present corporations exceeds any that we have had experience with in the past. It will be an interesting study to economists—but, perhaps, not so interesting to holders of securities.

We do not wish to be considered pessimists or doubters of the future growth of the country. But it is well, even in the high tide of success, to consider the possible reverses of the future and to provide against them as far as possible. One way to do this is to keep down fixed charges. Another would be to limit nominal capital, but we have gone too far on the road of expansion to do this now.

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TIMBERING IN DEEP MINES.

By A. W. CLAPP.

Prof. W. F. Blake, director of the Arizona School of Mines, has been discussing the timbering of mines, a particular example from which to deduct a moral being the caving in of the Mammoth mine north of Tucson, Ariz. The professor believes little in timbers, as they are generally used, and suggests a surer mode for removing large ore deposits. After a talk with the writer with regard to the caving in of the mine Prof. Blake continued:

"This extensive caving and crushing is another example out of many of the futility of attempting to hold up a mountain with timbers. Even on the Comstock lode, at Virginia City, within sight almost of the superb pine forests of the Sierra Nevadas, the transfer of large portions of those forests to the interior of the mines in the shape of square sets, framed and set with geometrical precision, served only the temporary purpose of checking incipient caving of the walls and securing the safety of the miners for a time. But when heavy splitting off from the walls began, with crowding at one side or the other, the beautiful symmetry of the square set structure was impaired and the posts were thrown out of plumb. The structure had more the nature of a trap than a secure shield.

"So it was at the Emma, in Utah; at the Silver King, and at the United Verde in Arizona, and ever will be in mines where there are large stoped spaces, with walls liable to split off and fall in. It is only a question of a few months or years in most cases, when a collapse must come, and generally with fatal suddenness and great loss of property and life.

"How, then, shall we work such deposits? This is a question confronting the mining engineer, and requiring his best efforts for its solution. It is not a new problem, and each case has its peculiar conditions, so that no fixed rule or method can be insisted on. There is, however, one general plan which may be adopted. If the walls are unstable and unsafe, caving should be regarded as advantageous. Let the ground cave in and follow the extraction. Do not try to hold it up; remove the ore below the wreckage in such a way that this wreckage shall follow slowly but surely, and fill the spaces from which the ore has been removed. Attack the unbroken ore in such a way as to remove it in blocks or slices of convenient width, as in the long-wall system of mining coal. Or drifts may be run at right angles just under the wreckage, so as to block out regular squares, one after the other being removed.

"Access may be had by side drifts or galleries in the firm ground. The stopes may be carried across the lode or parallel with the walls. The removal of a small area of the solid lode does not precipitate a run or sudden cave. Usually the movement of the loose debris is gradual, and gives time for the removal of broken ore. If there are deads and waste these can be piled back, as in drift mining in gold gravel placers. This method of stoping out the ore in slices may be varied as regards the breadth of the slice and its height, according to the conditions. If the debris stands up well and does not crowd the miners, a broad opening can be made.

"Temporary protection from the falling of small fragments can be secured by a line of timbers or supports, covered by planks or steel plates, all of which may be withdrawn and moved forward as the extraction proceeds. Timbers or steel supports may be made tapering, so as to be easily withdrawn from the debris of rocks and timbers. Any timbers lost in the caving tend to form a mat of network, which is a protection against the rapid and sudden fall of earth and stones.

"The plan of filling in old stopes by loose waste or earth, stones or broken rock has the disadvantage that such stuff runs too freely, and cannot be subsequently underrun with the same security as a mass of coarse rock and timber wreckage, which moves slowly downward."

COAL IMPORTS.

Imports of coal into the United States for the three months ending March 31 are reported by the Bureau of Statistics of the Treasury Department as below, in tons:

From:	1901.	1902.	Changes.
Canada	395,859	422,779	I. 26,920
Europe	14,370	32,930	I. 18,560
Australia	52,848	84,916	I. 32,068
Other countries	29,666	1,895	D. 27,771
Total	492,743	542,520	I. 49,777

With the exception of some Nova Scotia coal, received chiefly at Boston, practically all of these imports were received on the Pacific Coast. It will be seen that by far the larger part of these imports —77.9 per cent this year—were from Canada, Excepting the Nova Scotia coal above mentioned, this was British Columbia coal, which is largely used in California. The coal from Europe is carried to Pacific Coast ports by vessels going after grain cargoes, which will usually take coal at very low rates rather than sail in ballast. Australian coal has shown a large increase this year. The falling off in other countries is chiefly due to very small receipts from Mexico and to the absence of any from Japan. It may seem strange to import coal from Mexico; and yet some is received at points along the border, usually very small quantities.

RAILROADS IN THE YUKON.—An Ottawa dispatch says that the Canadian Railway Committee has refused the application of the Yukon Pacific Railway for permission to build from Pyramid Harbor to White Horse Pass. The Minister of Railways and Canals, Mr. Blair, announced that the Government would adhere to the policy of declining to grant charters to railways with terminal in American territory. The company's charter was amended, giving power to build from White Horse in a southwesterly direction to the boundry line between the provinces of British Columbia and the territories, or about 20 miles from the international boundary line.

SMELTER AT MONTEREY, MEXICO.—Consul-General Hanna reports from Monterey, March 28, 1902, that James Meehan & Sons, Americans, have decided upon the erection of a new smelter at Monterey for the smelting of ore from their mines, located in this district. This may prove of interest to manufacturers of such machinery and equipments as are generally used in smelters.

UNWATERING FORMER BONANZA MINES AT GUANAJUATO.

By HENRY RUSSELL WRAY.

The mines of Guanajuato, Mexico, on account of their past enormous production, hold an important place in the history of the mining industry of the Republic. They have been so rich that, during the epoch of their greatest prosperity, they produced, according to the figures of Baron Humboldt, a fourth part of the entire production of Mexico, and a sixth part of that of the entire American continent. If this mining district is compared with others of Mexico it will be seen, taking its superficial area into consideration, that but a small portion of it has been exploited. The mineral zone of Guanajuato can be considered to comprise a square, two of whose sides are parallel with the Mother Vein. They measure 28 kilometers each in length, and the square has a superficial area of 784 square kilometers. This is nine times greater than the combined districts of Pachuca, Real del Monte and el Chico. According to Burkhart, the district of Zacatecas has a superficial area of 204 kilometers, or a little more than one-fourth of that of the Guanajuato District.

The exploitation of this great Guanajuato District has been confined to isolated points, leaving much unexplored territory between the worked spots. Taking the Mother Vein, for instance, the workings cover only a distance of 5 kilometers from northwest to south-east, or less than one-fourth part of the extension of the vein. Marked interest was aroused in the district some two years ago. Now considerable ground has been denounced. At the present time, with the advent of English and American capital and modern mining methods, much speculation is indulged in as to the handling of the water, which for years has accumulated in the famous old mines of the district.

The properties of the Rul Negotiation and the Purisima Group are not in the market, since an agreement cannot be reached by the numerous scattered heirs, but the unwatering of these former fabulous bonanzas is of considerable importance to the work now progressing so rapidly in their immediate vicinity.

Your correspondent was fortunate in securing a review from a recognized authority on the water problem—a review along lines never touched before.

Mines of the Rul Negotiation—Looking at these combined mines it will be noted that a large piece of ground remains without exploration (as seen by the accompanying longitudinal section No. 1) between the mines of the Valenciana and Cata. In accomplishing the unwatering, this territory is important. It would be necessary:

First. To open a level 180 meters long, starting from the General Cata shaft, at the depth of 50 meters from its curb and reaching surface in the yard of the old Bustes mill. The object would be to reduce the height to which the water and ore must be raised in the General Cata shaft, and also to serve as a means of transportation for the ores which would be treated in a modern sorting and concentration plant.

Second. To establish a communication between the mines of the Valenciana and Cata, by means of level 150, to accomplish which it would be necessary to drift through two pieces of virgin ground, one 288 meters long, and the other 160 meters long, and the remainder of the ground to be traversed is now opened up in old workings of the mines of Cata, Tepeyac and Valenciana. The object here would be to explore virgin soil, and at the same time to accomplish the unwatering of the upper levels of the Valenciana Mine. The unwatering of this level would save 150 meters of hoisting.

Third. To deepen the General Cata shaft 200 meters. This would secure depth in this shaft from which to open the 345 and 440 meter levels.

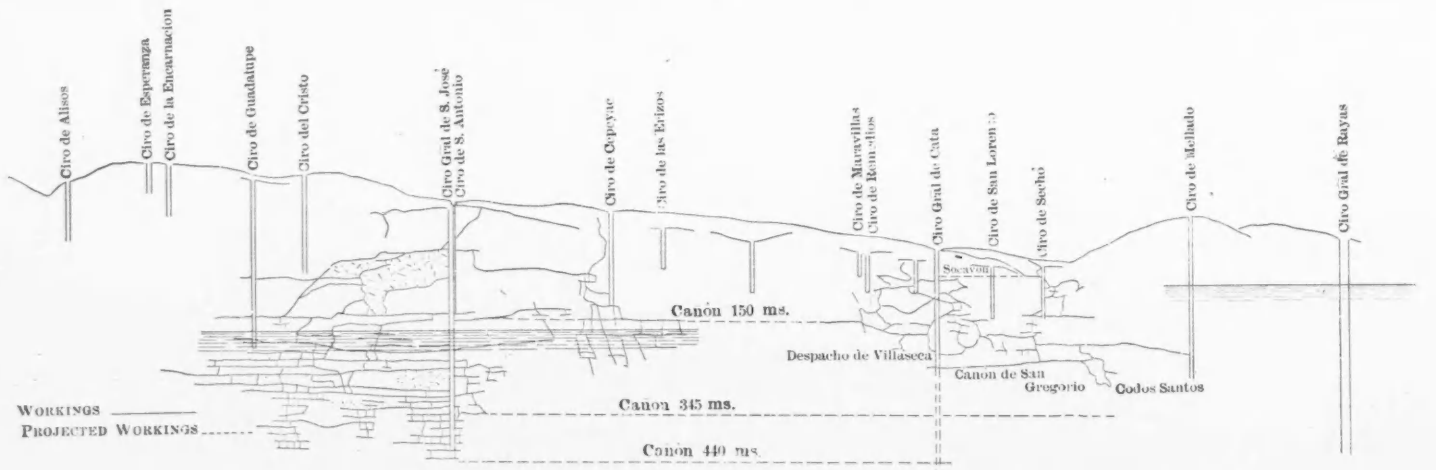
Fourth. To open a level at a depth of 345 meters in the General Cata shaft to the southeast, in order to reach a point beneath the old workings of Todos Santos. The object in this would be to explore and exploit the continuation of the ore body found in the San Gregoria levels.

Fifth. To open a level 440 meters deep in the general shaft of the Cata Mine and communicate with the workings of the Valenciana Mine.

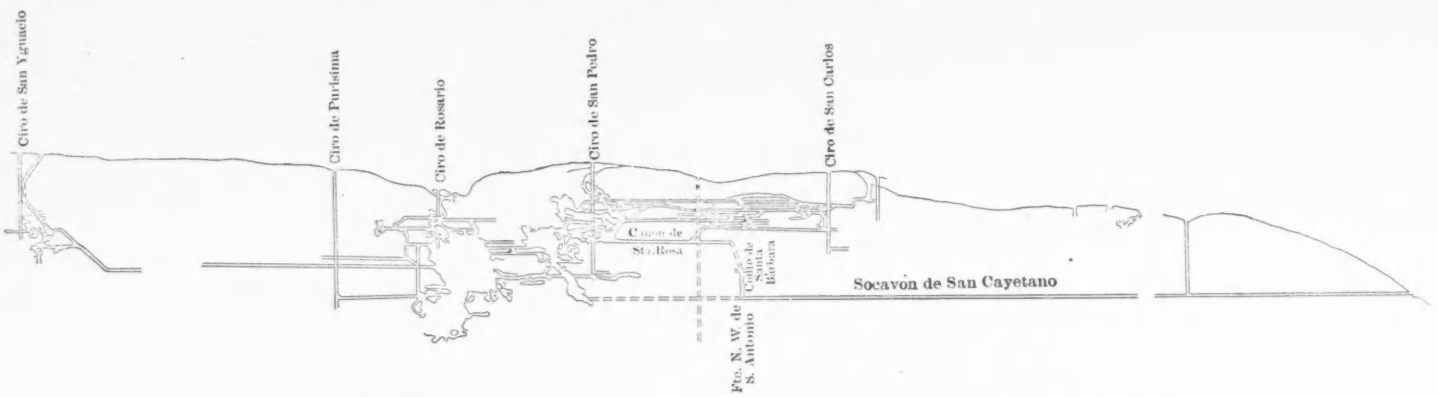
By means of this project a region of ground 1,000 meters long, entirely virgin, could be explored and the unwatering of the entire group of mines, to their lowest levels could be accomplished by means of the General Cata shaft, while at the same time, by continuing both the 345 and 440 meter levels, an extremely large piece of ground could be opened up.

The necessity for the establishment of a modern sorting and concentration plant is appreciated, when it is taken into consideration that the present profit from ores carrying 400 grammes of silver, is now only 39 cents per ton, but under the proposed modern conditions of sorting and concentrating they would give $2.32 per ton.

Purisima Group.—The mines which comprise this group are in La Luz District, and the water stands in them at a level of 100 meters below the curb of the Purisima shaft. The unwatering of this zone should be divided into three classes. In the first the water should be lowered to the depth of the Santa Rosa level. In the second to the level of the San Cayetano, and in the last it should be hoisted from greater depths to the level of the last referred level. In order to lower the water to the level of the Santa Rosa drift it would be necessary to continue the Santa Barbara raise 70 meters more, so that it might communicate with the south-east heading of the Santa Rosa drift. As is seen in the longitudinal section No. 2, the water passing through this Santa Rosa drift would pass out of the San Cayetano tunnel. In order to accomplish the unwatering referred to it would be necessary to sink a new shaft. From it communication could be had by a cross-cut 100 meters long with the Santa Rosa level, and the discharge of the water could be secured by this means. This shaft could be sunk to the level of the San Cayetano tunnel and at the same time that tunnel could be continued on to meet this shaft, thus opening up a large territory. The unwatering of the third could be secured by deepening the shaft to a point below the deepest workings.



UNWATERING MINES AT GUANAJUATO, MEXICO. SECTION No. 1, RUL NEGOTIATION.



UNWATERING MINES AT GUANAJUATO, MEXICO. SECTION NO. 2, PURISIMA GROUP.

AMERICAN EXPORT ORDERS.

The foreign demand for machinery and all labor-saving devices is increasing, according to reports of numerous inquiries received by our manufacturers. Good-sized orders have been booked from British and German territory. The active advertising of our prominent manufacturers and the action of the ENGINEERING AND MINING JOURNAL in sending a representative to the leading European countries to advance the interests of its advertisers show the interest manifested in this foreign trade. A favorable condition at present is the low ocean freight rates, which permit keener competition abroad. Some time ago we intimated the probability of an ocean steamship combination. It is now announced that this "community of interest" scheme will be promoted by people who are already prominent in American railroad circles. The steamship combination is to be capitalized at $200,000,000, and will control about 110 vessels, aggregating a little over 840,000 tons. It is believed that the export trade will be favored with an advantageous rail and water freight rate to foreign ports.

Of all the foreign countries taking our mineral and metal products, Great Britain leads. In March alone the exports from only one port (New York) amounted to $4,392,396, which is nearly as much as was sent to Germany, France, Belgium and Italy together. British buyers have recently placed substantial orders for electrical and other machinery, and will equip their railroads with American rails and rolling stock. In fact, it is the intention to extend the manufacture of machinery and supplies on the American plan so as to be better able to compete with us in foreign territory.

Of the more important British possessions, Australia seems the most promising for our manufacturers. Already New South Wales is employing various kinds of American labor-saving machines. To establish this trade some of our manufacturers have opened offices in Sydney and other cities of importance.

In Africa Americans are getting some good-sized contracts, especially for mining and other machinery. Business in South Africa is picking up, as the Witwatersrand gold mines are gradually increasing their operations. In March the exports to South Africa from New York alone were valued at $301,819, which is more than was reported by 6 European countries together. Most of this was mining machinery and other iron and steel manufactures. An interesting shipment recently was $134,000 worth of structural steel for the Uganda Railway in East Africa.

British India has been buying some coining machinery for its Government mint, and tenders have been opened for coal handling machinery for the Calcutta docks.

Of all the far Eastern countries Japan is particularly in favor of American manufactures, and already several large-sized contracts have been placed, especially by the Government. An international exhibition of manufactures is to be held in Japan in 1903, and the Government believes it will promote the business relations between Japan and the United States. Of the orders recently filled we note one for engines and general machinery for the Hokkaido coal mine, and another for rock crushers and pulverizers.

China's principal purchases are mineral oils, though several good lots of nails have recently been forwarded.

Russia has ordered a large air compressor and pneumatic tools for a Moscow boiler plant. Some more armor plate has been taken by the Government.

France and Germany are ordering more copper. The receipts of machinery and tools are also improving.

Italy buys copper sulphate for use as an insecticide in the vineyards. This country has also purchased quantities of copper, nickel, iron and steel and mineral oils. The bituminous coal trade is promising, and already orders have been booked at a rather low ocean freight rate.

Other Continental European countries show a moderate demand for American goods.

Mexico is a good customer, as American capital is doing much to develop the mineral resources of the country. In March the exports from New York alone amounted to $448,922, principally in machinery.

The South American countries are ordering mostly electrical machinery and supplies, especially for traction work.

Cuba and the other West India islands offer good opportunity for American manufactures, especially structural iron and steel. In March, Cuba alone received from New York $186,200 worth of iron and steel, besides $66,078 in other mineral products.

PETROLEUM PRODUCTION IN THE BAKU FIELD, RUSSIA.

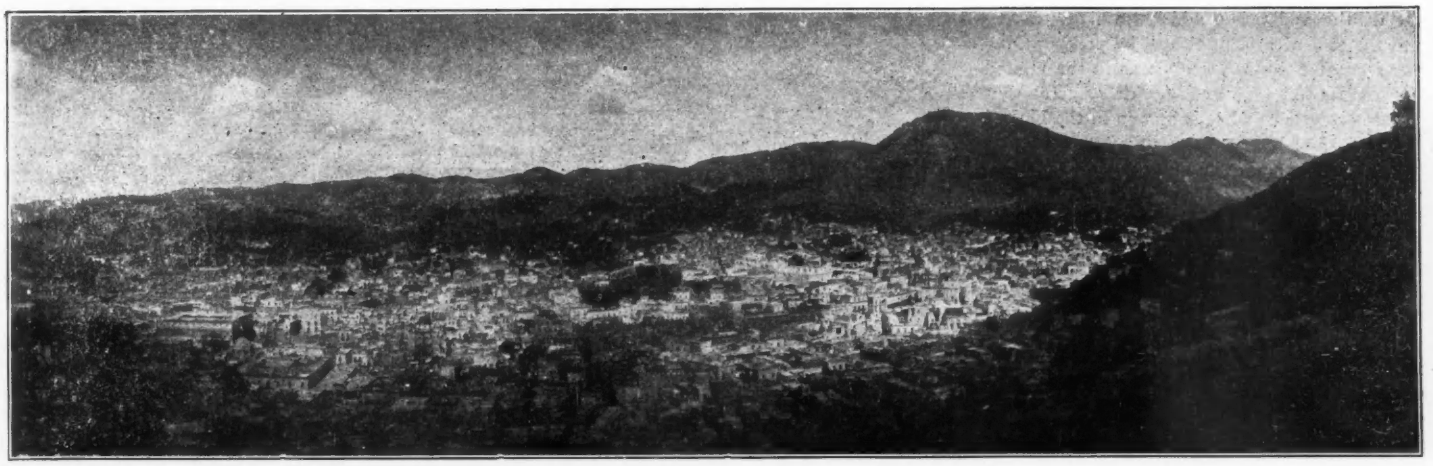
The report of United States Consul James C. Chambers, at Batum, Russia, for the year 1901, gives many interesting particulars as to the production of petroleum in the Baku District, from which nearly all the petroleum production of Russia comes. The accompanying map, which is reproduced from the report, shows the location of the wells and the different districts, to which reference is made in the report.

The report says that the usual increase in the crude production of the Baku fields occurred in 1901. The statistics show that the increase in the gross production over 1900 was nearly 25,000 barrels per day, and that the increase in the net production—the gross production less amount lost and used for fuel as wells and pipe-line stations—was about 21,500 barrels per day; and that this increase occurred with the completion of only 358 wells in the year, while in 1900, with the completion of nearly 100 more wells, the increase in the production was only about 2,000 barrels more. But the newer Government lands produced much more oil last year than in 1900—in fact, considerably more than the total increase came from those lands.

An analysis of the results obtained by drilling in 1901 show that with 603 wells drilling at the beginning of the year and 282 wells started during the year, there were only 358 wells completed, while with 579 wells drilling at the beginning of 1900 and 473 wells started during the year, 448 wells were finished, the depth of which averaged 999 feet, and the initial production of which was 304 barrels per day per well, while the depth of 358 wells completed in 1901 averaged 1,086 feet and the initial production was 330 barrels per day per well. Both the depth and initial production of the wells in all districts increased, but the increase in production of the wells is more than accounted for by the increased production from flowing wells, which was nearly 10,000 barrels per day. The increase in the flowing-well production was considerable in the newer Bibi-Eibat territory, but the greatest increase was in the older Balakhani-Sabunchi territory, which, apparently, is anything but an indication of the exhaustion of the territory.

In the first ten months of the year the production from flowing wells was not as great as for the same time in 1900, but early in November the well at Bibi-Eibat was struck, and continued flowing until it produced over 2,000,000 barrels. Before this well stopped flowing, another big one was struck in the Romani district, which produced nearly 1,000,000 barrels in December and was still flowing about 25,000 barrels per day on January 31. There were other wells flowing at the same time, but these two practically account for the whole increase in the flowing-well production.

It is generally believed that the owners of the big well which produced more than 2,000,000 barrels in a little more than 30 days lost money by it. With-



CITY OF GUANAJUATO, WITH MINES OF MOTHER VEIN IN DISTANCE.

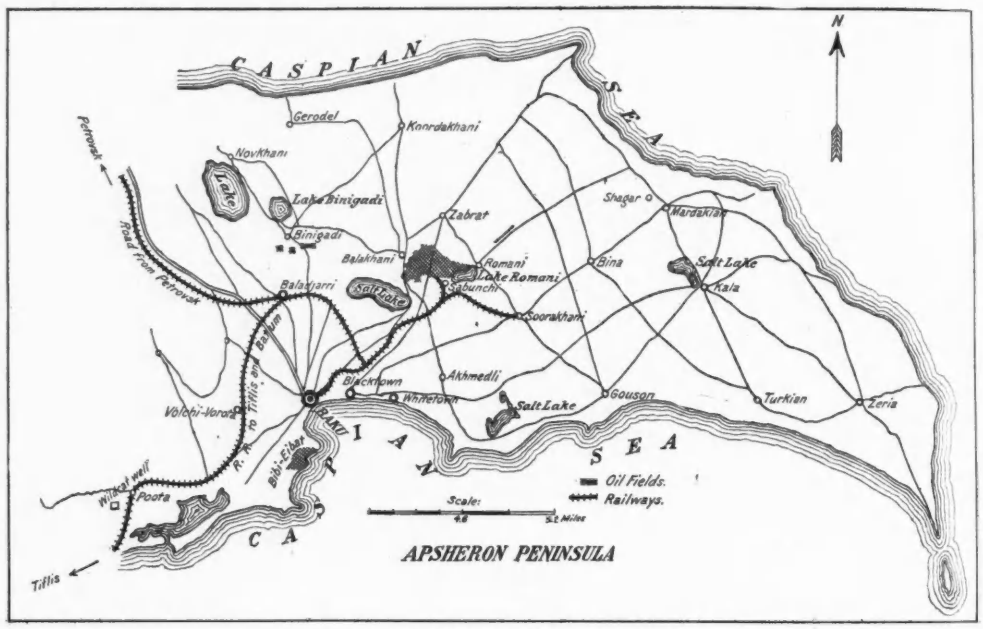
MAGNETIC BEHAVIOR OF ALLOYS.—Referring to experiments made in Ireland by Prof. Barrett and Dr. Brown, the *Electrical World and Engineer* says: "Some very interesting anomalies are presented in the magnetic behavior of certain alloys. Thus 2½ per cent of nickel in iron hardly affects the magnetic quality, and 5 per cent of manganese in steel leaves a strongly magnetic material. But 2½ per cent of nickel, plus 5 per cent of manganese in steel, makes non-magnetic steel. Two iron alloys are described as being magnetically superior to soft Swedish iron. One contains 2½ per cent of aluminum, and the other 2½ per cent of silicon. The former alloy is said to possess a permeability of 6,000, or to develop a flux-density of 12,000 maxwells at a magnetizing force of 2. This property ought to be useful in particular classes of magnetic apparatus. Curiously enough, it has been known for years that aluminum added to cast iron in the furnace increased the permeability of the casting; but it frequently happened that analysis failed to reveal any appreciable quantity of aluminum in the resulting alloy. It was, therefore, sometimes believed that the aluminum was valuable more in the breach than in the observance, and was useful in combining with the impurities of the cast iron, by eliminating such impurities in the form of a slag, leaving the cast iron purer and more permeable.

out explanation, this seems impossible. The fact is that the well is on Government territory, leased at a fixed royalty of 5 kopeks (2.5 cents) per pood (36.112 pounds) and the owners of the well realized very little above that figure for their production. They may have sold the oil at an average of 0.25 to 0.5 kopek (0.12 to 0.25 cent) per pood above the royalty, but certainly not more than that. They were compelled to pay heavy damages to neighboring property owners and to owners of property in the village more than a mile away, as part of the time, the well was flowing there was a high wind blowing which carried the oil over the village, and, it is said, the owners of the well must pay for repainting about all the houses in the village.

The Bibi-Eibat well is 1,813 feet deep, and is finished with 14-inch pipe, while the Romani well is 1,841 feet and finished with 11¼-inch pipe. Near the latter well there is another well flowing, belonging to the same owners, which produced nearly 500,000 barrels in December.

The cost of producing oil in the Baku fields is almost as interesting as it is difficult to ascertain. The increased depth of drilling not only increases the first cost of the wells, but adds steadily and materially to the cost of raising the oil by pumping, because pumping at Baku is not done as in the United States—by means of rods and working barrel—but the oil is baled out with what is known in the United States as the baler; but at Baku this instrument is, of course, much larger than is commonly used in the United States, as its diameter is as large as will run easily inside the pipe in the well, while its length is generally between 30 and 40 feet. Of course, the deeper the well the longer and, consequently, the fewer the runs of the baler. Then, cleaning out, deepening, and repairing wells is a big expense. The wells are generally long lived, but require much more expense to keep them in order than American wells as they cost more originally. They can not be pumped as steadily, and consequently there are fewer pumping days in the year. The statistics show that at the close of 1901, while there were only 1,354 wells classed as producing, there were 1,003 wells doing nothing. All, or at least nearly all, of these 1,003 wells were at one time producers, and it is very probable that many of them could be worked now, but probably not at a profit; but they may all be made to produce when the price of the crude advances sufficiently to justify it. Some of them may be abandoned, but the number of wells abandoned annually is insignificant. In calculating cost of production, however, the investment in many wells which are not producing must be taken into consideration along with the investment in those which are actually producing. But taking into account only those wells which were producing last year, the average of which for the year was 1,413, the average production per well for the year was about 477,000 poods (2,385,000 gallons). The average cost of wells at Baku is now conceded to be not less than 60,000 rubles (about $30,900). The Baku man's machinery and rig ready for drilling cost much more than the average American well completed; then comes the expense for pipe, which is insignificant in the United States. In the Baku fields, to get to a depth of 1,500 feet, they start with not less than a 26-inch hole, and in deeper territory with even larger holes, up to 32 inches in diameter. The pipe used is 0⅜-inch iron riveted, in 4-foot lengths, which are joined by riveting. They drill ahead of the pipe and then drive it, and they continue driving the first pipe until it collapses or for some reason will go no further; then they start another string of a diameter which will go inside the first, generally 2 inches less; and when this can be no longer driven, another string is run inside it, and so on until they strike the oil. In deep wells, there is sometimes more than $10,000 worth of pipe. Then the cost of drilling (contract) is very great, as the contract is generally made at about $5 per foot up to 700 feet, the price increasing about 75 cents per foot for the next 70 feet, $1.50 for the next 70 feet, and so on till after 900 feet the price is about $7.50 per foot. Thus, a 1,500-foot well will cost nearly $10,000 for drilling. And when the oil is struck the well is by no means finished, for then comes the process which is called "exploitation," really meaning cleaning out the sand until the well commences flowing or yields nearly pure oil by pumping. This work lasts sometimes months, and generally not less than two or three months, and adds materially to the cost of the well.

Taking 60,000 rubles as the cost of a well, the interest upon that amount must be added to the cost of raising the oil, and taking the rate of interest at 6 per cent per annum (the usual rate at Baku is not less than 12 per cent), makes that item 3,600 rubles ($1,854) per year. The cost of pumping is not excessive, the principal item being fuel, which, of course, is crude oil; but the repairs are expensive, and the two items may be conservatively estimated at between 5,000 and 6,000 rubles per annum—say 9,000 rubles ($4,635) for the total expense. Now, the Baku wells are not short-lived; but it is reasonable that in such a speculative business the producer should expect to get his money back in four years, for it is not so very long ago that the American operator calculated that he should have his money back in from 18 months to 2 years. But to get his money back in 4 years, the Baku producer must add 15,000 rubles ($7,725) per year to the cost of working expenses, making an annual income of about 24,000 rubles ($13,360) from each well necessary; consequently, with 477,000 poods as the average production per well per annum, as it was last year, the producer with average wells required about 5 kopeks per pood (2.5 cents per 36.112 pounds) to pay expenses, not including, however, the cost of land or royalty.



THE BAKU PETROLEUM DISTRICT, RUSSIA.

The experiment of raising oil by means of compressed air, mentioned in the report last year, still remains an experiment. The principal objection to this method seems to be the fact that it takes the oil out of a well more rapidly than it comes in, and soon exhausts, or apparently exhausts, the well; but the advocates of the method claim that the exhaustion is only apparent, as the well will again yield oil after being allowed to stand awhile without pumping. But as the installation for the method costs from $8,000 to $10,000, and as with present low prices it is not at all desirable to get the oil out rapidly, there is little probability of the method being generally adopted. Some of the foreign companies, however, are equipping their wells in part with air compressors, which are manufactured in the United States.

There has been no increase in the area of the territory in the past year, and prospecting was not very energetically carried on.

The trade was much depressed during the year, and prices were low. This was largely due to overproduction. Many well owners, having all their capital invested in drilling their wells, were forced to secure money and put their product on the market at any price. The refining interest also suffered severely. The cost of refined oil was greater, probably than the selling price. There is no present prospect that any combination in regulation of the trade can be arranged.

While the residuum output from Baku in 1901 was greatly in excess of the output the preceding year, the amount which reached the districts of principal consumption was not much more than in 1900. The total increase in the output was about 262,000,000 gallons or 52,000,000 poods; but 43,000,000 poods (215,000,000 gallons) of this remains at the mouth of the Volga, which is not much nearer the center of consumption than Baku, and consequently, for all practical purposes, this amount can be added to the stocks at Baku, which makes those stocks on January 1 about 582,000,000 gallons instead of 367,000,000 gallons as shown by the statistics. That is not far from twice the stocks of residuum at Baku on January 1, 1901, and is a very considerable contribution toward the necessities of the current year.

The addition to the residuum stocks at Baku in the month of December was about 136,000,000 gallons, and then the total production of the month was not refined, as the crude stocks also increased about 1,000,000 barrels; consequently, upon the basis of 66 per cent residuum from the crude, had the whole production in December been refined, the increase in the stock of residuum in the month would have been about 163,000,000 gallons; but the crude production in January was probably less than in December, and it is likely to also be less in February and March. But taking the probable increase in stocks in the first three months of this year at 140,000,000 gallons per month, and the residuum in the crude stocks at the end of the year, will give a total stock of residuum at the opening of Volga navigation of not far from 250,000,000 poods (1,250,000,000 gallons), and as the total amount of residuum which reached the markets last year was only 273,000,000 poods (1,265,000,000 gallons) it is interesting to know what the trade will do with its monthly output of residuum after the opening of the Volga, in case the crude production does not materially decline or the demand for the residuum does not materially increase.

It is, however, exceedingly probable that the present low prices for residuum will greatly increase the demand for that product for fuel in the manufacturing districts of Russia. As has been hereinbefore stated, the Russian consumption of oil fuel steadily increased during the seasons of high prices—even during last year with the average price at Baku not far from 17 kopeks (8.75 cents) per pood (5 gallons), which made the cost to the consumer in the manufacturing districts about Moscow from 30 to

40 kopeks (15.45 to 20.6 cents) per pood; consequently, the inference is reasonable that the demand for it will materially increase at the prices which have been ruling for some time, and are still declining.

While there were no additions to the railway or pipe-line capacity between Baku and Batum in 1901, the fact that the Mikhailovo-Batum pipe line was working the whole year instead of only 7 months, as in the preceding year, accounts for the increased deliveries at Batum. There are great improvements contemplated in the transportation capacity.

The cost of the construction of the Mikhailovo-Batum line (143 1-3 miles, with three pumping stations) was 5,184,523 rubles ($2,670,029) up to the commencement of its utilization. After that and up to the end of the first year of operation of the line, there was an additional cost (not working expenses, however) of 117,807 rubles ($60,671), making the total cost of the line up to the end of its first year in operation $2,730,700.

Appended to the report are a number of statistical tables, which we summarize below:

The total number of wells in the Baku field at the close of the year is reported as follows:

	1900.	1901.	Changes.
Producing	1,309	1,354	I. 45
Finished drilling, not producing	42	48	I. 6
Drilling	605	416	D. 189
Drilling deeper	83	81	D. 2
Cleaning out and under repair	123	177	I. 54
Standing idle	586	1,003	I. 417
Total	2,748	3,079	I. 331
Rigs up, ready to drill	115	72	D. 43

The total number of wells is divided by districts as follows: Balakhani-Sabunchi, 2,470; Romani, 344; Bibi-Eibat, 265. The new wells completed in 1901 numbered 358; the average depth was 1,086 feet, and the average daily production 330 barrels each.

The wells are divided into six classes, as follows: Imperial grants, 360 wells; crown lands leased at royalties on production, 461; crown lands leased at fixed rentals, 545; crown lands subleased from peasant lessees, 108; lands in dispute between holders and the crown, 250; private lands, 1,076 wells.

The production of the Baku Oil-fields for the year is stated by districts as follows, in barrels of 42 gallons:

Districts.	1900.	1901.	Changes.
Balakani-Sabunchi	45,152,852	49,620,752	I. 4,467,900
Romani	13,768,476	15,290,913	I. 1,522,437
Bibi-Eibat	13,097,415	16,033,582	I. 2,936,167
Total production	72,018,743	80,945,247	I. 8,926,504
Used for fuel at wells, or lost	8,203,245	9,361,846	I. 1,158,601
Net production	63,815,498	71,583,401	I. 7,767,903

The average daily production in the whole district was 221,768 barrels; of which 188,628 barrels was from pumping wells and 33,040 barrels from flowing wells. The proportion reported as used for fuel at wells, and lost or wasted, last year was 11.6 per cent of the total production.

The average price of refined oil at Baku, f. o. b. vessel on Caspian Sea, was 0.82 cent per gallon, against 2.12 cents in 1900. This average price for 1901 was the lowest reported since 1894. The average price of residuum at Baku was 0.91 cent per gallon, against 1.55 cents in 1900. The average price of crude oil at wells was 32.61 cents per barrel of 42 gallons, against 68.60 cents in 1900.

The total stocks of crude oil at Baku on December 31, 1901, were 8,909,716 barrels; an increase of 3,342,493 barrels over those reported at the close of 1900. Stocks at Baku and at the Black Sea ports at the close of the year were: Refined oil, 61,420,745 gallons, a decrease of 84,429,315 gallons, as compared with the close of 1900; lubricating oil, 24,630,220 gallons, an increase of 5,641,945 gallons; residuum, 372,029,590 gallons, an increase of 66,364,465 gallons.

The shipments of all products from Baku for the year were as follows, in gallons:

	1900.	1901.	Changes.
Illuminating oil	617,250,000	640,260,000	I. 23,010,000
Lubricating oil	67,055,000	65,115,000	D. 1,940,000
Residuum	1,318,590,000	1,580,625,000	I. 262,035,000
Crude oil	194,890,000	180,080,000	D. 14,810,000
Totals	2,197,785,000	2,466,080,000	I. 268,295,000

On the total shipments last year 508,580,000 gallons were sent from Baku by rail, and 1,957,500,000 gallons by water.

The statement shows that the illuminating oil obtained in 1901 was 22.40 per cent on the crude run, and the residuum 61.66; against 25.52 and 57.08 per cent, respectively, in 1900.

The total shipments of Russian petroleum products from Black Sea ports for the year are given below, in gallons:

To—	1900.	1901.	Changes.
Austria-Hungary	6,455,310	7,381,560	I. 926,250
Belgium	28,494,240	21,503,045	D. 6,991,195
Bulgaria	1,904,180	2,851,950	I. 947,770
China	13,360,350	21,320,040	I. 7,959,690
Cochin China	1,161,600	999,640	D. 161,960
Egypt	11,940,220	13,759,075	I. 1,818,855
United Kingdom	104,014,285	87,017,195	D. 16,997,910
France	30,385,710	38,407,800	I. 8,012,090
Germany	32,174,965	24,193,780	D. 7,981,185
India	32,158,680	53,664,490	I. 21,505,810
Italy	9,483,995	10,835,555	I. 1,351,560
Japan	1,622,500	4,070,000	I. 2,447,500
Java	7,864,030	5,832,070	D. 2,031,960
Malta	1,910,760	1,297,975	D. 612,785
Netherlands	1,437,810	6,497,265	I. 5,059,455
Philippine Islands	2,246,170	1,965,350	D. 280,820
Portugal	3,234,980	1,116,650	D. 2,118,330
Roumania	499,010	651,930	I. 152,920
Siam	.....	473,000	I. 473,000
Spain	657,030	1,258,915	I. 601,885
Suez Canal	69,484,255	81,716,235	I. 12,231,980
Turkey	35,633,545	39,479,560	I. 3,846,015
Other countries	736,450	2,354,130	I. 1,617,680
Total exported	396,860,075	428,657,210	I. 31,797,135
Russia	39,957,165	31,592,320	D. 8,364,845
Total shipped	436,817,240	460,249,530	I. 23,432,290

The total shipments in 1901 included 14,534,200 gallons crude and residuum; 39,640,925 gallons lubricating oil; 48,214,740 gallons solar and distillate; and 357,859,645 gallons refined oil. "Distillate and solar" means illuminating distillate to Austria and France and gas oil to the United Kingdom. To the above must be added, in order to get total output, 2,190,000 gallons of refined and 30,000 gallons of lubricating in cases, the cargo of the steamer *Norramore,* total loss in the Black Sea.

Of the shipments above reported last year 390,920,095 gallons were from the port of Batum, and 69,329,435 gallons from Navorossisk.

Grosni Oil-field.—The number of wells reported in the Grosni field, in all stages, was 187, an increase of 33 during the year. The output for the year in barrels of 42 gallons each, was 4,190,918 barrels, against 3,658,924 in 1900; an increase of 531,994 barrels. The average daily production in 1901 was 11,482 barrels. The Grosni oil is mainly sold crude for use as fuel, though there are three refineries in the district. The crude oil is heavy and the proportion of illuminating which can be obtained is small.

THE OUTLOOK IN THE KLONDIKE.

By Walter C. Mendenhall.

Statistics of the gold output of the Klondike show an increase from $2,500,000 in the year of discovery, 1897, to $16,000,000 in 1899. In 1900 the same amount was taken from the creeks as during the previous year, but 1901 shows some falling off from these figures, the production being about $14,500,000, and predictions have been fairly made that the camp will quickly decline to an unimportant place as a producer, unless quartz properties of value are developed.

All placer gold districts pass with greater or less rapidity through three phases: A preliminary feverish stage of unsystematic and costly but rather high production, in which operations are confined to the richer properties; a second stage with more systematic working or reworking of the partially exhausted banner properties and of development of producing areas which were not sufficiently rich for exploitation during the first stage, and finally into a third, that of gradual decline.

The rich region back of Dawson is in the period of transition from the first to the second of these stages of development. A number of the best creek and bench claims are already worked out so far as profitable manipulation under present methods is concerned, and the majority of the others are rapidly approaching exhaustion. The camp has passed with unusual rapidity through this first most highly productive period because of the small size of the claims under Canadian law and the consequent large number of original holders and operators, each of whom could quickly cover his 500-foot claim. The great richness of many of the Bonanza and El Dorado properties, too, by making it possible to work at a profit no matter how great the lack of method, has encouraged the operations of the original staker and prevented his immediate sale to larger, more careful, and more deliberate interests. It is this early unsystematic period of feverish operations on small holdings, which is now giving place to another of bigger holdings and more business like management.

A few weeks since the sale was recorded of a number of Gold Hill claims to one company, which will no doubt win large profits by reworking the famous bench upon which operations under present conditions have practically ceased. The Treadgold concession, which has created such excitement in Dawson this winter, and by whose terms a syndicate with large capital is to be granted all lapsed claims within the basin drained by Bonanza, Eldorado, Hunker, Bear, Gold Bottom and Last Chance Creeks, in return for bringing to the district a sufficient water supply, is another one of the signs of the times pointing toward the passing of the small individual holder, and the incoming of the large capitalist.

These new conditions alone could not keep production near the maximum of 1899 and 1900, but there are others which tend to counteract the shrinkage. Among them may be mentioned the improving transportation facilities between Dawson and the outside world, and particularly between Dawson and the various mining centers, which have advanced steadily since the discovery in 1897, through the stages of pack trail, private road, government road, and government bridges, until now a railroad is projected. These improvements, bringing about cheaper living and cheaper labor, increase the output by bringing within the zone of production many properties whose richness, although high was below the standard necessary for successful operation under earlier conditions.

These considerations lead to the belief that while the maximum of production is probably past, a rapid falling off within a few years to an unimportant output is not to be expected, but rather than the district will yield well for some years to come, independent of new strikes or quartz mining.

IRON AND STEEL EXPORTS AND IMPORTS.

Exports of iron and steel—including machinery—from the United States for the month of March, were valued by the Bureau of Statistics of the Treasury Department at $8,392,307, against $8,571,320 in March, 1901. For the three months ending March 31 the total exports were $23,839,561, against $26,141,690 for the first quarter of 1901; showing a decrease of $2,301,529, or 8.8 per cent, this year. The decrease is explained by the great activity of the iron trade here, which has left small surplus for export.

The chief items of the exports for March are shown in the following table, in long tons:

	1901.	1902.	Changes.
Pig iron	3,306	1,716	D. 1,590
Bar iron and steel	5,004	1,793	D. 3,211
Rails	35,409	8,036	D. 27,373
Sheets	6,347	1,100	D. 5,247
Structural steel	3,109	11,695	I. 8,586
Wire	6,911	6,757	D. 154
Nails	3,156	2,435	D. 721

Structural steel was the only article showing an increase; though the decrease in wire was very small.

Imports of iron and steel into the United States in March were valued at $2,173,198, against $1,217,141 in March, 1901. For the three months ending March 31 the total value of these imports was $5,892,146, against $4,008,057 last year, showing an increase of $1,884,089. Among the items were 33,374 tons of pig iron, against 5,311 tons last year; and 14,119 tons of steel billets and ingots, against 1,917 tons in 1901.

Imports of iron ore for the three months were 219,175 tons, against 111,678 tons last year; an increase of 107,497 tons. This ore was chiefly from Cuba.

INDUSTRIAL EXPOSITION AT DUSSELDORF.

The United States Consul at Dusseldorf, Germany, in a report to the State Department refers to the mining features at the exposition, opened May 1, as follows:

The mining of ore and coal, the production of iron, steel, and other metals, the manufacture of articles in foundries, rolling mills and machine shops, and the electrical industry are the trades most conspicuous in the well-known manufacturing districts of the Rhineland and Westphalia. The manufacturers and ironmasters, being unable to properly display the development of their industries at the Paris exposition, on account of lack of space, resolved to arrange the present undertaking. At that time, the German iron and steel industry and kindred trades were at the height of their glory; since then, however, these industries have undergone serious depression, and it might have been expected that the exhibition would lose thereby. On the contrary, every detail of the original programme has been executed, and vast amounts of money have been expended. Never at any world's exhibition, it is said, were these industries represented in such completeness as on this occasion. The committee strictly refuses anything which is not worthy of exhibition.

Krupp's exhibition building is over 400 feet in length, with iron-clad towers and a military mast 165 feet in height. It will include an arsenal of land and naval artillery, ranging from small cannons placed in the turrets of the military mast to gigantic guns with all appliances of latest construction. There will be a complete stem and stern of German battleship and an armor plate of 130 tons (metric) in weight. Models of ships and shipbuilding establishments and many other exhibits of warfare will be shown by the firm. There will also be a complete shaft, with screw, intended for the large passenger steamer *Kaiser Wilhelm der Grosse*, a 40-ton railroad car, a sheet of tin of 100 square meters (1,076 square feet), whole mining plants, and machinery.

The exhibits of the other large firms, among which the most prominent are the Gutehoffnungshuette in Oberhausen, Bochumer Verein, Rheinische Metallwaaren- und Maschinenfabrik, Hoerder Bergwerks- und Huettenverein, Deutzer Gasmotoren-Fabrik, are not less important. They contain such specialties as a roller carrier 20 meters in length, boiler bottoms, railroad tracks; a twin tandem engine, which raises 4,400 kilograms of matter from a depth of 750 meters, at a rate of 12 meters per second; and a 1,000-horse-power gas motor operated by waste gas from blast furnaces. These machines may be seen in operation. The mining trades will have exhibits to demonstrate the several stages in the development of the mining industry of these provinces during the last two decades, and will show in operation a mining shaft, with all the wood-framing, ventilators, pumps, and other machinery.

THE BEAUMONT PETROLEUM FIELD.

The information conveyed by the following statement showing the status of the field on March 31, 1902, and the progress of development and investment of capital since December 31, 1901, may prove interesting. Whenever possible exact figures and cost have been ascertained, where estimates are given they are based upon the best information obtainable, and, if anything are underestimated. In a rapidly expanding field changes are frequent, and it is not possible to obtain more than approximate data regarding many items, but while the absolute correctness is not always obtainable the compilation presents a fairly reliable statement of the field and the existing conditions. The figures show that the estimated amount of increased investment during the three months ending March 31, was $2,619,407, and it is certain that the progress during the ensuing three months will be in an equal if not a higher ratio, for there are more wells being drilled now than at any previous time, and more effort being put forth to provide storage and marketing facilities. Of this, however, no notice has been taken unless such work has been actually commenced or the material on the ground. Briefly stated, the figures are those of work done and money invested, and do not pertain to contemplated developments or investments.

The estimated value of well material, tanks, tank cars, pipe lines, pumping stations, refineries, etc., the number of wells drilled and drilling, etc., at Beaumont, Texas, and vicinity up to March 31, 1902, are shown below:

	Cost.
Abandoned wells and dry holes, 31	$502,108
Iron tanks completed (capacity), 4,890,300 bbls	1,222,700
Iron tanks building (capacity) 445,000 bbls	55,000
Earthen reservoirs, completed 5	48,987
Earthen reservoirs under construction 6	44,813
Loading racks, 275 cars	22,632
Pipe lines laid and under construction, 161 miles	641,250
Producing wells, 214	1,637,100
Drilling wells, 83	290,500
Pump stations, 14	101,500
Refineries, 5	615,000
Drilling outfits, 113	386,500
Tank cars, 1,044	987,500
Wooden tanks (capacity) 50,000 bbls	21,000
Total	$6,576,590

The estimated increase in number and value of wells, pipe lines, tank cars, iron tanks, etc., Beaumont and vicinity, during period from December 31, 1901, March 31, 1902, is as follows:

	Cost.
Abandoned wells and dry holes, 3	$65,000
Iron tanks completed and building (capacity) 1,605,500 bbls	459,250
Earthern reservoirs completed and building, 9	80,050
Loading racks, 114 cars	9,382
Pipe lines completed and building, 36 miles	91,050
Producing wells, 76	581,400
Drilling wells, 37	106,500
Pump stations, 4 plants	23,200
Refineries under construction, 1	275,000
Drilling outfits, 29	92,500
Tank cars, 719	727,500
Wooden tanks (capacity) 16,850 bbls	8,575
Total	$2,619,407

The iron tanks in Beaumont and vicinity, March 31, 1902, are named below:

No.	Situation.	Capacity. bbls.	Total. bbls.
7	Lucas	55,000	
3	"	37,500	497,500
4	Gladys	2,000	
1	"	12,000	
1	"	5,000	
1	"	37,000	
27	"	37,500	
2	"	1,000	1,076,500
15	El Vista	55,000	
9	"	37,500	1,162,500
1	Beaumont	1,300	
1	"	5,000	6,300
2	Sabine	55,000	110,000
30	Port Arthur	55,000	
3	" "	37,600	1,762,500
4	Sun Station	55,000	220,000
1	Vitaloe	55,000	55,000
112	Totals		4,890,300

The production of the field to March 31, 1902:

Production 1901	Barrels.
Waste, wild gushers Lucas, Palestine, Beaumont, et al	850,000
Waste, other wells	500,000
Shipments by rail	1,500,000
Shipments by water	250,000
Local consumption	90,000
Held in tanks	1,000,000
Total, 1901	4,190,000

	Barrels.	Barrels.
Shipments, 1902, three months	1,900,000	
Increased amount of oil in tanks	3,000,000	
Waste estimated 2,000 bbls. daily	180,000	5,080,000
Total production to March 31, 1902		9,270,000

The amount of oil in tanks March 31, 1902, was about 4,000,000 barrels It will be noted that the production for the first quarter of 1902 was greater than that for the entire year 1901.

CARRARA MARBLE COMBINATION.—In order to better regulate the trade in Carrara marble leading exporters in Italy have formed the Unione fra gli Esportatori di Marmo. This combination has been made necessary by the unsatisfactory condition of business throughout the Carrara District. It is intended to formulate and adopt from time to time a tariff fixing minimum prices under which no member of the association will be allowed to sell. Rules and conditions of sale are also to be fixed.

WIRE ROD AND WIRE NAIL PRODUCTION.

The production of iron and steel wire rods in the United States in 1901, as reported by the American Iron and Steel Association, amounted to 1,365,934 gross tons, against 846,291 tons in 1900, 1,036,398 tons in 1899, and 1,071,683 tons in 1898, showing an increase of 519,643 tons, or over 61 per cent, in 1901, as compared with 1900. Of the total production in 1901, 1,365,459 tons were steel and 475 tons were iron rods. The following table gives the production by States in the last three years:

States.	1899.	1900.	1901.
Mass., Conn., Rhode Island, N. Y., and N. J.	139,945	134,502	176,101
Pennsylvania	319,058	240,533	386,037
Ky., Alabama, and Ohio	312,620	244,731	422,679
Indiana and Illinois	264,775	226,525	381,117
Total	1,036,398	846,291	1,365,934

Pennsylvania made the largest quantity of wire rods in 1901, with Illinois a close second, Ohio third, and Massachusetts fourth. Seven other States, Rhode Island, Connecticut, New York, New Jersey, Kentucky, Alabama, and Indiana, also rolled wire rods in 1901. With the exception of Rhode Island, which first rolled rods in 1901, all the States named also produced rods in 1900.

The production of steel wire nails in the United States in 1901 amounted to 9,803,822 kegs of 100 pounds, as compared with 7,233,979 kegs in 1900, an increase of 2,569,843 kegs, or over 35 per cent. In 1899 the production amounted to 7,618,130 kegs, in 1898 to 7,418,475 kegs, in 1897 to 8,997,245 kegs, in 1896 to 4,719,860 kegs, and in 1895 to 5,841,403 kegs.

The following table gives the production of wire nails in 1900 and 1901 in kegs of 100 pounds.

States.	1900.	1901.
Mass., Rhode Island, and Conn.	212,584	71,553
New York	63,466	136,118
Pennsylvania	2,158,399	3,118,508
Md., W. Va., Ky., Ala., and Ohio	2,516,391	3,633,894
Indiana and Illinois	2,195,672	2,716,748
Mich., Wisconsin, and California	87,467	127,001
Total	7,233,979	9,803,822

The wire nails produced in 1901 were manufactured by 61 works, as compared with 56 in 1900. The production in 1901 was greatly in excess of that of any other year, exceeding by 906,577 kegs that of 1897, the next year of largest production.

MINERAL IMPORTS AND EXPORTS OF SPAIN.—Imports of fuel into Spain for the two months ending February 28, included 346,898 tons of coal and 30,866 tons of coke. Imports of metals included 937 tons pig iron, 811 tons wrought iron, and 2,539 tons steel. Exports of minerals for the two months are reported by the *Revista Minera* as below, in metric tons:

	1901.	1902.	Changes.
Iron ore	1,218,203	1,103,145	D. 115,058
Copper ore	147,706	121,206	D. 26,500
Zinc ore	11,664	8,532	D. 3,132
Lead ore	381	471	I. 90
Pyrites	50,253	91,389	I. 41,136
Salt	47,219	38,354	D. 8,865

Exports of metals were 8,661 tons pig iron, against 633 tons in the corresponding period last year; 3,369 tons copper, against 2,884 tons; 313 tons zinc, against 297 tons; 24,124 tons lead, against 22,107 tons last year.

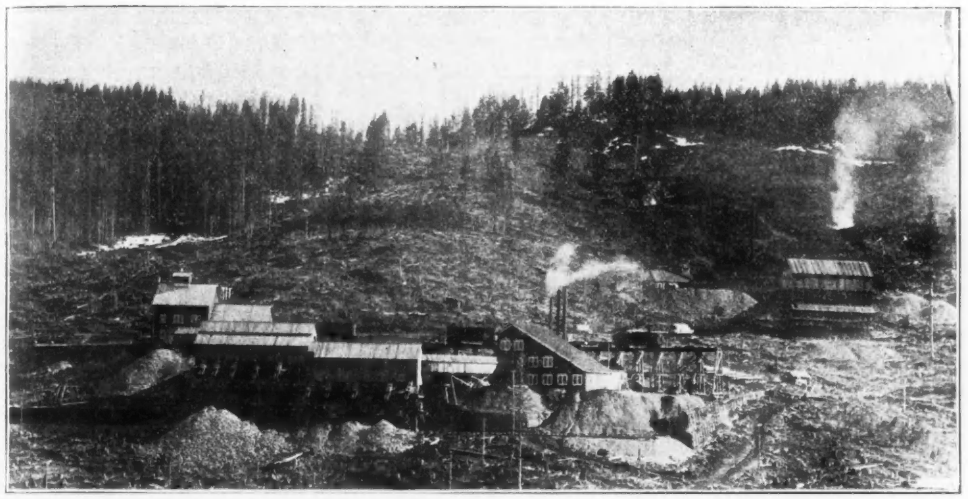
A BLAST FURNACE IN ITALY.—In a recent number *Stahl und Eisen* describes the blast furnace of Porto Vecchio, in which iron ores mined in the island of Elba are smelted. The furnace is small, having a capacity of 22 tons of iron daily. The stack is 13.60 meters high, and the internal diameters are 1.30, 2.95, and 1.95 meters; the capacity is 53 cubic meters. The blowing engines are of the Cockerill type and supply blast at a pressure of 150 millimeters of quicksilver and a temperature of 400° C. The average assay of the ore used is 86.5 per cent iron oxide—Fe_2O_3; 5 per cent silica; 0.5 per cent manganese and 0.05 phosphorus. This is equal to about 58 per cent metallic iron. The fuel used is charcoal. Wages of workmen are very low, ranging from 70 cents a day for skilled workmen down to 30 cents for common laborers.

BRITISH COLUMBIA—BOUNDARY MINING DISTRICT—PROGRESS IN MINING AND SMELTING.

By WILLIAM M. BREWER.

When it was reported that copper had fallen to 12 cents per pound in New York, the general supposition was that because of the low grade of the ore the entire Boundary District would be wiped off the map.

The writer recently visited that section of British Columbia in order to ascertain from personal observation the possibilities of the district, together with the costs of mining and smelting, and thus be in a position to place before the readers of the ENGINEERING AND MINING JOURNAL the true condition of the mining industry. There is no question but that to-day mining and smelting are carried on in the Boundary country at less cost than anywhere on the North American Continent. Because of the self-fluxing and non-sulphurous character of the ore smelting operations are carried on at a cost below $2 per ton, while the enormous bodies of ore permit of mining at a cost not to exceed 75 cents per ton by the quarry system on the surface and the "pillar and stope" system underground. This latter may be designated as an underground "glory-hole," and is more minutely described later in this article.



OLD IRONSIDES AND KNOB HILL MINES, BOUNDARY DISTRICT, B. C.

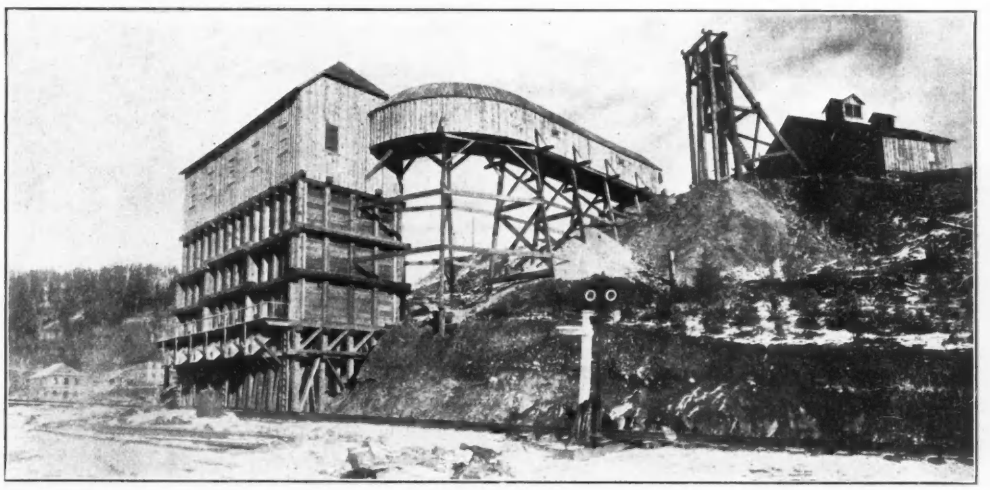
It was the late Samuel MacMaster, who, as superintendent of the Homestake Mining Company 25 years ago demonstrated that under reasonably favorable conditions, with an enormous tonnage of ore in sight and very large crushing capacity, it was possible to treat a lower grade free milling ore profitably than had ever been attempted before. In the same way the Alabama iron masters demonstrated that it was possible to manufacture pig iron at a low cost, which had provoked the ridicule of veteran furnace men when suggested. It appears now as if operators in the Boundary District in British Columbia have been successful in demonstrating that under the conditions there existing it is possible to reduce the cost for mining and smelting gold-copper ores to a figure never before dreamed of.

During the writer's visit he went through the Granby Copper Company's smelting and converting plant at Grand Forks, the B. C. Copper Company's smelting plant at Greenwood, the Standard Pyritic Company's smelter at Boundary Falls, as well as the Sunset and Mother Lode mines in the Deadwood Camp, about 3 miles northwest from Greenwood.

As the two first named smelting plants were described in detail in the columns of the ENGINEERING AND MINING JOURNAL about a year ago, it is only necessary in this article to state that at the Grand Forks Smelter two additional furnaces, which will increase the capacity of the smelter to 1,300 tons per day, are being built, and that two converters, with a nominal capacity of about 20 tons of matte each per day, have been installed, together with traveling cranes, additional blowing machines and electric motors. In the converting plant all the copper matte produced in the Province, except that at the trail smelter, is being converted into blister copper. It is estimated that by this means the smelters will obtain about a cent per pound more for their copper than heretofore, or, rather, will save that amount in cost of production.

By the system of electric traveling cranes the matte pots which receive the molten metal from the furnaces are picked up and carried to the converters into which the molten copper matte is poured and converted into blister copper. A quartz ore, which is shipped for treatment in the smelter, is used for lining the converters. As soon as completed a reverberatory furnace will be used for storing the molten matte drawn from the furnaces previous to transferring it to the converters. By adopting this policy there will always be a regular supply for charging the converters.

The smelting plants at Grand Forks and Greenwood, where the capacity is being doubled, are by far the most modern and up-to-date in British Columbia. Every possible opportunity has been taken advantage of to employ automatic methods and reduce items of cost. It is impossible to obtain any direct information from the Granby people as to cost for mining or smelting, but a rough estimate after a visit through the works can be made, and when it is considered that at Greenwood 9 tons of ore per day are treated for every one man employed, and that at Grand Forks, when the two new furnaces are blown in, the production will represent about ten or twelve tons per day to the man, it can readily be seen how low the cost for labor has been brought. The limit for minimum production cost has not yet been reached, because the price of coke and the charges for freight will undoubtedly be considerably reduced. The extensive water power at Grand Forks has helped materially to reduce cost price, but, although, at the Greenwood smelter steam power instead of water is used, which would appear to be much more expensive, yet Mr. Paul Johnson, the manager, states that his steam coal only represents a cost of five cents per ton of crude ore smelted.



SHAFT-HOUSE AND ORE-BINS, SUNSET MINE, BOUNDARY DISTRICT, B. C.

Four years ago, when the only smelters in the interior were those at Trail and Nelson, the cost of coke was $12 per ton delivered on the smelter sidetrack. To-day the cost is about $7 per ton, including freight. Until the completion of the Crow's Nest branch of the Canadian Pacific Railway, Vancouver Island supplied all the coke used in the province, but since the fall of 1899 the supply has been drawn from the Fernie coal mines in the Crow's Nest Pass. The Vancouver Island coke is strong, but high in ash, averaging about 15 per cent, while the Crow's Nest coke has about the same, if not greater, strength and carries only about 10 per cent ash. The rail way haul from the ovens to the Greenwood smelter which is the most westerly plant in operation at present on the main land of British Columbia, is about 300 miles, while the haul by steamer from Comox, on Vancouver Island, to Vancouver is about 60 miles, and from there to Greenwood by rail about 600 miles.

Deadwood Camp is directly tributary to Greenwood, while Phoenix Camp, although 28 miles distant from Grand Forks, is the source of supply from which the Granby company's smelter at that point receives its ore.

As the writer described the Phoenix Camp in the ENGINEERING AND MINING JOURNAL about a year ago, he will in this article confine himself to the Deadwood Camp, in which the Montreal and Boston Copper Company and the British Columbia Copper Company are operating on adjoining properties.

Accessibility.—A branch of the Columbia & Western Railway connects the camp with the town of Greenwood, about three miles southeast. This branch traverses from southeast to northwest the surface of the Sunset mineral claim, crosses a corner of the Primrose, and has its terminus on the Mother Lode. Switches have been laid to the ore bins on the Sunset and Mother Lode claims which afford facilities for loading cars by means of chutes discharging from the ore bins by gravity.

Historical.—The history of the Boundary Creek Mining Camp dates back to 1892, when the claims on which occur the most extensive out-croppings, such as the Mother Lode, Sunset, Crown Silver and others, were located according to the old law, which recognized extra-lateral rights and limited the size of the claims to 600 feet in width by 1,500 feet in length. Owing to the character and grade of the ore but little development was done, and no progress made until after the completion of the railway in 1899 and the erection of the smelters.

Since February, 1901, when the British Columbia Copper Company's smelter at Greenwood was blown in, the camp has furnished from the Mother Lode

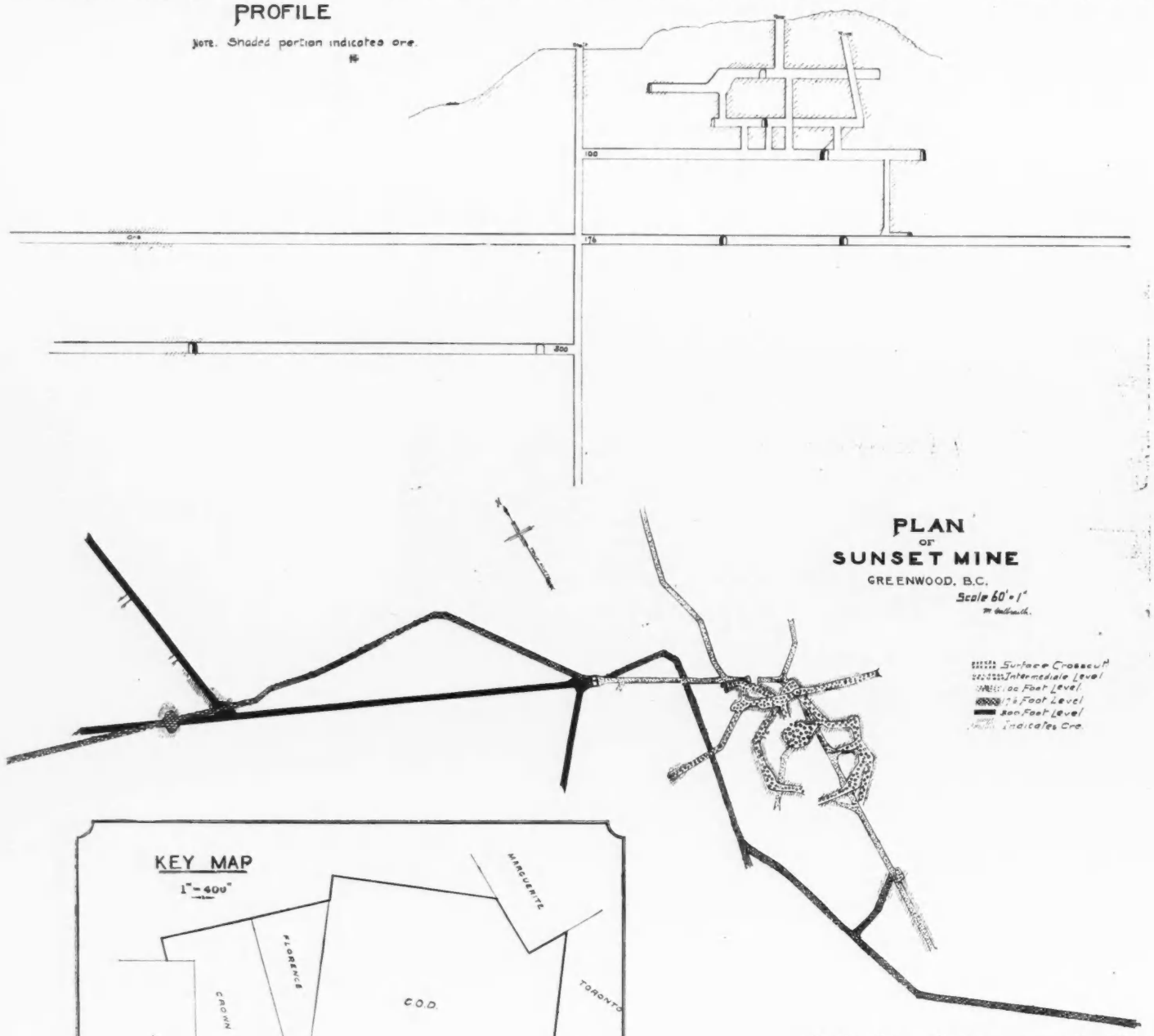
Mine up to February 1 last 131,252 tons of ore, besides about 1,000 tons for test samples from the Sunset Mine.

SUNSET GROUP.

As this group of mineral claims is the nearest group of locations to Greenwood in active operation at the present time, it will be described first in this article. It embraces the Sunset, Crown Silver, C. O. D. and Florence Fraction, occupying an area of about 112 acres, and is owned by the Montreal & Boston Copper Company, Limited.

ing and faulting, as well as erosion from glacial action, and uplifting from eruptive disturbances, have all left their marks. Apparently the original rock was diabase, but to-day much of the country rock is quartzose and calcareous, while intrusions of porphyry occur in the ore bodies evidently of a more recent period than that during which the ore was deposited. These intrusions appear to have had no effect on the ore, even close to the lines of contact.

Undoubtedly because of the disturbances which magnetite solutions charged with copper must have percolated, depositing as a resultant chalco-pyrite, sometimes in masses of considerable extent, at others in crystals and small particles as impregnations. The deposition of ore is not confined to the magnetite, for the chalco-pyrite is often found in paying quantities in the diabase, associated with garnets and hornblend, the latter sometimes altered to asbestos. Calcite crystals and veins also occur through the ore bodies as well as in the country rock, but in the latter are usually only found, where



THE SUNSET MINE, BOUNDARY DISTRICT, B. C.

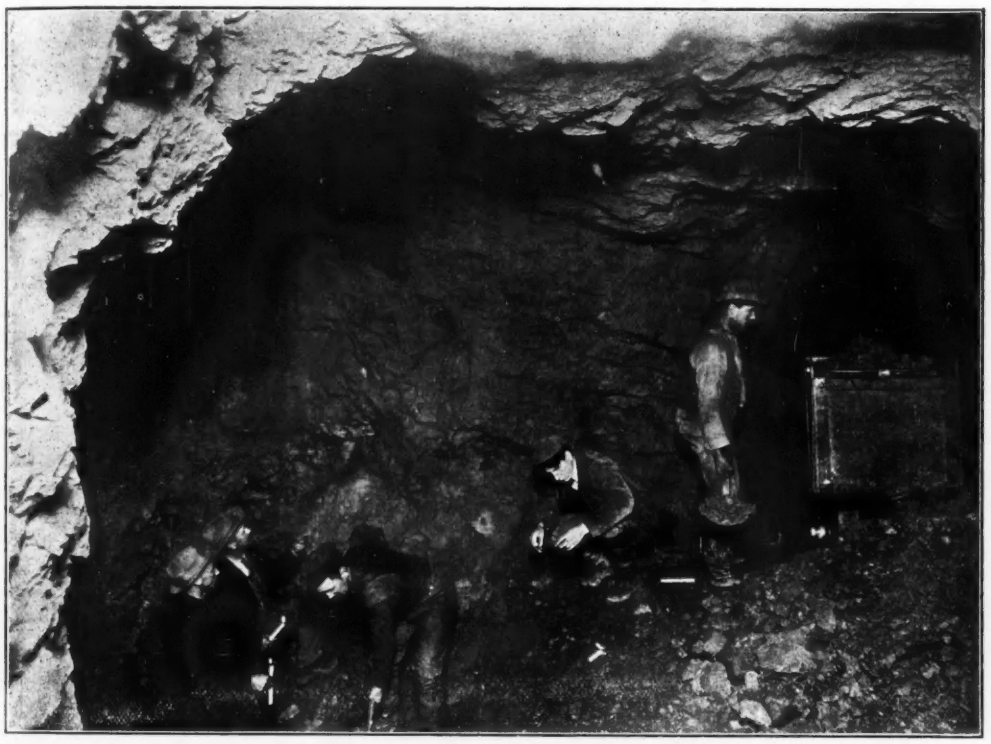
Geology.—In this portion of British Columbia there are several parallel zones of variable extent which are mineral bearing. Deadwood Camp is situated in one of these zones, which may possibly be connected with the zone occupied by Phoenix Camp, about six miles in an air line to the eastward. The rock formation is quite difficult to classify, because the alterations from the original rocks has been so marked. Metamorphism, shearing, crushcaused the shearing movement, an excellent opportunity has been afforded for the deposition of the enormous bodies of mineral which have been discovered, and occur with lenticular structure, usually without well-defined walls and often reaching several hundred feet in length, and upwards of 100 feet in width. Apparently the basic rock yielded the magnetite, which is almost always the gangue in which the chalco-pyrite is found. Through this shearing has made the country rock schistose. The percentage of iron and lime in the Boundary ores is sufficient to make them entirely self-fluxing.

Character of Ore Bodies.—On the Sunset and Crown Silver mineral claims there are apparently four distinct ore bodies having their lines of strike nearly parallel. One of these shows extensive outcroppings on the mountain side northerly from the shaft, which is sunk 75 feet in ore, but below that depth in country rock the outcrop is also noticeable under the ore bins. Another body is a sulphide ore, carrying higher gold values than is usually the case in the Boundary; this has been exposed on the 176 and 300-ft. levels to the westward from the shaft and 380 feet distant. The main ore body, at least the most extensive as far as developed, has been exposed on two levels in the Sunset ground by tunnels, the lower connecting with the 100-ft. station at the shaft. This tunnel was apparently intended as a drift, but after passing through ore near the foot-wall for 80 feet the work was continued in the country rock beyond the foot-wall and paralleling the ore body.

The strike of this ore body is nearly due north and dip variable, averaging about 35 degrees towards the west, in which direction is located the shaft.

While there appears no question but that this ore body is lenticular in structure, yet the tonnage already exposed is great, reaching approximately 250,000 tons above the 100-foot level, and the character of the country rock is such that there is apparently no reason to apprehend that it will not maintain its continuity to considerable depth. A cross-cut from the 200-foot level has intersected the ore body, but the main work on that level has been tunneling apparently parallel to the ore body, only on the hanging-wall side instead of on the foot-wall side, as has been the case on the 100-foot level. The width on the intermediate level is 125 feet and length undetermined, but apparently not less than 300 feet.

On the Crown Silver mineral claim another ore body has been developed, but as the workings were



STOPES IN MAIN ORE-BODY, SUNSET MINE, B. C.

full of water the writer could not examine this occurrence. It is proposed to connect these workings by a tunnel, now being run from the 300-foot level at the Sunset shaft, in order to obviate the necessity for maintaining two surface plants, hence the reason why the workings had been allowed to fill with water.

Although the grade of the main ore body on the Sunset Mine is of the low average characteristic of the Boundary (carrying about 2 per cent copper, $1 in gold, and low silver values per ton), yet the excess of iron and low silica renders it a valuable ore for mixing with the siliceous refractory gold ores from Republic and other camps in the smelter, which the Montreal & Boston Company proposes to purchase at an early date. In fact, this Sunset ore will permit of higher percentage of siliceous ores being added in mixture than most of the ores so far known in this portion of the province.

The less extensive but richer ore body was first exposed on the 176-foot level under the gravelly bed of a small creek which flows across the Sunset and C. O. D. claims, but has eroded out so deep a channel that the bed is about 150 feet lower than the collar of the shaft. The 300-foot level of the shaft was cut and this ore body exploited from that level, the shaft, though, has been sunk to a depth of 412 feet. On the 300-foot level this high-grade ore body (which carries gold values principally, as shown by two car-loads sent to the Trial Smelter for tests) was cross-cut 380 feet westward from the shaft and drifted on for 60 feet towards the north. From that point the course of the tunnel was slightly changed in order to run into the Crown Silver ground to connect with that ore body, which is about equal in extent with the main body on the Sunset, but of higher grade. The continuity of the high-grade body was determined by cross-cuts run from the tunnel after its course was changed. The returns from the Trail Smelter show that one car of this ore yielded $16.50 in gold per ton, and the other $11.60 in gold per ton, with very little copper.

The ore body on the Crown Silver mineral claim is extensive and similar in character to that of the Mother Lode Mine, which adjoins it on the west. It carries higher values than the main ore body in the Sunset. This information was furnished to the writer by disinterested parties, as well as by the manager of the Montreal & Boston Copper Company.

Ore in Sight.—From personal observation the writer was only enabled to measure up the ore in sight above the 100-foot level in the Sunset Mine. The tonnage he estimates approximately at 250,000 tons. Further development from the tunnel on the 100-foot level and also from the tunnel in the intermediate level should expose a much larger tonnage. Development from the tunnel on the 200-foot level, which has apparently been run in the hanging-wall side paralleling the ore body, should be pushed at once and will probably expose an equally large tonnage to that above the 100-foot level. The strong probabilities are that the grade of the ore will increase as depth is attained, at any rate for a few hundred feet. This has been the case in the Mother Lode Mine adjoining this company's property, where the workings have been carried to a vertical depth of nearly 500 feet below the apex of the ore body. On the Crown Silver mineral claim I am informed by the manager that there has been developed equally as large a tonnage of ore as I estimate in sight above the 100-foot level on the Sunset, which will be available for stoping as soon as the workings have been connected with the workings on the 300-foot level on the Sunset.

System of Mining.—Mr. Johns, the manager, has adopted a system for mining the main ore body on the Sunset by which it is possible to bring the cost almost to as low a figure as is reached in the surface quarrying on the Knob Hill and Mother Lode mines. By a series of chutes so arranged as to carry ore from one immense stope over 100 feet square into the 100-foot level, he should be able to mine at least 50 tons of ore to each machine drill per shift, and he can use four machines at one time in the stope, making an output of 400 tons per day of two shifts. This tonnage is being reached at the Mother Lode per machine per shift in the stopes on the 200-foot level, where practically the same system has been in vogue for sometime, the only difference being that Mr. Johns has arranged for opening stopes of greater dimensions than has heretofore been done. This he can, judging from the condition of the ground, do with perfect safety. Broken ore is left in the stope for the miners to work from instead of erecting scaffolding. No timbering other than for the chutes will be required, and these timbers can be withdrawn for use in the shutes in other stopes. This system of mining is practically the "glory hole" system used underground, and is the cheapest possible method that can be adopted. It is peculiarly adaptable in these extensive bodies of ore where the large percentage of iron has so solidified the material as to render such a system equally as safe as the old method in less solid ground.

The Caledonia Gold Mine in the Black Hills of South Dakota was stoped out by the same method to the 700 foot level, between 1886 and 1890.

Value of Ore.—The following is a copy of the smelter certificate from the Canadian Smelting Works at Trail, showing the results obtained from one car-load of the richer ore shipped by the Montreal and Boston Copper Company for a test shipment Aug. 7th, 1900.

Car No. 20,174 lot No. 1 Sunset:

Moisture 2.5 per cent.
Gold 0.58 oz. per ton.
Silver 0.3 oz. per ton.
Copper 0.7 per cent.

A second car-load shipped to the Trail Smelter yielded 0.825 ounce gold per ton.

Ledoux & Company's assay certificate dated Oct. 29th, 1901, give the following results per ton from two samples after drying:

	Gold, oz.	Silver, oz.	Copper, %.	Iron, %.
1st	0.39	3.10	8.44	37.66
2d	1.40	7.20	11.57	30.60

Consequently it will be seen that although the main ore body in the Sunset Mine is of the usual low grade, characteristic of the Boundary district, bodies of high grade ore are also encountered.

Developments.—The development work on the Sunset Mine consists of the following: Drifts 311 feet, dimensions 5 by 7 feet; cross-cuts 3,800 feet, dimensions 5 by 7 feet; winzes 64 feet, dimensions 7 by 11 feet; upraises 502 feet, dimensions 7 by 11 feet; shaft 412 feet, dimensions two compartments each 4½ by 5 feet.

The development on the Crown Silver from information from the manager consists of: Shaft 265 feet, dimensions 4½ by 7½ feet; tunnels 880 feet, dimensions 5 by 7 feet.

Surface Plant.—The mining machinery consists of: Double hoisting engine, steam cylinders each 14 by 20 inches built by the Jenckes Machine Company of Sherbrooke, Que., with necessary cable and two mine cages; dynamo, 125 volts, manufactured by the Northern Electric Company of Madison; one Racine automatic geared 12 horse-power engine to run the dynamo. Two boilers 80 horse-power each. One half Ingersoll-Sergeant 20-drill air compressor built by James Cooper Company of Montreal; ore bins of 2,000 tons capacity; modern assay office, furnished complete; boarding house with dining room to seat about 80 men, bunk house, stabling, etc.

MOTHER LODE GROUP.

The mineral claims of the British Columbia Copper Company of which the most prominent are The Mother Lode and Primrose, adjoin the Crown Silver on the west and south. All the development work performed by the company has been done on the Mother Lode claim.

Character of Ore Bodies on the Mother Lode and Primrose Claims.—An ore body apparently of extensive dimensions is exposed on the Primrose claim in an open cut made by the Railway Company, but it has not been exploited below the surface, be-

cause parallel outcroppings on the Mother Lode were of so much greater extent. On the latter claim, an ore body has been developed to a vertical depth of 490 feet below the summit of the outcroppings. The vertical shaft is 300 feet in depth and above the collar of the shaft to the summit is 190 feet. In length the ore body has been developed about 600 feet and its width is not fully determined, but is at least 120 feet. In structure the ore body is lenticular, but the tonnage in sight can be safely estimated at 2,300,000 tons. The strike is towards the north, and dip apparently towards the east in the lower levels although near the surface it appears to be towards the west. The outcroppings are much more extensive than any other in the Boundary district except the Knob Hill in the Phoenix Camp. The shaft is sunk in ore to the 200 foot level and on the 300 foot the ore is picked up at a short distance from the station. The ore body occurs in the same sheared and crushed zone of diabase as do the Sunset and Crown Silver ore bodies. The ore is a magnetite with impregnations of chalcopyrite, calcite, garnet and sometimes hornblend. The country rock is often calcareous. Porphyry dikes similar to the narrow intrusions referred to as occurring in the Sunset ore body, also occur as intrusions in the Mother Lode, the maximum thickness of porphyry exposed is about 15 feet between the 200 and 100 foot levels where the dike lies nearly flat in the ore body, but does not appear to have exerted any influence with regard to affecting the values or character of the ore at or near the lines of contact.

So far as known only this one ore body occurs on the Mother Lode, but on the Primrose in addition to the outcrop already mentioned, the rich ore body exposed on the 200 and 300-foot levels of the Sunset should be found to occur as the line of strike points directly into the Primrose ground. The grade of the ore on the Mother Lode averages about the same values as other low-grade. Boundary ore carrying about 2 per cent copper with variable gold and silver values. One very satisfactory feature is the fact that a higher grade ore is found in the stopes on the 300-foot level than above, its appearance indicates that its sulphur content is somewhat higher, but that its lime content is about the same as the other typical Boundary ores.

Developments.—The development work consists of main working two compartment shaft 300 feet in depth; drifts on the 200 and 300-foot levels total length about 1,400 feet; cross-cut tunnel from air compressor plant on the creek to the 200-foot station at shaft; cross-cut tunnel from new rock crusher to connect with glory hole chute; cross-cut tunnels under stopes on 200-foot level.

Surface Plant.—Ingersoll-Sergeant 40 drill air compressor; electric motor 125 volts for lighting purposes; double hoisting engine, steam cylinders 20 by 42 inches; Gates No. 5, and style 14B Farrel pattern crushers; Robins belt conveyors from No. 5 crusher to ore bins; modern machine shop fitted with lathes, etc.; two 60 horsepower and two 80 horsepower boilers.

CONCLUSIONS.

In the opinion of the writer the property of Montreal & Boston Copper Company, Limited, consisting of the Sunset, Crown Silver, C. O. D. and Florence Fraction mineral claims is capable (provided proper attention be directed by the management to dead or development work, and to the minimum cost for mining) of furnishing about 400 tons of ore per day of sufficiently high grade to yield a satisfactory profit on operations on this scale. This opinion is based on the assumption that an equally low cost for smelting can be attained as is being done at the Greenwood and Grand Forks Smelter at the present time, and that the market price of metals does not fall below a reasonable figure.

There are approximately 250,000 tons of ore in the main ore body on the Sunset Mine above the 100-foot level and about the same quantity I learn from the manager of the Crown Silver. Of the richer ore body the tonnage in sight could not be estimated because exploratory work has not been carried far enough. The cost for mining should not exceed 80 cents per ton, making allowance within this limit for development work proposed to be carried on by the management. This cost if the ore bodies develop as the indications promise, should be in the future somewhat reduced. With a smelting and freight cost of less than $2 per ton which the writer is informed is the actual cost to-day at the Greenwood smelter referred to, it can readily be seen that a very low ore can be profitably mined and treated.

On the C. O. D. and Florence Fraction mineral claims no work has been done of a development nature, consequently this is virgin ground to be exploited.

With regard to the properties of the B. C. Cooper Company there is only one conclusion which can be reached, and that has been demonstrated from actual work since the smelter was started up in February, 1901. It is that the Mother Lode Mine alone is capable of furnishing 1,000 or 1,200 tons of ore per day, or even if necessary a greater amount for treatment in the smelter. The system of mining carried on is as economical as can be done under existing circumstances. Of course in all these properties where it is neseccary to allow broken ore to accumulate in the stopes it is almost impossible to calculate the exact cost for mining until all the ground between the levels is entirely worked out. To what depth this system of mining will be permissible is a problem which can only be determined from practice.

The extent of the mineral zone in which the mines under discussion are located, has not yet been determined. Where the country rock is massive and has escaped shearing and crushing, the ore bodies which have been so far discovered are narrow, and usually occur as bodies of quartz.

A thorough geological survey is necessary before satisfactory solutions of the problems which present themselves, can be formed, and unfortunately both of the visits of the writer to the district have been made during the winter months when but little of the surface could be examined.

GERMAN IMPORTS OF IRON AND OTHER ORES.

The imports of iron into Germany for the year 1901 are reported by *Stahl und Eisen* as below, in metric tons:

From:	Tons.	Per cent.
Spain	1,367,016	42.4
Portugal	2,580	0.1
France	88,157	2.7
Algeria	304,587	9.4
Norway	38,912	1.2
Sweden	1,041,317	32.3
Italy	58,524	1.8
Greece	134,625	4.2
Newfoundland	189,460	5.9
Total	3,225,178	100.0

Nearly all of these imports were received through Dutch ports—Amsterdam and Rotterdam.

Imports of manganese ores for the year were as follows: From Russia, 128,537 tons; British India, 9,980; Brazil, 2,954; Turkey, 3,840; total, 145,311 tons.

Imports of pyrites, both iron and copper amounted to 272,754 tons, all from Spain.

Imports of nickel ore were 13,213 tons. All of this was from New Caledonia, 10,260 tons being received directly; 2,181 tons by way of Sydney, N. S. W., and 772 tons through London.

DYNAMITE FACTORY AT MONTEREY, MEXICO.—Consul-General Hanna, of Monterey, under date of March 28, 1902, says that a concession has been granted for the establishment of a dynamite and explosive plant at Monterey, convenient to the many mining properties of that district. He is informed that the Société Financière pour l'Industrie de Mexique and the Sociéte Centrale de Dynamite, represented by H. Tron, of Mexico City, are large stockholders in this new organization.

TREATMENT OF MIXED SULPHIDE ORES CONTAINING ZINC BY HYDROMETALLURGICAL PROCESSES.

BY WALTER RENTON INGALLS.

The treatment of mixed sulphide ores containing zinc has been for many years an attractive field to the inventor. The number of processes that have been proposed reaches far into the hundreds; the patents that have been taken out upon them, and their details and modifications, are upward of a thousand. Many of these processes represent probably only the ideas that their inventors have aimed to protect in advance of experiments as to the reactions involved; others have evidently been tried only in the laboratory, without much consideration of the conditions which would attend their practical application; some have been tested on a larger experimental scale, without a previous, careful analysis of the conditions, and have failed; a comparatively few have been applied on a commercial scale. Among the last class there have been some colossal failures, but on the other hand there have been some which have proved partially successful. Altogether, the attempts to solve this problem have cost a vast amount of money.

The various processes which have been proposed fall under the classifications of pyrometallurgical, hydrometallurgical and electrometallurgical, but those terms are purely arbitrary, inasmuch as an electrolytic process may involve both fire and wet methods besides the application of electricity, while almost all processes are to some extent pyrometallurgical. The present paper is intended to treat only of the hydrometallurgical, or wet, processes, in which the zinc is in some way brought into solution and precipitated therefrom by chemical reagents; in other words, methods which are analogous in their procedure to those which are employed in the Henderson process of copper extraction. Such a process involves two essential steps, namely lixiviation and precipitation.

In the projects for the treatment of mixed sulphide ores containing zinc, the favorite idea has been to bring the zinc into solution as sulphate. This may be done in one of four ways: The ore may be roasted at a low temperature with view to the production of the maximum possible quantity of normal zinc sulphate, $ZnSO_4$, which is readily soluble in water; it may be roasted sweet, i. e., chiefly to oxide, and then be leached with dilute sulphuric acid; it may be calcined in admixture with an acid sulphate of an alkali; or it may be decomposed raw by heating with concentrated sulphuric acid. But little attention has been given to the last method. The use of the alkaline sulphates involves numerous practical difficulties, and because of them has received only slight consideration. With respect to the other two methods, which are apparently comparatively simple, there are serious drawbacks to each of them.

In attempting the sulphating roasting, it has never been possible to convert a really large percentage of the zinc sulphide into the soluble sulphate; about 50 per cent appears to be the most that has been accomplished. The remainder of the zinc exists as basic sulphates, as oxide, and as undecomposed sulphide, the percentage of the last being always high, wherefore the extraction of zinc is likely to be unsatisfactory. Inasmuch as sulphuric acid is required in considerable quantity to dissolve the oxide and basic sulphates, it is a logical step to consider carrying the roasting sufficiently further to decompose all of the sulphide, even if the normal sulphate be to a considerable extent decomposed at the same time, since the additional extraction of zinc should outweigh the extra quantity of acid required, which would anyway in all probability have to be made in conjunction with the process. If the zinc be entirely converted to oxide, in order to dissolve it as sulphate there is required, for each part of zinc, 1.5 parts of pure sulphuric acid, or 1.92 parts of Glover tower acid (77.5 per cent H_2SO_4) which is equivalent to 2.45 parts of chamber acid (62 per cent H_2SO_4). A ton of ore containing 25 per cent Zn, if roasted entirely to oxide, would

therefore need about 0.5 ton of tower acid, which quantity would be diminished in proportion to the amount of the zinc converted into the normal and basic sulphates during the roasting.

There are some ores which, by roasting to complete, or nearly complete, decomposition of the zinc sulphide, give a good extraction of their zinc with sulphuric acid; but in many cases the experimenter is confronted by the dilemma that, although all of the zinc sulphide has been oxidized, some other insoluble compound of zinc is formed during the process, and to such an amount as to permit only a very unsatisfactory extraction of the zinc. For example, in testing some Leadville ore, which was roasted to a product containing less than 1 per cent of sulphur as sulphide, the extraction with warm, dilute acid was only about 66 per cent of the zinc; boiling with an excess of much stronger acid, a method that would be practically infeasible, gave a maximum extraction of 80 per cent of the zinc. The nature of the insoluble compound that is formed during the roasting of such ores has not been investigated. There are some strong grounds for the belief that it may be the ferrate of zinc ($ZnO.\ F_2O_3$). At all events the phenomenon appears to be manifested particularly in the case of ferruginous ores.

The apparently simple process of roasting so as to put the zinc into soluble form is the first stumbling block in the sulphate methods for the treatment of mixed sulphide ores, and it is a serious one. If a process is to lose 20 or 30 per cent of the zinc at the outset, it starts with a heavy handicap. Moreover, the zinc which is lost because of its insolubility detracts from the value of the residuum as a silver-lead ore. Assuming that the ore under treatment assayed 25 per cent Zn, 22.5 per cent Fe, 8 per cent Pb, 38 per cent S, 6.5 per cent SiO_2 and 10 ounces Ag per ton, and were sulphated to the extent that only five units of the zinc, or 20 per cent remained as undecomposed sulphide, the iron being converted entirely to ferric oxide and the lead to sulphate; if there were no losses in roasting (which, however, there would be) there would be left, after leaching, a residuum weighing 0.578 ton (dry basis) and assaying 8.65 per cent Zn, 38.03 per cent Fe, 13.84 per cent Pb, 6.4 per cent S, 11.25 per cent SiO_2 and 17.5 ounces Ag per ton. Forty per cent of insoluble zinc (as sulphile) would imply a residuum of 0.728 ton, which would assay 13.73 per cent Zn. These figures would naturally be somewhat modified by the proportion of zinc existing in an insoluble form other than as sulphide. It appears therefore that such residua would still be rather zinky products. They would retain 15 to 20 per cent water after filtration and would have to be agglomerated, or briquetted, to make them suitable for reduction in the blast furnace.

It is possible that mixed sulphide ores can be roasted by delicate manipulation, and modifications in the process, in such a way as to steer a clear course between the danger of undecomposed sulphide of zinc on the one hand and that of insoluble oxidized compounds of zinc on the other, but the proper method has not yet been pointed out. As remarked previously, however, the ores differ in this respect, there being some which can be roasted so as to give a good extraction without any great difficulty. Assuming the latter to be the case, the next step to consider is the lixiviation, which presents some interesting problems of its own.

One of these is the trouble that may be experienced in the subsequent separation of the solution because of the gelatinization of silica, the gangue of the ore, or the silicates possibly formed during the roasting, being subject to decomposition by sulphuric acid of only moderate strength. If that happens, the liquor becomes agglutinized throughout with the floating jelly, which may rise to the surface in thick masses, preventing fine ore from settling and making it next to impossible to separate a clear solution or wash the residuum. Ashcroft experienced great trouble in this way at Cockle Creek, N. S. W. The remedy lies in the use of dilute acid (not stronger than 10 per cent H_2SO_4) and a proper regulation of the temperature of the lixiviation. The former requirement unfortunately leads to a great increase in the bulk of the solution, which is an important consideration if an evaporation is to form one of the subsequent steps in the process.

Various impurities of the ore are taken into solution along with the zinc, the most important of which is iron. Aside from the drawback that these may consume acid, they necessitate perhaps a troublesome refining of the solution. Such a refining is absolutely necessary if the desired product is crystallized zinc sulphate; or if the solution is to be used for the manufacture of lithophone; while if it is contemplated to subject it to electrolysis for recovery of the zinc, grave difficulties are encountered unless certain of these impurities are removed. On the other hand, if the desired product be zinc oxide for distillation, the impurities which enter the solution may not cause any serious trouble. Iron in the ferric condition can be precipitated as oxide by means of zinc oxide, which may be added in the form of roasted blende or calcined zinc carbonate. In fact, if the quantity of acid employed in the lixiviation be no more than is required by the zinc, ferric oxide will not be dissolved at all, or rather will be reprecipitated immediately if it is dissolved. Ferrous iron will, however, go into solution, and before it can be precipitated by zinc oxide it must be peroxidized, which can be done in various ways; for example by thoroughly aerating the solution. Heating to 80 or 90° C for a sufficiently long time serves to bring down insoluble basic sulphates of iron, which settle out in long standing and leave a perfectly clear, iron free solution. The sulphate liquors purified in the latter manner in the Lower Harz yield absolutely white crystals.

With respect to the mechanical part of the lixiviation process, it seems to be impossible to perform it by percolation. The great weight of the sulphide ore causes it to pack very densely. In applying the acid the excess in one part of the vat will dissolve iron, which will later on be precipitated in a subsequent stratum of the ore, filling the interstices of the latter and making it quite impermeable. Consequently the lixiviation will have to be done in agitators, either revolving barrels or vats provided with a stirring mechanism. The arrangement will conform substantially to that employed for analogous purposes in other hydrometallurgical installations, attention being given of course to the necessity of keeping down the bulk of the wash-waters and at the same time discharging the residues with the minimum of soluble zinc. The zinc bearing solutions will in all probability be collected in settling vats. Ashcroft found, at Cockle Creek, that it was necessary to filter-press the solutions and had to install a costly department for that purpose. However, there does not appear to be any reason, in the case of many ores, why clear solutions can not be obtained by decantation, if gelatinization of silica be avoided and ample settling capacity be provided.

A clear and pure solution of zinc sulphate having been obtained, several lines of procedure present themselves. The simplest and cheapest is to boil down the solution to a strength of about 50° B and crystallize out the sulphate by cooling. The demand for zinc sulphate is, however, comparatively small and because of the low tenor of zinc in its composition (22.6 per cent Zn when pure) the freight per pound of zinc counts up fast when it has to be carried long distances to market. Another alternative is to evaporate the solution to dryness and convert the anhydrous sulphate to oxide, by heating, the oxide being of course capable of direct distillation for spelter. This was Doctor Schnabel's recommendation for the treatment of the Broken Hill sulphides; however, the idea long antedates his report.

In heating the anhydrous sulphate of zinc to a sufficiently high temperature, it is decomposed eventually into zinc oxide, oxygen, sulphurous anhydride and sulphuric anhydride, the proportion of the last having been as high as 40 per cent of the volume of the gases in some of the trials at Broken Hill. On first sight, this is an engaging idea. The gases evolved ought to be highly suitable for the manufacture of sulphuric acid, being capable of delivery to the towers and chambers in a concentrated form and to a large extent as sulphuric anhydride, without any necessity for its further oxidation, wherefore the cost of making the acid should be relatively low and all the acid used for the lixiviation of the ore should be recovered, save the unavoidable small losses in the process; if the original roasting of the ore could be conducted in such a way as to afford to sulphurous gas capable of utilization, the quantity recovered from the decomposition of the sulphate would be a valuable by-product of the process. In theory nothing could be simpler; in practice the desulphurization of zinc sulphate is a difficult task. Upon evaporation, it blows and bubbles as the last of the water goes off, and finally the paste sets with a cement-like hardness and is difficult to handle. To effect its decomposition a high temperature, probably 900° to 1,000° C, is required; in fact all the difficulties of decomposing the sulphates which form in the blende roasting furnace are reproduced on an exaggerated scale. The experiments which were made in this direction at Broken Hill held out no promise of a commercially successful process under the conditions existing there.

Various methods have been devised to overcome the practical difficulties in decomposing zinc sulphate. Ashcroft proposed to add a proportion of zinc oxide to the paste, before the final evaporation, making it easier to handle, which doubtless it would, but this involves a considerable quantity of oxide going round and round in the process and does not lower the temperature required for decomposition of the sulphate. Hampe and Schnabel patented the process of decomposition by means of an admixture of carbon, whereby zinc oxide, sulphurous anhydride and carbon monoxide result, which involved no new idea. There is no doubt that zinc sulphate is decomposed in that way at a lower temperature than when heated alone, the reaction beginning as low as 650° C (the upper limit of dull red heat). The temperature should not rise above 900° C, because zinc oxide begins to be reduced by carbon at about that point. At very high temperatures zinc sulphate is reduced by carbon to zinc sulphide. The desulphurization of zinc sulphate with the aid of carbon does not, however, appear to have found any practical application as yet. Parnell patented the process of decomposing zinc sulphate by heating the equivalent of three parts of zinc in that form with one part of zinc as sulphide, the latter being mixed in before the final evaporation of the paste. This reaction, when performed in a closed muffle, gives zinc oxide and undiluted sulphurous anhydride, and takes place at a comparatively low temperature. It was employed practically at Swansea, Wales, on a large scale, from 1879 to 1883. Unless the zinc sulphide be artificially prepared, or there be a supply of high grade blende available, impurities are introduced into the zinc oxide and the silver content of the blende employed is likely to be lost.

The third line of treatment for zinc sulphate solution, which is open, is precipitation of the zinc by means of some chemical reagent, but herein the costliness of most of the substances which will precipitate zinc imposes rather narrow limits. The cheapest available precipitant is milk of lime, but unfortunately the calcium sulphate which is formed by the reaction is itself insoluble, so the precipitate is of low grade in zinc, containing theoretically only 30 per cent Zn after calcination; but this percentage would be reduced by the insoluble impurities of the lime, which would enter the precipitate. Burned dolomite would give a higher grade precipitate, because the magnesium sulphate would remain in solution; a rock containing calcium carbonate and magnesium carbonate in the ratio of 2:1 should give theoretically a precipitate containing 38.8 per cent, Zn, which would be reduced in grade in proportion to the gangue of the rock. Milk

of baryta would produce a precipitate of zinc hydroxide and barium sulphate which would be an ideal pigment, but barium hydrate is too expensive for general consideration; however, the new process of making barium oxide by smelting barytes in an electrically heated furnace, which has lately been applied at Niagara Falls, and has already considerably reduced the cost of making barium hydrate, holds out considerable promise in this direction. Marsh and Storer proposed to use calcined magnesite, which should give a high grade precipitate, but magnesite is also too expensive at most of the places at which it is desirable to undertake the treatment of mixed sulphide ores, although because of the low molecular weight (40) of magnesia as compared with that of zinc oxide (81) the required proportion of the former is relatively small; the value of Grecian magnesite, 95 per cent pure, is $6.25 per 2,000 pounds delivered at New York; on that basis the precipitation of the zinc from the solution of an ore assaying 25 per cent Zn, of which 20 units had been dissolved, would cost $1.70 for the 0.272 ton of magnesite theoretically required; a profitable disposition of the magnesium sulphate that might be recovered from the supernatant liquor would be very doubtful. Sodium carbonate throws down zinc as basic carbonates and hydrocarbonates of complex composition, but this is also out of the question for a commercial process on a large scale.

It will be observed that the precipitants for zinc that have a commercial possibility are chiefly the alkalies and the alkaline earths. Because of the costliness of the most efficient of them, it has been proposed by numerous inventors to regenerate them from the solution remaining after the precipitation of the zinc. Thus, Marsh and Storer in their latest patents have considered the evaporation of the magnesium sulphate solution and reproduction of the magnesia by heating the sulphate, although it is hard to see wherein that procedure would have any advantage over the direct decomposition of the zinc sulphate; indeed, magnesium sulphate is generally supposed to be more difficultly decomposed than zinc sulphate. Recovery of sodium carbonate from the sodium sulphate solution has also been proposed; this would involve the addition of a soda factory to the ore reduction works. It should not be lost sight of that the recovery of reagents would seldom, if ever, be complete, and the more costly they are, the greater is the expense of replacing unavoidable losses. None of these processes has had a trial outside of the laboratory, and it is doubtful if any of them will have a practical application, the first cost of the necessary plant for large scale experiments being too great in comparison with the promises that are held out.

Assuming that the zinc can be obtained economically in the form of oxide from a sulphate solution, the final question that arises is as to its disposition. There is considerable doubt as to whether the precipitated products (except the zinc oxide-barium sulphate mixture) will be fit for use as zinc pigments; certainly they will not be unless great care has been taken in purifying the solutions, especially from iron, which is precipitated by most of the reagents which throw down zinc; in all probability the reduction of the oxide to spelter must be contemplated. In this last step there is not yet much experience. In some respects the chemically prepared oxide should be well adapted to economical distillation; in other respects, not so. Precipitated zinc oxide is capable of quick distillation and at a compartively low temperature, while its freedom from sulphur should lead to a high percentage of extraction, and the metal should be of extra fine quality. On the other hand such precipitates are very bulky and the capacity of the furnace would be diminished thereby, while in spite of the voluminous character of the material it would lie densely in the retorts, or rather the air spaces, although greater in the aggregate than in the case of coarser material, would be less easy for the escape of gas, because of the greater friction. However, it might be possible to consolidate such material in some way that would make it more suitable for distillation.

Besides the processes which have contemplated the obtaining of a solution of zinc sulphate, it has been proposed to bring the zinc into solution as sulphite, chloride, nitrate and as alkaline zincates. The methods of those classes may be summarized very briefly, inasmuch as less of a practical character has been accomplished with them than with the sulphate processes.

It has long been well known that zinc oxide is acted upon by sulphurous acid, with the formation of zinc bisulphite, which is soluble in water, and this was one of the early methods of neutralizing sulphurous fumes that were tried in Germany, but it has not survived. Zinc bisulphite ($H_2ZnS_2O_6$) in solution is decomposed, by heating, into sulphurous acid (H_2SO_3) and zinc monosulphite ($ZnSO_3$), of which the latter is insoluble in water and precipitates. The monosulphite is an unstable compound, giving up its sulphurous anhydride at 200° C, but also being subject to rapid peroxidation to sulphate, which as has previously been pointed out is a very stable compound. However, even if the scheme of dealing with a sulphite solution were impracticable, it would appear to be an easy way to obtain a sulphate solution through the sulphite, and experimentally this has been demonstrated to be the case. The drawbacks to the method on a commercial scale are the same difficulties in roasting the ore that are encountered in connection with direct sulphate lixiviation, the large losses of sulphurous acid that are bound to be experienced, mechanical difficulties in thoroughly sulphiting the ore, and finally the fact that sulphurous acid acts far more slowly than sulphuric. It is probable that a plant for this purpose would offset in its extent all the advantages there might be in other respects. At all events, the experimental and tentative work that has been done at various times at Lautenthal, in the Harz, at Broken Hill, N. S. W., at Thomasville, N. C., and elsewhere does not appear to have held out promises of success in this direction.

For the production of a solution of zinc chloride the oldest expedient is a chloridizing roasting of the ore. Such a method would be substantially a direct continuation of the Henderson process of copper extraction, and was in fact contemplated specifically by William Longmaid, who anticipated Henderson, in his patent of 1844, wherein he proposed after precipitation of the copper by means of metallic iron to throw down the zinc, together with some of the iron, by means of milk of lime. The same process in so far as the zinc is concerned has been re-invented and re-patented several times since that date. In extracting copper from ore assaying 2.5 per cent Cu. it is the practice to mix about 200 pounds of salt with 2,000 pounds of ore, that quantity being about 107 pounds in excess of what is theoretically required by the copper. A ton of ore assaying 25 per cent Zn would require theoretically about 900 pounds of pure salt, or 1,000 pounds if the same excess were used as in copper extraction, but in all probability a greater excess would be needed, inasmuch as a considerable portion of the lead would also be converted into chloride, which is soluble in hot water, though insoluble in cold. The cost of the salt for such a roasting would be therefore no mean consideration in most places.

In a chloridizing roasting of zinc ore, a portion of the zinc is volatilized as chloride at the temperature necessary for the operation; another portion is converted into basic chlorides (oxychlorides) which are insoluble in water. Loss in the former way would be obviated by passing the furnace gas through a condensing tower, the liquor from which would naturally be returned to the process. The solution of the basic chlorides would depend upon their quantity and the acidity of the tower liquor; if the latter were insufficient, fresh chlorhydric acid would be needed. Aside from these considerations, the drawbacks to a chloridizing roasting process appear to be a difficulty in converting all the zinc into chloride, Stahl having found in treating burned pyrites containing 7 to 11 per cent Zn that a rechlorination of the residue remaining after lixiviation was necessary, the certainty that a large part of the silver will be dissolved with the zinc and the trouble of recovering it from the voluminous solutions that would ensue in the process (unless of course there were sufficient copper present to make its precipitation worth while) and the chances of having a considerable percentage of lead chloride in the insoluble residue, which would doubtless lead to losses of lead in the smelting of it. The idea of conducting the chloridizing roasting in such a way as to volatilize all of the zinc is said to be precluded by the non-volatility of the basic chlorides. Such chlorides are decomposed by heating into zinc oxide and chlorine gas. It appears, however, that at a high temperature a considerable percentage of the zinc is volatilized.

Some of the methods of preparing zinc chloride from dead roasted ore may be briefly referred to. Dissolving the zinc in chlorhydric acid would hardly be economical unless the latter were available at very low cost. The same compounds of zinc formed during the roasting that are insoluble in sulphuric acid appear also to be insoluble in chlorhydric. Leaching with ferric chloride must give a nasty precipitate of ferric hydroxide, since the zinc and the iron change places in the solution. The late Dr. Hoepfner put in application the method of dissolving zinc oxide by means of a solution of calcium chloride and carbon dioxide, the zinc going into solution as chloride and the lime being precipitated as carbonate. This is actually in use at the works of Brunner, Mond & Co., in England. It is feasible only where calcium chloride is obtained as a by-product in some other process and has the drawback of leaving considerable zinc undissolved in the residue, which is greatly increased in bulk by the precipitated chalk.

Zinc is capable of precipitation from its chloride solution by about the same list of reagents that throw it down from the sulphate solution, milk of lime being the cheapest available substance. The chloride solution has the advantage that the compound of lime, calcium chloride, which is formed during the reaction is soluble, wherefore the precipitate is of high grade in zinc. If the solution contain iron, and the latter be peroxidized, the iron may be precipitated by means of zinc oxide and then the zinc may be thrown down with lime; or a fractional precipitation of iron and zinc by means of lime alone may be effected; the latter is, however, rather difficult to manage, or at least it has appeared so in experiments on a small scale. The milk of lime precipitation of zinc from the chloride solution is attended by the serious drawback that the zinc is thrown down not merely as hydroxide, but also to some extent as oxychloride. The latter compound appears to lead to a grave loss in the subsequent distillation of the precipitate. De Bechi states that this loss amounts to 7 or 10 per cent. It is necessary therefore to calcine the precipitate at bright red heat, recovering the volatilized zinc in condensing towers, before subjecting it to distillation.

The processes which contemplate a lixiviation of zinc oxide from roasted ore by means of caustic alkalies may be passed over as impracticable, with only a brief mention of some of the reasons. These relate chiefly to the cost of those substances, which makes it expensive to replace the unavoidable losses; and the losses are bound to be high, because they attack other substances that are certain to be present in the ore, lead oxide for example, and all the sulphates, normal and basic, go into solution, giving up their sulphuric anhydride to the alkali, which it would be quite impracticable to reconvert to the caustic form.

Although this essay is intended to refer only to the purely hydrometallurgical processes of zinc extraction, it would be incomplete without some comment as to the electrometallurgical processes which are quite analogous to the hydrometallurgical up to the stage of precipitation. This number is legion and the chief source of wonder is why so much money should have been expended for the patents

alone, if in no other way. The employment of soluble anodes has never been even in the shadow of success and there appears to be no promise in that direction. In most of the projects the use of insoluble anodes has been contemplated. Apart from all the other difficulties, which are neither few in number nor unimportant, the quantity of energy that is required for the deposition of a pound of zinc practically precludes the development of a commercially successful process unless the anode reaction be utilized in some profitable manner, not even if power be obtainable as cheaply as $20 per horse power per annum. The Hoepfner process is the only one which has found continued application; by means of it, Brunner, Mond & Co. produce 500 to 600 tons of electrolytic spelter per annum in England. Chlorine is recovered at the anode, and calcium chloride liquor, which is a by-product of the ammonia soda process, is the lixiviant for the ore. Under less favorable circumstances the Hoepfner process does not appear to have been successful; at least it is reported that certain works in Germany at which it was applied have been closed.

Messrs. Ashcroft and Swinburne are now experimenting in England with an electrolytic process which deserves mention because of its novel character. The raw ore is poured into molten zinc chloride in a vessel like a copper converter. Chlorine gas is blown through, attacking the suspended sulphides and converting them into chlorides, while the sulphur goes off as vapor and sulphur monochloride, from which a large percentage is recoverable as brimstone. The molten chlorides are decanted off and the lead is precipitated as metal by means of spelter. The zinc chloride which finally remains alone is decomposed electrolytically, giving spelter, and chlorine gas which is returned to the process. The process is hydrometallurgical only to the extent that the fused chlorides can not be entirely decanted from the gangue of the ore and consequently the residuum from the converter has to be leached with water (at least this is considered the most feasible method) and the solution boiled down. This process has not yet passed beyond the experimental stage. However, the experiments have been made on a very respectable scale, and the details appear to have been well thought out.

Mr. Ashcroft estimates that Australian mixed sulphides will yield 100 per cent each of their silver, lead and zinc in metallic form, and 55 per cent of their sulphur, at a cost of £2 3s per metric ton of ore with power costing £4 per electric horse power per annum; and £2 16s with power costing £8 5s. (A loss of 5 per cent of zinc chloride is allowed for in the costs). It is not to be expected that such high percentages of recovery will actually be effected and the estimates of cost are perhaps too low, although they are entirely reasonable as to quantity of power required and its cost, not because Mr. Ashcroft has not carefully considered the matter, but because things are apt to be overlooked in preliminary estimates which have to be paid for in practice. However, the novelty of this process may well excite interest in its development.

It can not be said that wet methods of zinc extraction have yet attained any considerable practical importance. Whether they ever will, or not, is doubtful. It does not in the light of present knowledge appear likely that there will be developed any cheap process that will be a universal panacea for the class of ore which it is aimed to treat. On the other hand, it is not improbable that certain of the methods which have already been described might be economically successful under favorable conditions. In any case the plant required for the application of such methods would most likely be necessarily extensive and costly. After all, the chief progress that has been made up to date in rendering available the mixed sulphide ores containing zinc has been in the improvement in the methods of mechanical separation, which affords a silver-bearing lead product for the lead smelter, and a silver and lead-bearing zinc product for the zinc smelter. From start to finish the aggregate loss of value is large and the cost of treatment is high, but it still remains to be shown practically if there be any more profitable way.

IRON AND STEEL INSTITUTE, GREAT BRITAIN.

The annual meeting of the Iron and Steel Institute of Great Britain will be held in London, May 7 and 8. The meetings will be held at the rooms of the Institution of Civil Engineers, Great George street, Westminster.

The Bessemer gold medal for 1902 will be presented to Herr F. A. Krupp, of Essen, Germany.

The following is a list of the papers that are expected to be submitted:

1. Report by the Committee appointed to investigate the Nomenclature of Metallography.

2. "On a New Vacuum Tuyere for Blast Furnaces," by Horace Allen, London.

3. "On the Microstructure of Hardened Steel," by Professor J. O. Arnold and A. McWilliam, Sheffield.

4. "On the Compression of Fuel before Coking," by J. H. Darby, Brymbo.

5. "On Gas from Wood for use in the Manufacture of Steel," by James Douglas, LL.D., New York.

6. "On a Combined Blast-Furnace and Open-Hearth Process," by P. Eyermann, Benrath, near Düsseldorf.

7. "On the Physical and Chemical properties of Carbon in the Hearth of the Blast-Furnace," by W. J. Foster, Darlaston.

8. "On the Sulphur Contents of Slags and other Metallurgical Products," by Baron H. von Jüptner, Donawitz, Austria.

9. "On the Elimination of Silicon in the Acid Open-Hearth Furnace," by A. McWilliam, Sheffield, and W. H. Hatfield, Sheffield.

10. "Report on Research Work carried out during the Past Year," by J. A. Mathews, Ph.D., New York (Andrew Carnegie Research Scholar).

11. "On the Iron Ores of Brazil," by H. Kilburn Scott, Rio de Janeiro.

12. "On the Recovery of By-products in Coking," by J. Thiry, London.

13. "On Brinell's Researches on the Influence of Chemical Composition on the Soundness of Steel Ingots," by Axel Wahlberg, Stockholm.

The Autumn Meeting of the Institute will be held in Düsseldorf, Germany, on September 2 and following days.

MINERAL PRODUCTION OF QUEENSLAND.

The Mines Department reports the mineral production of Queensland—other than gold—as follows, for the past year:

	1900.	1901.	Changes.
Silver, oz.	112,990	571,561	I. 458,571
Tin, tons.	1,123	1,661	I. 538
Copper, tons.	384	3,061	I. 2,677
Lead, tons.	205	561	I. 356
Wolfram ore, tons.	190	72	D. 118
Bismuth ore and molybdenite, tons.	19	46	I. 27
Iron, tons.	....	430	I. 430
Manganese ore, tons.	75	218	I. 143
Coal, tons	497,132	539,472	I. 42,340
Lime, tons.	3,664	6,514	I. 2,850
Opals, value.	£7,500	£7,400	D. £100
Other gems, value.	900	5,000	I. 5,100

The total estimated value of these products in 1901 was £572,810, against £308,355 in 1900; showing an increase of £264,455, or 85.8 per cent, last year.

IRON ORE IMPORTS OF GREAT BRITAIN.—Imports of iron ore into Great Britain for the three months ending March 31, were, in long tons:

	1901.	1902.	Changes.
From Spain.	1,115,304	1,184,648	I. 69,344
From other countries.	203,263	204,371	I. 1,108
Total.	1,318,567	1,389,019	I. 70,452

The other countries included Sweden, Greece, Algeria and Newfoundland.

NEW YORK EXPORTS IN MARCH.

The closing month of the first quarter this year shows exports from the port of New York valued at $13,044,298 in mineral products and their manufactures. This makes a total for the 3 months ending March 31 of over $32,000,000, which, considering the depreciation in the market value of certain important articles and the heavy decrease in exports of iron and steel, compares favorably with preceding years.

The more important exports during this quarter are shown in the accompanying table:

Articles.	Jan.—Mar. Quantity.	Value.
Coal, Anthracite, tons.	3,861	$17,873
Bituminous, tons.	14,551	47,503
Copper ore, tons.	4,648	461,581
ingots, etc., lbs.	64,458,934	8,060,238
manufactures	.....	182,222
Copper sulphate, lbs.	12,105,861	485,942
Iron and steel bars, lbs.	2,925,664	76,718
wire, lbs.	24,545,238	727,779
nails, lbs.	12,287,644	253,201
Iron, structural, tons.	7,284	452,876
Steel rails, tons.	7,861	213,384
Machinery, electrical.	.....	856,103
metal works.	.....	838,003
pumping	.....	420,016
Engines	.....	757,499
Pipes and fitting.	.....	812,954
Mineral oils, gals.	143,136,244	10,094,906
Nickel, lbs.	966,666	272,516
Roofing, slate.	.....	64,718
Zinc ore, tons.	5,789	171,000
pigs, lbs.	1,377,940	58,740
Zinc oxide, lbs.	1,791,676	77,968
other paints.	.....	201,518

Compared with the corresponding period last year the heaviest decreases are shown in iron and steel bars and sheets and steel rails. Increases are most prominent in copper, zinc ore and nails.

The largest buyers were Great Britain, Germany, France, Belgium, Italy and Mexico. Good exports have also been made to China and South Africa, where trade is recovering somewhat from the war disturbances. The bulk of exports has been in mineral oils, copper and labor-saving machinery.

A QUESTION OF SAMPLING.

One of the natural results of the present somewhat strained relations between the producers and the purchasers of gold ore in the West is a grievance regarding the method of sampling, which seems to call for reasonable consideration and possible compromise or improvement.

As an instance in point, the management of the leading producing gold mines of Colorado objects to the course pursued by the reduction company in crushing fine for purposes of sampling only one-fifth of each lot delivered. As the ore runs irregularly and often contains greater or less quantities of high-grade material, it is claimed that a fair sample can only be obtained by crushing the whole lot fine and then putting the entire shipment through the regular course of coning and cutting down.

In response to this the smelter claims that as a result of this fine crushing, much of the ore being fed into the furnaces in the form of dust, escapes from them before being reduced, and enters the flues and retaining chambers as dust only, thus greatly retarding the process of recovery, and in certain cases, escaping altogether through the stack.

That both parties to the controversy have grounds of complaint is unquestionable, hence a satisfactory solution of the problem would seem to be demanded. One suggestion made is the possibility of combining the ore dusts or fine particles, with coal with or without lime, in the form of briquettes, which could then be used as fuel as well as a retaining medium, for the otherwise unstable ore dust. Mechanical appliances exist in abundance for the manufacture, at a medium cost, of briquettes, and slight modifications of these would easily adapt them to the special demands of the smelting furnace.

ALUMINUM WIRE.—The Pittsburg Reduction Company has recently sold 21 miles of aluminum wire to the Lewiston & Auburn Electric Company, for the transmission of electric power. It has also sold 20 miles of aluminum wire to the Boston & Maine Railroad for use at Concord, N. H. Electric light companies are now using it, the Boston Electric light Company having recently ordered 100,000 pounds.

UNITED STATES EXPORT TRADE.

The present demand in this country for iron and steel causes a lull in the export trade of these important products. This condition will not last long, as manufacturers are enlarging their plants to meet it. Moderate shipments are being made in some export time orders. The ruling low ocean freight rates are favorable, and were it possible to get material, our foreign trade would be much larger than last year.

We give below a table showing the export trade in mineral products during the first two months of this year. This shows total exports of $40,512,741, which compares favorably with the preceding year considering the depreciation in the market value of some of the more important articles, notably copper. As compared with the corresponding period of last year, these exports show a falling off of only $400,803.

Copper is third in value among the exports and leads the commercial metals. In January and February the copper exports aggregated 64,899,990 pounds, which is fully 60 per cent more than was reported last year. On the other hand, however, the increase in value was only $1,236,989, or less than 20 per cent. The shipments to the United Kingdom show a marked improvement, having been 29,721,239 pounds, as against 5,754,743 pounds last year. France imported only 6,329,453 pounds, as against 12,098,167 pounds last year, while Germany's receipts increased from 4,337,446 pounds to 6,956,782 pounds. Other European countries are credited with 21,392,626 pounds, against 17,849,264 pounds in 1901. Smaller quantities have been sent to British North America, Mexico, South America, Russia, Japan, etc. Copper ore exports have also increased; Great Britain took 3,480 tons and Mexico, 1,245 tons, both larger quantities than last year. Copper sulphate trade shows a

U. S. Exports of Domestic Mineral Products and Manufactures in Jan. and Feb., 1901 and 1902.

Articles.	1901. Quantity.	1901. Value.	1902. Quantity.	1902. Value.	Changes 1902. Quantity.		Changes 1902. Value.	
Aluminum	.....	$28,897	.....	$10,195	.....	D.	$18,702	
Brass	.....	263,226	.....	239,770	.....	D.	23,456	
Bricks, Building and Fire	.....	72,067	.....	53,300	.....	D.	18,767	
Cement, bbls.	35,692	76,254	42,392	64,680	I. $6,700	D.	11,574	
Acids	.....	37,198	.....	54,723	.....	I.	17,525	
Ashes, pot and pearl, lbs.	241,663	11,462	192,457	9,661	D. 49,206	D.	1,801	
Copper sulphate, lbs.	12,358,694	577,982	8,463,279	345,773	D. 3,895,415	D.	232,209	
Lime, acetate of, lbs.	10,959,306	202,676	8,544,698	130,273	D. 2,414,608	D.	72,403	
Coal, Anthracite, tons	312,108	1,417,881	215,465	1,003,536	D. 96,643	D.	414,345	
Coal, Bituminous, tons	830,298	1,916,582	750,337	1,882,487	D. 79,961	D.	34,095	
Coke, tons	56,806	235,542	68,626	295,335	I. 11,820	I.	59,793	
Copper ore, tons	1,395	150,686	4,725	473,226	I. 3,330	I.	322,540	
Copper Ingots, bars, etc., lbs.	40,481,190	6,647,995	64,899,990	7,884,984	I. 24,418,800	I.	1,236,989	
Gunpowder and Explosives	.....	215,344	.....	320,349	.....	I.	105,005	
Iron Ore, tons	842	2,290	316	1,184	D. 526	D.	1,106	
Pig iron, tons	30,067	448,071	9,696	161,033	D. 20,371	D.	287,038	
Bar iron, lbs.	13,303,554	213,829	5,846,768	115,524	D. 7,456,786	D.	98,305	
Bar and Rod Steel, lbs.	29,333,131	413,418	6,708,932	151,239	D. 19,624,199	D.	262,179	
Iron and Steel Billets, etc., tons	23,139	567,632	364	10,893	D. 22,775	D.	556,739	
Iron and Steel Hoops, etc	689,289	14,921	1,246,802	26,666	I. 557,513	I.	11,145	
Iron and Steel Scrap, lbs.	1,673	24,058	1,964	30,623	I. 291	I.	6,565	
Rails, iron, tons	382	8,762	130	2,165	D. 246	D.	6,597	
Rails, steel, tons	49,059	1,400,096	20,588	553,726	D. 28,471	D.	846,370	
Sheets, iron, lbs.	4,375,526	121,775	1,411,146	41,262	D. 2,964,380	D.	80,513	
Sheets, steel, lbs.	16,249,506	219,274	2,067,477	46,261	D. 14,182,029	D.	173,013	
Tin Plates, etc., lbs.	656,736	31,828	798,566	29,670	I. 141,830	D.	2,158	
Structural Iron and Steel, tons	10,419	585,497	15,053	693,694	I. 4,634	I.	108,197	
Wire, Iron and Steel, lbs.	25,999,059	660,487	32,797,543	748,234	I. 6,798,484	I.	87,747	
Builders' Hardware	.....	1,357,775	.....	1,614,365	.....	I.	256,590	
Nails, cut, lbs.	4,043,811	93,870	2,820,125	55,804	D. 1,223,686	D.	38,066	
Nails, wire, lbs.	6,832,835	156,013	7,172,770	135,113	I. 339,935	D.	21,500	
Nails, all other and tacks, lbs.	693,303	42,191	825,454	49,093	I. 162,091	I.	6,902	
Machinery, Electrical	.....	934,180	.....	1,000,554	.....	I.	66,374	
Machinery, metal working	.....	476,983	.....	646,696	.....	I.	169,713	
Machinery, pumping and pumps	.....	320,447	.....	381,528	.....	I.	61,081	
Steam Engines and parts	.....	1,551,657	.....	866,307	.....	D.	685,350	
All other manufactures of iron and steel	.....	7,826,606	.....	8,095,532	.....	I.	268,926	
Lead, pigs, bars and old, lbs.	3,615,184	162,988	9,695	589	D. 3,605,489	D.	162,399	
Lead manufactures	.....	43,361	.....	62,370	.....	I.	19,009	
Lime, bbls.	4,008	4,791	5,877	7,571	I. 1,869	I.	2,780	
Marble and Stone	.....	123,565	.....	113,322	.....	D.	10,243	
Roofing, slate	.....	139,455	.....	128,888	.....	D.	10,567	
Mineral Oil, crude, gals.	18,594,319	883,683	18,692,319	808,813	I. 98,000	D.	74,870	
Naphthas, gals.	4,789,621	398,371	1,922,214	149,009	D. 2,867,407	D.	249,362	
Illuminating Oil, gals.	111,781,141	7,151,827	124,258,876	7,724,422	I. 12,477,735	I.	572,595	
Lubricating and Paraffin Oil, gals.	11,027,671	1,596,922	12,041,460	1,641,054	I. 1,013,789	I.	44,132	
Residuum, bbls.	143,085	328,909	109,111	132,113	D. 33,974	D.	196,796	
Nickel, lbs.	838,566	222,228	677,070	197,535	D. 161,496	D.	24,693	
Phosphate Rock, tons	99,066	809,782	79,459	624,103	D. 19,607	D.	185,679	
Quicksilver, lbs.	144,129	82,538	133,904	78,109	D. 10,225	D.	4,429	
Salt, lbs.	1,396,593	7,437	2,086,216	11,668	I. 689,623	I.	4,231	
Tin manufactures	.....	68,152	.....	65,806	.....	D.	2,346	
Zinc ore, tons	7,171	215,815	6,086	180,450	D. 1,085	D.	35,365	
Zinc, pigs, sheets, etc, lbs.	1,548,997	69,502	1,370,801	59,265	D. 178,196	D.	10,237	
Zinc manufactures	.....	6,331	.....	15,466	.....	I.	9,135	
Zinc, oxide, lbs.	823,808	36,411	1,033,495	46,423	I. 209,687	I.	10,012	
Other pigments and colors	.....	295,424	.....	240,908	.....	D.	54,516	
Total value	.....	$40,973,544	.....	$40,512,741	.....	D.	$400,803	

Of this year's total exports iron and steel contributed $15,456,566, or over 38 per cent, as compared with $17,472,260, or 42.7 per cent in 1901. The decrease of $2,015,694, or 11.5 per cent this year, is due chiefly to the curtailed shipments of bar iron and steel, and steel rails, for which there is an unprecedented domestic demand. Machinery exports are growing and some good-sized lots have gone to Great Britain and to Australia and other Eastern countries. A promising field for mining machinery is Mexico, where mineral properties are being developed on a large scale, especially by American capital. Railroad equipment is in request, and large quantities have already been shipped to South America, to facilitate the opening up of the mineral resources of Brazil, Peru, etc.

Mineral oil exports were valued at $11,455,411, or $1,095,699 more than last year. This increase is credited principally to illuminating oil. Leading buyers are Great Britain, Germany, the British East Indies, Japan, and China, though good purchases have also been made by Brazil and other South American countries, and Africa.

falling off, especially with Italy, but an improvement is expected.

The decreased exports of lead and zinc only emphasize the good home consumption and satisfactory prices, especially for zinc.

Nickel exports have fallen off over 19 per cent. Quicksilver is not moving as well as last year, owing to higher prices. Consequently, exports show a decrease of nearly 8 per cent. Mexico, Central America, and British Columbia have bought fair quantities for use in the gold producing districts.

Coal shipments are considerably less than last year, but the coke trade is materially better. Of the anthracite coal exported British North America received 211,666 tons, against 304,834 tons last year, while Europe took 1,802 tons, against 3 tons in 1901. The remainder went chiefly to the West Indies. The bituminous coal was credited principally to British North America, 411,343 tons, against 460,493 tons last year; West Indies, 146,249 tons, against 140,914 tons; Mexico, 84,086 tons, against 96,752 tons; and Europe, 53,635 tons, against 65,297 tons. The coke went chiefly to Mexico and the West Indies.

THE ONTARIO PROVINCIAL ASSAY OFFICE.

The latest bulletin issued from the Ontario Provincial Assay Office at Belleville, Ont., gives an interesting summary of the work done during 1901, which we reproduce below:

The Assay Office was opened July, 1898, by the Bureau of Mines to encourage prospecting and developing of mineral lands in Ontario. The office offers to prospectors and owners of mineral lands an opportunity of securing reliable assays and other tests of commercial values of minerals at a nominal cost, the fees charged being only intended to prevent abuse of the privileges. That prospectors and mining men appreciate the value of a public assay laboratory may be judged from the following yearly record of determinations:

	1898. 6 months.	1899.	1900.	1901.
Assays and analyses	406	1,651	2,215	2,949
Identification and qualitative examinations	45	304	187	487

The office has performed the following service for the Bureau of Mines and directly and indirectly for the public during the year:

1. Issuing laboratory reports (assays and analyses, etc.) of samples sent in by the Government geologists and survey parties exploring the unsurveyed portions of northern and western Ontario.

2. Making check analyses of iron ores raised in Ontario and smelted at blast furnaces in the Province. The miners of such ore are entitled to the bounty provided by the iron mining fund.

3. Doing general laboratory work for a report on the peat industry in Ontario, and making tests of various raw and briquetted peats for fuel purposes. Compressed peat is expected to take the place of wood as a fuel locally and also to compete with coal for several purposes.

4. Compiling a report on the arsenic industry with special reference to the deposits of arsenical pyrites in Eastern Ontario as a future source of supply, to be published in the eleventh report of the Bureau of Mines.

5. Collecting ore samples from Eastern Ontario, for the Government exhibit which attracted much attention at the Pan-American Exposition held in Buffalo, N. Y., during 1901.

The following services have been performed during the year for prospectors and parties engaged in mining or developing ore bodies in Ontario:

1. Issuing laboratory reports consisting of assays, analyses, qualitative examinations, identifications or reports as to probable commercial value of minerals. These reports are charged for at actual cost according to the scale of fees approved by the Director of the Bureau of Mines and are entirely the property of parties paying the fees for the tests ordered. While this is a public laboratory, custom work is done for private parties and such reports cannot be issued other than to parties sending in samples and paying the necessary fees. Pulp or samples sent in by private parties are held for reference by the sender only or subject to written order of the sender. The same rule holds good in case of laboratory reports.

2. Acting as an information agency answering as far as possible inquiries from owners of mineral lands as to market prices, uses and purchasers of mineral and raw ores. One thousand six hundred and twenty-two letters were sent out, many of which were in answer to such inquiries for information as above stated. Inquiries from dealers, investors and manufacturers using raw ores, asking information regarding Ontario's mineral deposits, are published in the monthly office bulletins.

3. Making check determinations on pulped ore samples and also umpire work in cases of disputes as to correct values contained in samples. In most cases the differences were found to be due to different methods of sampling rather than to errors on the part of the assayer or chemist whose report was disputed. In order to show the best and simplest methods of sampling, it is proposed to prepare a short paper on Sampling and Assay Values to be issued as a circular free of charge.

4. Issuing a monthly bulletin containing monthly laboratory report, inquiries of general interest and notes on minerals coming into commercial use. This bulletin is sent free to any person interested in mining in Ontario and its object is to keep prospectors and others in touch with the various changes in metallurgy and new uses for minerals.

5. Samples of commercial economic minerals have been distributed to bona fide prospectors and interested parties who were in doubt as to the characteristics of certain ores and wished samples for comparison. Eighty-four samples were distributed throughout Ontario in answer to this demand during the year.

The laboratory report shows a total of 3,436 determinations made during 1901, divided as follows: Assays, 886; analytical determinations, 2,063; identifications and qualitative tests, 487. The total number of samples received for assay, etc., was 1,050.

The laboratory is equipped for the following determinations:

Gold and Silver; by fire assay and by bottle amalgamation to test the free-milling quality of gold ores.

Copper; by both electrolytic and cyanide titration methods, the latter on pure copper ores only.

Nickel; by both electrolytic and cyanide titration methods.

Lead; by fire assay for rich ores and molybdate titration for lean ores.

Manganese; by standard methods as employed by iron smelters.

Metallic Iron; by both bichromate and permanganate methods, using stannous chloride as a reductor.

Sulphur; by weighing as barium sulphate for iron ores. By Gladding's method for sulphur in pyrites and pyrrhotites.

Phosphorus; by precipitating with ammonium molybdate weighing direct, or titration with potassium permanganate with metallic zinc as reductor, also by Handy's method.

Titanium; weighing as dioxide.

Lime; titration with potassium permanganate for limestones and marls weighing as oxide in rock-analysis.

All other determinations by standard methods. All determinations except those requiring an impalpable powder are done on 100-mesh pulp at ordinary temperatures without being previously dried unless otherwise stated in the certificate. Raw ore carrying water to such an extent as to prevent grinding is dried at 110° C. and report is made both on the basis of dried ore and on the ore in natural state as received.

At present the office holds samples of standard iron ores and portions of such samples with copy of complete analysis as obtained at this laboratory will be sent free of charge to any Canadian chemist.

Technical investigation of any nature affecting the minerals of Ontario are also undertaken so fas as the laboratory equipment will allow.

Shipping bags and mailing envelopes addressed to this office are supplied free of charge to prospectors and parties wishing to send in samples, and schedule of fees for assays, giving also directions for taking and mailing samples, may be had on application.

DEAD BRANCHES OF THE IRON AND STEEL TRADE.—The new *Directory* just issued by the American Iron and Steel Association shows that there are some branches of the domestic iron trade which are either dying out or are making no progress. Only one of the Catalan forges is active, the Standish Works in Clinton County, New York, and only 8 pig and scrap iron bloomaries are left. Only one Clapp-Griffiths converter is left, and it has been idle for several years. There are to-day only 55 charcoal furnaces in the whole county, against 79 in 1898, and the annual capacity of the furnaces of to-day is in round number 250,000 tons less than that of the furnaces of 1898. The crucible steel industry has made but little progress for many years.

MINING IN THE PHILIPPINES.

We are permitted to make the following extract from a private letter, dated in Manila, February 16 last:

"The mining situation here at present, while not discouraging, yet is in such a condition that I am unable to give any definite information as to the mining resources. There is gold, silver and copper in nearly every island in the group, besides coal in large bodies.

"There have been no great discoveries as yet, wherein miners have struck anything you would call a big proposition, or in paying quantities, except that in one portion of Luzon Island there have been found bodies of high-grade copper ore; and this section will probably be found to contain some very rich mines. Gold has been taken out here and there by American prospectors, both from quartz and placer workings, and the opinion of the miners is that there will be found in other islands (when they

A PROSPECT, SURIGAO PROVINCE.

are permitted to go out and prospect) some very rich gold mines. The outlook, however, is good, and we all hope to make some rich discoveries as soon as Congress extends mining laws to this country."

The American Mining Association of the Philippine Islands, which has been organized, with headquarters at Manila, has the following officers: President, J. B. Early; vice-presidents, Frank S. Bourne, Daniel H. Ming; secretary, Robert Mills; treasurer, Henry Chandler; directors, William Grey, H. H. Muecke, C. M. Thorndyke, H. J. Robinson, D. M. Mickel, M. A. Clarke.

The following is the full text of the memorial to Congress adopted by the association, to which references have heretofore been made:

"Whereas, The conditions now existing in the Philippine Islands relative to mining are such as to practically prohibit the development of mines, and will so continue unless the United States mining laws are extended to this archipelago, and,

"Whereas, Many American miners have been prospecting for the past two years, and have located claims under the United States mining laws, and organized mining districts, similar to those that have been organized in the mining States and Territories of the Union, many of whom have done considerable development work on their said claims, the said

PROSPECTING QUARTZ, MINDANAO.

prospectors and miners continuing to locate mining claims, expecting the Congress of the United States to extend the United States mining laws to these islands, and that their claims now located will be recognized by the Congress of the United States, and,

"Whereas, It is a well-known fact that the Spanish mining laws in the Philippine Islands have been practically a failure, as far as the development of the mineral resources of the said islands is concerned, there having been practically no prospecting done until the American miners, who are here, and who are the pioneers in prospecting and mining, have gone over these islands and discovered valuable mineral deposits, and,

"Whereas, The United States mining laws, as is well known, have been the cause of developing the great mineral resources of said country, and the same rule will apply here, provided that Congress shall extend said mining laws to this archipelago, and,

PHILIPPINE GIRL PANNING GOLD QUARTZ.

"*Whereas,* The prospectors and miners now in these islands, numbering somewhere between 1,500 and 2,000, most of whom are ex-soldiers, are now out in the hills and mountains prospecting and developing their said claims, with the expectation that Congress will recognize their said locations, and extend the United States mining laws to these islands, and thus develop the great mining resources, which will not be developed unless the United States liberal mining laws are extended here; now, therefore, be it

"*Resolved,* That we, the American prospectors and miners, now in session in the city of Manila, do hereby resolve, and petition, the Congress of the United States to pass an act extending the liberal mining laws of the United States to the Philippine Islands and to recognize their claims now located, and that the Civil Governor and the Philippine Commission be requested to embody a copy of these resolutions in their report to Congress, and that the Philippine Commission recommend to Congress that the United States mining laws be extended to said islands, and that a copy of these resolutions be sent to the Civil Governor of the Philippine Islands, to the Philippine Commission, to the President of the United States, to the Secretary of the Interior, to the Congress of the United States, and to such individual members of Congress as may be reached by mail."

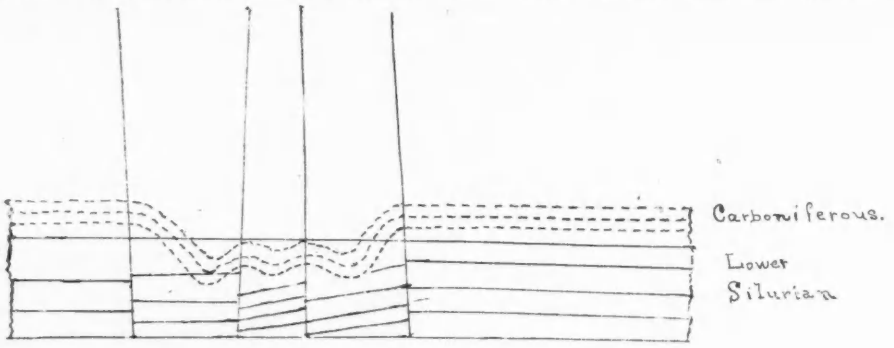
The accompanying photographs, for which we are indebted to the courtesy of a correspondent, show some prospectors at work in the Philippines, with the aid of native miners. The scenes are typical of the working methods in use up to the present time.

SOME OF THE PYRITES DEPOSITS AT PORT AU PORT, NEWFOUNDLAND.*

By C. A. MEISSNER.

The subject presents an exceedingly interesting phase of a mineral formation that happened to come under the writer's notice, and which occurs on the western coast of Newfoundland, along the southern shores of Port au Port Bay. That whole section is one of great interest, especially to the geologist and mineralogist, presenting a wealth of fossil and mineral forms, seldom seen in any one location. Many of these are in a peculiarly interesting form, giving a collector and student some rare finds, in addition to the economic interest they excite, and it is to this former phase of this section that I want to call your attention to-day. I have brought with me some specimens to illustrate the paper, and only regret that time did not permit my bringing others that I have, bearing on the case.

Port au Port Bay is a beautiful sheet of water, like a great amphitheatre, just north of St. George's Bay, and cut off from the latter by a very peculiar, low, narrow strip of sand called the "Gravels." (See map.) The southern and western shores, as well as a large part of the eastern, are formed by a large deposit of lower Silurian or calciferous limestone, resembling in many features the Trenton formation of New York, as described by John Fulton. The stratification is nearly horizontal, with a slight dip to the northeast. It covers an area of many miles east and west, and also to the north, where it finally has been disturbed by heavy eruptions of diorite and magnesian rocks, principally dunite, carrying chrome. These outflows of eruptive matter have caused great disturbances to the limestone formation near the contact, and apparently, have caused a gradual sinking towards the center of the Bay.



SECTION SHOWING CHARACTER OF FAULTS AT PORT-AU-PORT.

Throughout these limestones, large faults and splits are to be found, at right angles to the stratification, which occur along the whole water front of Port au Port Bay. The whole country was evidently submerged for a long period after these disturbances, and these faults and splits have in many cases, been partially or completely filled in with calcarous shales. (See section.) These shales have been surmounted by boulder clay, leda clay, and again covered by boulder clay, and subsequently have been brought to the surface by the slow, general rising of the whole country while the greater portion of the over-lying, softer carboniferous strata have been denuded by glacial and other causes of denudation. It is in these shales, especially near the point of contact, that we find the pyrites, galena and other mineral matter, either in mases or scattered through the rock, but generally running in the line of dislocation, as stated by Murray. The pyrites formation in these shales represents some exceedingly interesting phases. The first to attract my attention was a large deposit of gossan, having all the appearance of a bed of iron ore. Running through it was a skeleton work of pyrites, which plainly showed that oxidation had not yet been completed, and that some more centuries had to pass ere this bed was ready for its final resting place and its ultimate form.

This gossan showed the following analyses:

	Per cent.
Sulphur	1.25
Iron	53.06
Silica	3.78
Phosphorus	0.003
Lime	Trace.
Magnesia	Trace.
Alumina	20.00
Loss	18.00

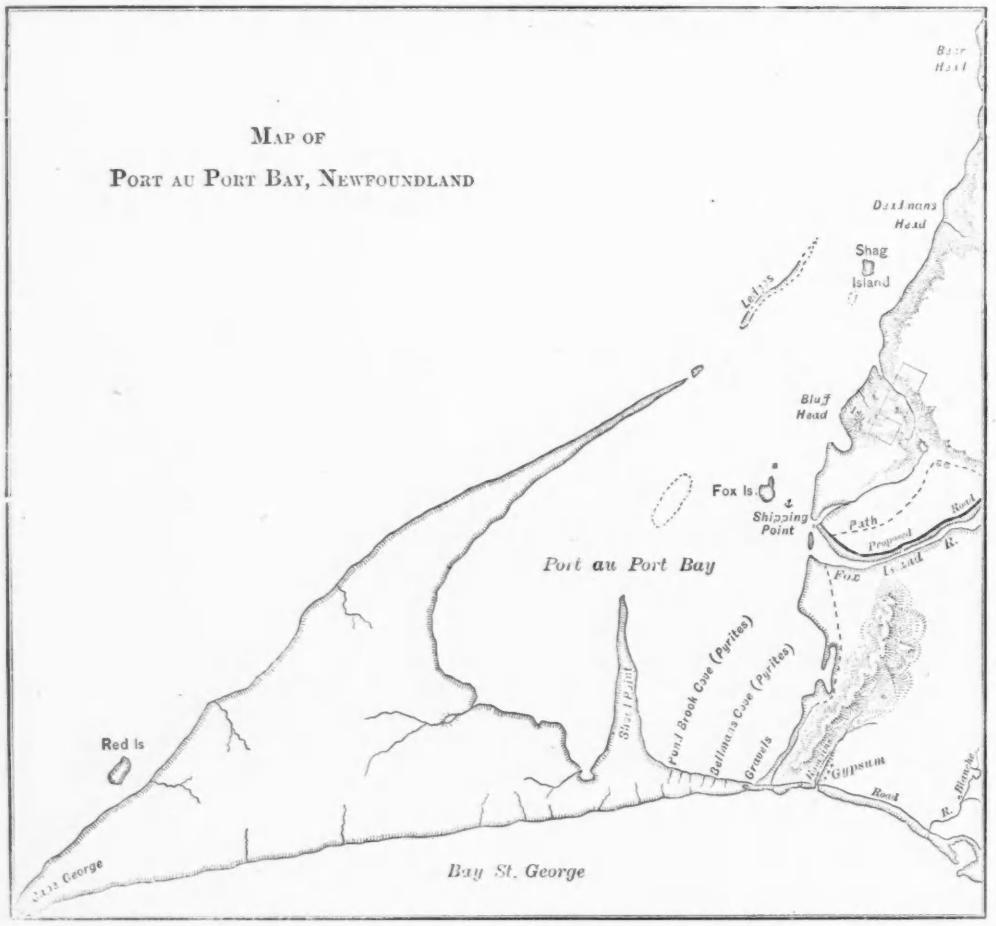
The analysis of the solid pyrites was:

	Per cent.
Sulphur	50.04
Iron	44.26
Silica	2.04
Arsenic	None.
Copper	None.

Here, therefore, was the visible, tangible method of ore formation in one of its phases plainly depicted to us. The process in short is as follows: The metals are all contained in the original magma or mass, as it exists under the earth's crust, being distributed in varying percentages, iron and sulphur having a very wide and general range of distribution.

When an outflow of igneous rock takes place, it is accompanied and followed by a flow of hot water, steam or superheated gases. These having a strong solvent action, especially when in the condition of very high temperature and frequently enormous pressure, both of which increase the solvent action tremendously. They dissolved or absorbed, among other elements, the sulphur, the acidulated waters or fumes in turn dissolved, or combined with, the minerals for which they had the greatest affinity under the existing circumstances, and then spread themselves over the near surrounding regions, dissolving out parts of the wall and contact rocks, and replacing by precipitation portions of their solution. The solutions containing the sulphides of iron, are readily precipitated from carbonated waters or gas, and by organic or carbonaceous matter; we have, therefore, the acidulated water coming in contact with these calcareous shales containing animal and vegetable remains, which directly tended to precipitate the sulphide of iron, and also had these solutions dissolving portions of limestone and being precipitated in place of the dissolved carbonates, a process which at Port Au Port, apparently goes on to-day.

Where the conditions are favorable, the precipitation takes place in large masses, and where un-



*Read at the meeting of the Mining Society of Nova Scotia, Feb. 26, 1902.

favorable precipitation would take place in thin seams, or the solution would force itself through the interstices of the rock, precipitating its contents throughout the whole mass, by replacement. All these forms are plainly visible in the Port Au Port deposits.

After the pyrites had precipitated itself into the larger masses, surface oxidation began to take place, the sulphur was oxidized by the action of air into a sulphate, water percolating through it dissolved it and carried it off, leaving the oxide of iron in its place to form the gossan.

If the process is perfect, but little sulphur remains; if imperfect, we have a skeleton of pyrites running all through, and protected by the oxides of iron from the action of the air, which makes its final dissolution a slow process, unless hastened by erosive or compressive action. At Port au Port we still have the ore in its primary condition in the gossan.

Not a hundred yards away we find the rock impregnated throughout with specks of pyrites. At several points the solvent action has concentrated itself, and in attacking the surrounding rock in force has formed large bodies of solid pyrites, free from impurities in the center of the masses, and gradually grading off into beautiful crystallizations of pyrites and calcite, though the calcite predominates, and finally becomes the solid limestone rock. This crystallization is especially interesting, as indicating the continuation of solvent action at the present time, for in the solid rock we do not find the calcite crystals, showing that there is a strong solvent action going on, which first dissolves the lime, recrystallizes it, then gradually replaces the crystals by pyrites, which are added to constantly, until the whole mass is made solid by the pyrites crystals precipitating themselves over each other into one mass.

The material for this accretion in masses evidently comes from the impregnated pyrites in the main body of the limestone, and my reason for believing them to be of recent origin and in a still formative state, lies in the fact that the gossans are always found at a higher level, thus representing the long finished process, while the pure pyrites lie at lower levels, where they are subjected to the draining action of the surface waters, passing from and over decomposed vegetable matter and then percolating through the mass.

Another exceedingly interesting step in the formation of the minerals is the deposition of what looks like free sulphur, but it is probably a hydrated ferrisulphate. This occurs in a higher level than the gossan, and apparently comes from a mass of similas gossan a short distance from land, along the surface of the cliff, and resulting from percolation through the carboniferous shales, which are heavily brecciated and crushed. All along the side of the cliff we find an incrustation of sulphate on a matrix of ferruginous matte. This was, evidently, a solution of portions of the skeleton of pyrites left in the gossan still going on, which when it reaches the cliff as a sulphate in a sulphuric acid solution, was again oxidized, the oxide of iron precipitated from it, the sulphate formed in a more or less impure form and deposited in these minute crystallizations on the surface; these again were partially oxidized, redissolved, and trickled down the cliff. This process, possibly, is similar to that from which the concretionary pyrites were precipitated.

RECENT DECISIONS AFFECTING THE MINING INDUSTRY.

SPECIALLY REPORTED.

CUSTOM AND USAGE.—The business of a company, so far as a party dealing with its agent has a right to believe, being confined to the manufacture and sale of mining machinery, no custom in any locality where it sent its agent could bind it by his unauthorized act in buying such machinery.—Gates Iron Works v. Denver Engineering Works Company. (67 *Pacific Reporter*, 173); Court of Appeals of Colorado.

ENTRY IN LAND OFFICE PREVENTS RELOCATION WHILE IT STANDS.—After the entry of a mining claim in the land office, a relocation of the premises cannot be made by another so long as that entry stands; and such relocation acquires no rights, of possession or otherwise, which will sustain a suit by him in the courts to compel a conveyance to him of the legal title.—Nelson v. Champaign Mining & Milling Company. (111 *Federal Reporter*, 655); United States Circuit Court, District of Colorado.

RIGHT TO ROYALTIES ON ABANDONMENT.—The measure of damages for breach of a contract by a lessee of a gas well to test it for oil before abandoning it is what the lessor's royalties would have amounted to, where such lessee left it in such condition that it could not be tested, and the failure to test it was not unavoidable, or the lessee left it in a condition in which it could have been tested and the lessor did not know it.—McClay v. Western Pennsylvania Gas Company. (50 *Atlantic Reporter*, 978); Supreme Court of Pennsylvania.

WHAT CONSTITUTED PARTNERSHIP IN MINING MACHINERY.—An owner of a machine and appliances used for boring for gas and oil agreed with another to rent it to him, and to pay one-half of the cost of certain tools, which in the operation of the well were liable to be lost, and the other party was to operate it at his own expense and pay the owner 25 cents per foot for all wells completed. Such owner was also to share equally in any right of development of wells drilled, in case any should be found worth operating. The court held that such an agreement constituted one of partnership between the parties.—Rider v. Hammell (66 *Pacific Reporter*, 1026); Supreme Court of Kansas.

INTENTION AN ELEMENT AS TO ABANDONMENT.—A lessee of a stone quarry who after taking out a large quantity of stone, leaves it with his tools and machinery on the ground, does not in the absence of an intention so to do abandon it, so as to prevent his recovery of the value of same from one who buys it from the lessor and takes it away two years after the stone was quarried, although the lease was forfeited under a provision that in case the quarry was idle for a year and $50 was not paid and the lessee who was attending to business elsewhere had made no claim to it in the meantime.—Russell v. Stratton (50 *Atlantic Reporter*, 975) Supreme Court of Pennsylvania.

ABSTRACTS OF OFFICIAL REPORTS.

Horn Silver Mining Company, Utah.

This company's report covers the year ending December 31, 1901. The financial statement shows receipts as follows: Sales of ore and concentrates, $229,150; surplus from Frisco store, $9,000; net proceeds of smelter at Franklyn, $360; total, $238,510. The expenses were: Mining, $123,865; milling, $29,644; Cave lease royalties, $14,354; general expenses, taxes, etc., $37,823; suspense, taxes, $540; total, $206,226, leaving a net balance of $32,284. To this is to be added $127,164 brought forward from 1900, making a total of $159,448. Dividends paid were $72,000—18 cents per share—leaving a surplus of $87,448 at the close of the year, of which $78,521 was in cash and $8,927 in supplies on hand.

The ore statement shows the following results for the year:

	Tons.	Value per ton.
First class crude ore	6,419	$14.30
First class copper ore	1,448	38.27
First class lease ore	838	24.67
Total shipping ore	$8,705	$18.53
Mill ore	18,587	3.54
Total, crude ore	27,292	$8.39
Concentrates shipped	2,888	23.80

The result of treatment of the milling ore was the concentration of 6.4 tons crude ore into 1 ton of concentrates. The metals produced from the total ore shipped were 504 ounces gold; 277,382 ounces silver; 577,578 pounds copper, and 6,407,969 pounds lead. The fuel used was 2,202 tons coal and 2,184 cords wood. The mine timber used included 406,006 feet and 1,333 poles. The expenses of mining and milling were as follows:

Mining:	Total.	Per ton.
Labor on ore	$42,952	$1.573
Labor on dead-work	26,509	0.971
Labor on surface	22,436	0.823
Supplies, timber, fuel, etc.	31,968	1.171
Total, mining cost	$123,865	$4.538
Concentrating:		
Labor	$16,893	$0.909
Supplies, fuel, etc.	12,751	0.686
Total concentration	$29,644	$1.595

The average costs of concentration are given per ton of crude ore. The cost per ton of concentrates was $10.26.

The total prospecting work done for the year was 2,754 feet, the results being generally favorable. The drifts have been largely run with reference to the faults, and the report of Manager Farnsworth says, of this and other matters: "In referring to the fault planes in the way of explanation, the south fault apparently dips to the north, the center going down nearly directly vertical, the north fault dipping to the south for a long distance, and then, so far as we can determine, dips to the north, which is in the territory covered entirely by the Horn Silver patents. So far as we can determine the great ore bodies of the Horn Silver Mine are formed against these faults, therefore, reference is made to them.

"Through this entire district of country a series of droughts have occurred which have cut off our water supply, and that has reduced the output from the mill, as we were unable to obtain water from any other source, the flow shrinking from 30 to 40 per cent. On the 1,600 level quite a flow of water was encountered which ran for over a year without any apparent shrinkage. Since that time the flow has gradually decreased until now there is not sufficient water to supply the mill. According to the best expert opinions sinking 100 or 200 feet would give us an ample flow of water; however, this is an open question. I am inclined to the opinion that if we did we would get all the water required for handling the ores.

"As the developments progressed during the present year a very large amount of milling ore as well as first class shipping ore has been developed, and every day's work simply develops more ore, so that, even now, we are able to only approximate the tonnage in the Horn Silver Mine. It is not only developing more mill and first class ore, but is increasing the quantity of zinc ores of a grade averaging 40 per cent. The zinc ores are of a most desirable character for concentration, as the lead and silver values apparently go together. The zinc contains from 6 to 9 per cent lead, and from 5 to 8 ounces silver, also from 60 to 80 cents gold, and from 3 to 4½ per cent iron. By concentration, with sufficient water flow, the lead, silver and gold values are easily separated. It is clearly the duty of the company to make further explorations with a view to developing more water. Very many offers have been made for this zinc ore, all of which we have not entertained, as the future value of this product seems to be considerably in excess of anything yet offered. It would appear that the zinc values alone are far in excess of all the dividends paid to the stockholders during the entire history of the mine.

"On December 31 our contracts with the American Smelting and Refining Company for the treatment of ores expired. They are not willing to enter into contract for the output of the mine except on a basis of $1 per ton in excess of last year's treatment charge ($19), saving only an offer for ores from 15 to 20 per cent lead based upon New York prices. Unfortunately this class of ore does not yield sufficient silver and gold values with the lead to pay the treatment charge even at the reduced price. They draw the line at 30 per cent lead. When that is exceeded the treatment charge is advanced $1 per ton in excess of the reduction in the price of lead from $3.90 to $3.50 per 100 pounds, New York quotation. This simply means that we lose from $3.50 to $1.50 per ton as compared with last year's prices. This shuts out 80 or 90 per cent of the out-

put of the mine so far as a shipping proposition is concerned, as the lead ores from 15 to 20 per cent do not contain sufficient silver and gold to pay the excess freight and treatment charge demanded.

"The mill for some time past has not been in operation, owing to a lack of water. Of course, this materially reduces the output. The tonnage in the Horn Silver Mine as developed at this writing is in excess of anything heretofore reported in the history of the mine. There is a large territory partially developed which shows enormous quantities of ore, with a prospect of still larger bodies to be developed both in zinc and lead-silver ores, also copper.

"The net profits from the mercantile business, etc., was $9,762 in all, $9,000 of which will be turned over to the treasurer; the balance, $762, will be used in reducing values of real estate, etc."

Mountain Copper Company, California.

At the annual meeting in London recently Mr. W. Keswick, the chairman, made the following statements on the operations in 1901 and the present condition of the mine: "The accounts show most satisfactory results for the working of the past year. The market price of copper was maintained at a figure so much above the average that we made every effort to produce and market all the copper possible, and we succeeded in selling and delivering over 13,000 tons. The net profits for the year, after writing off considerable amounts, and maintaining the plant generally in thorough efficiency, come to nearly £400,000, and if the dividend we now recommend is approved at this meeting, the total dividends declared to date, together with the sum in the reserve fund, will amount practically to the original capital of the company; very satisfactory results to show in the short period of five years.

"Towards the close of last year some of the timbers, which had necessarily to be left in the upper levels, from which ore had been extracted, caught fire, and unfortunately being winter the water supply was cut off by frosts in the mountains, and the manager was able to do but little to extinguish it until the rains began in the month of February. We have hopes that this fire is practically extinguished, and indeed it, like a previous fire, has not damaged the property, except in so far as it has caused expenditure to be incurred for several new extraction galleries and delayed operations by smoke preventing work in several levels. We have not been obliged, however, to stop smelting operations, as we have had certain stocks of ore on hand, although not sufficient to keep all the furnaces going. We must not, therefore, expect, during the current 12 months so large an output of copper as in the past year. The fire fortunately occurred at a time when it was not of importance to get copper on to the market; the price of the metal, we regret to say, from the beginning of this year having fallen very materially. The decline and the uncertainty when recovery will take place have of course enforced the importance of studying economy in every direction and of introducing methods with this object calculated to cheapen production. At the end of last year a new besse-merizing plant, costing about £30,000, was erected, and it is working satisfactorily and will enable us to convert our matte into bar copper at a considerable saving on our old processes. A further economy will be effected by the introduction of electric motive power in the place of steam, and a contract has been entered into with an electric supply company to transmit and deliver power to the smelting works from water-falls some 45 miles distant, at a much less cost per horse power than formerly. Hot blast stoves have also been added to the smelting plant. Three stoves are for heating the blast before it enters the furnaces, and by this means the percentage of coke used in the furnaces is considerably reduced. Coke, including the cost of delivery at the smelting works, is a very expensive fuel and as very cheap petroleum oil is now obtainable, we use it in the hot blast stoves and effect a considerable saving.

"The important question of ore reserves calls for special remark. It will be within your memory that the company started with ore in the original mass estimated at about 1,340,000 tons, and I can now state further exploration of the ore body, according to an independent expert's report, shows that between 200,000 and 300,000 tons may be added to the original quantity, and I am glad to say of fair quality; and if we deduct the ore already extracted from the mine, we believe we have some 800,000 tons of rich ore left to treat.

"Exploration has been carried on in other parts of the property, but, as we have informed you from time to time, not with such satisfactory results as we could have wished. With diamond drills, numerous bores were made on the mountain side adjoining the original mass and to the north of it, but it was only a few months ago that a fresh body of ore *in situ* under the decomposed outcrops was discovered. The quantity and quality of the ore thus struck could only be ascertained by driving a long adit tunnel, which has only been two or three weeks in the ore, and the first sample taken was of satisfactory quality, although not so rich as the original mass. In the opinion of the experts the quantity may not be very large, yet it is satisfactory to have found new ore, and the manager has now commenced to run galleries and do other exploratory work with a view to defining the size of the ore body and ascertaining its quality. At the moment we do not deem it prudent to attach great importance to the find, but in accordance with our general practice we give the shareholders all the information, favorable, or otherwise, that comes to our knowledge. The ground beyond this point and towards the north end of the property has been partially explored without any satisfactory result, but it has yet to be exhaustively examined, and during this year borings will be continued.

"At the north end of the property an ore body, magnificent as to size, has been gradually developed, and the estimate recently made convinces us that we have in this body over 5,000,000 tons of ore, but unfortunately the greater part of it is, under today's conditions, of too low copper contents to be of much commercial value. At one end of this mass, however, the assays are proving better, and while we hope eventually, through alterations in conditions of which we see prospects, it may become of value, yet, with the uncertainty that exists, your directors, during the life of the rich ore, desire to place the company in a more favorable financial position than it would be were the profits freely distributed without writing down and extinguishing capital. The board, therefore, having taken the best legal advice, have put before you a scheme which they believe will thoroughly safeguard your interests.

"The board thought at first of making the debentures represent only £750,000, and to give shares for £250,000, which until the debentures were paid off should remain tied up and unproductive to the holder. On further consideration, however, and in view of representations made to them, the board have decided to issue debentures to represent the full £1,000,000, bearing interest at the rate of 6 per cent. per annum and arranging that when £750,000 have been paid off the balance of £250,000 shall automatically become shares possessing all the rights of shares as fully as at present.

To meet possible contingencies at that period a permissive power is provided by which instead of substituting a full £1 share for the £1 debenture, the directors have power if they so elect and if approved of by the debenture stockholders to pay in cash, part of their £1, and thus reduce the nominal value of the shares to that extent.

"The legal and other difficulties of paying off capital, when in the form of ordinary shares, is the reason for the scheme, and the board believe that in every respect it is worthy of acceptance. The arrangement, too, has the merit of not preventing the development of the property to its fullest extent, nor does it preclude the acquiring of other valuable properties if such be obtainable on reasonable terms. The same directors and officers who, I venture to think, have given you satisfaction, will continue to manage the property, and we are sanguine enough to hope that in a few years the profits will pay off the debentures and leave the shareholders in possession of a valuable asset."

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.

Hills' Official Manualette. A Directory of Mines. Cripple Creek Series, No. 1. Colorado Springs, Colo.; Fred Hills. Pages, 104, paper cover. Price, 25 cents.

Methodes d'Analyse des Laboratoires d'Aciéries Thomas. By Albert Wencelius. Paris, France; Ch. Beranger. Pages, 120; illustrated. Price (in New York), $1.40.

Canada. Summary Report of the Geological Survey Department for the Calendar Year, 1901. Dr. Robert Bell, Acting Director. Ottawa, Canada; Public Printers. Pages, 270; illustrated.

Las Rhyolitas de Mexico. Segunda Parte. Boletin No. 15. Institute Geologico de Mexico. By Sr. Ezequiel Ordoñez. Mexico; Printing Office of the Secretaria de Fomento. Pages, 80; illustrated.

The Foreign Commerce and Navigation of the United States for the Year Ending June 30, 1901. Volume I. Prepared in the Bureau of Statistics of the Treasury Department; O. P. Austin, Chief of Bureau. Washington; Government Printing Office. Pages, 1,420.

Coal of Michigan. Its Mode of Occurrence and Quality. Part 2, Volume VIII, Geological Survey of Michigan. By Alfred C. Lane, State Geologist. Lansing, Mich.; State Printers. Pages, 232; illustrated.

Arithmetic of Electrical Measurements. By W. R. P. Hobbs; revised by Dr. Richard Wornell. London; Thomas Murby. New York; the D. Van Nostrand Company. Pages, 112; illustrated. Price, 50 cents.

Armature Windings of Direct Current Dynamos. By E. Arnold. Translated from the German by Francis B. DeGress. New York; the D. Van Nostrand Company. Pages, 124; illustrated. Price, $2.

Standard Polyphase Apparatus and Systems. Third Edition. Revised. By Maurice A. Oudin. New York; the D. Van Nostrand Company. London; Sampson Low, Marston & Company, Limited. Pages, 292; illustrated. Price, $3.

BOOKS REVIEWED.

Mining Laws of the Bodie Mining District, California. Compiled from the Original Records, with Addenda. By O. F. Hakes. Bodie, Cal.; printed at Bodie *Miner Index* office. Pages, 44.

This is an interesting monograph, giving what may be called a legal history of the Bodie Mining District in California from 1865 up to the present time. It gives a record of the miners' meeting of the district, with the laws and regulations adopted by those meetings and in force at different dates. These furnish a study which will interest students of the development of mining and local mining regulations, as well as those specially concerned in the district. Appended to the legal record is a brief sketch of the mining districts of Mono County, of which Bodie is the most important.

Fifteenth Annual Report of the Bureau of Industrial and Labor Statistics for the State of Maine. S. W. Matthews, Commissioner. Augusta, Me.; State Printers. Pages, 212; illustrated.

This report gives a variety of interesting statistics with regard to the various industries of Maine. The statistics cover wages, capital invested, value of products and many other points. Maine is not a mining State, and its mineral industries are confined almost entirely to its large and valuable quarries of granite and other building stones, and to the production of lime, for which the district about Rockland has long been famous.

The Economy of Isolated Electric Plants. By Isaac D. Parsons. New York; reprinted from the *Engineering Magazine.* Pamphlet, pages, 32.

This is an interesting discussion of the relative economy of generating electricity in an isolated or special plant, and of obtaining it from a central station supplying a number of different buildings and shops. It applies, of course, chiefly to towns and cities where the central station system can be applied Comparisons of costs between the two systems, drawn from actual experience in a number of buildings of different kinds, are given, the results being tabulated in forms easily understood.

Register of Mines and Minerals of Placer County, California; February, 1902. Prepared under Direction of Lewis E. Aubury, State Mineralogist. San Francisco, Cal.; issued by the State Mining Bureau. Pamphlet, 24 pages; with map.

This is one of the very convenient registers prepared and issued by the California State Mining Bureau. It gives a list of all the mines of every description in Placer County with the addresses, the names of owners or managers, and a condensed account showing the extent of workings, etc. It is accompanied by a brief account of the county and a large map. It is an official directory, which will be of much service to all who are interested in the region.

Geological Survey of Canada. Annual Report of the Section of Mines for 1900. Elfric Drew Ingall, Chief of Section. Ottawa, Canada; Public Printer, Pages, 160; with diagrams.

The principal figures of production in this report were given out some time ago; in fact the preliminary report or summary of production for 1901 was issued early in March. The present volume gives, in addition to the general statements, many details in relation to the different Provinces and their products. In addition to these there are tables of exports and imports, so that the consumption of the Dominion and the sources from which it is supplied can be ascertained. Diagrams showing graphically the course of output of the leading articles, are added. We have heretofore referred to the growing importance of the mineral production of Canada, in many directions. This report gives a very complete statement of the directions in which this growth has taken place. It is a carefully prepared and valuable document.

Deep-Level Mines of the Rand and Their Future Development. By G. A. Denny. London, England; Crosby Lookwood & Son. Pages, 170; illustrated. Price (in New York), $8.75.

In this book the author has taken the commercial or economic rather than the technical view of the possible future development of gold mining in the Transvaal. Of course, it has been necessary to consider many technical questions as to the possibilities of mining at great depths and the probable cost; but these have been taken up as bearing on the investment of capital and the probable returns, rather than on account of their importance in themselves. The author considers very carefully the different elements entering into the problem of the future for the Witwatersrand mines—the capital required, the time needed to sink shafts, the number of claims which should be included, the probable grade of the ore, the effect of faults, etc., and other points. His conclusions are generally favorable to the extension of mining to depths of 5,000 or 6,000 feet, provided the work is undertaken by companies having sufficient capital and controlling areas sufficiently large to allow operations to be conducted on a scale which will permit the operation of large mills. The probable grade of the ore on these lower levels will make it necessary to work large quantities in order to give an adequate return for the investment. Under proper management there will be opportunities for profit, but close work will be required to pay satisfactory dividends when the first cost of sinking to the 5,000 or 6,000-foot levels is considered.

The book is the result of careful work and deserves reading by all who are interested in the question of the future of the Transvaal. Its conclusions agree very rarely with those of others who have written or spoken on the subject, and the author has given his reasons so fully that the reader can form his own opinion from the data supplied.

Report on the Iron Ore Deposits along the Kingston & Pembroke Railway in Eastern Ontario. Prepared for the Geological Survey of Canada by Elfric Drew Ingall, M.E. Ottawa, Canada; Public Printer. Pages, 92; with maps and illustrations. Price, 25 cents.

This report covers several years' field work done in the section of Eastern Ontario north of Kingston, in which are located a number of iron ore deposits of possible importance. Several mines have been opened in this district, and some of them have had a considerable production. The ores include magnetites and hematites, and where mined have generally been of good quantity; and it is possible that a large supply may be drawn from them hereafter.

Upon the whole the district is an interesting one. It covers an area of about 1,600 square miles, and along its length of about 70 miles, it is traversed by the Kingston & Pembroke Railway, which is connected by short spur lines, with the more important mines. Crossing it and connecting with the above, are the Bay of Quinte railway system, and the main line of the Canadian Pacific between Montreal and Toronto. The Brockville, Westport & Sault Ste. Marie Railway, would also connect with Kingston, either by means of the waters of the Rideau Canal at Newboro', or by the all-rail route through Brockville. Furthermore the navigable waters of the Rideau Canal and all its ramifications through the series of connecting lakes give water connection to many points in the district. Transport of ores from these points and of material to them can thus be effected by scows and small tugs. Steamers of moderate draft ply regularly on the main channel of the canal during the summer months.

The report gives detailed accounts of the mines opened and of a number of areas prospected. It is illustrated by several maps, and by a number of geological sections.

Electric Power Transmission. A Practical Treatise for Practical Men. Third Edition; Revised and Enlarged. By Louis Bell, Ph.D. New York; the *Electrical World and Engineer.* Pages, 632; illustrated, Price, $3.

The first edition of this work was issued four years ago, and the rapid progress made in electrical work is shown by the fact that it has been necessary now to rewrite a considerable part of it, and to make many additions, both to text and illustration. It is now fully up to date, so far as electrical practice is concerned, and describes the latest methods and apparatus very fully. It would have been well, perhaps, to revise further the chapter on engines and boilers, in which some rather old data are given; and the addition of a chapter on the work done with gas engines in electric plants would have been of service. As it is the gas engine is dismissed in a few paragraphs, leaving it to be inferred that the use of engines of this kind is limited chiefly to those of small size, and that large gas engines are still in the experimental stage.

Aside from this the book is an excellent and practical one. It will be of much servie not only to electrical engineers but to the large class of people who are now or may become interested in power transmission plants. For the benefit of the latter as much abstract matter—including formulas and mathematical calculations—has been omitted as possible, and the explanations given are generally clear and simple. The apparatus described is intended to be typical of the methods used, and the descriptions are plain and for the most part sufficiently well illustrated.

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. Preferences will, of course, always be given to questions submitted by subscribers.

Copper Mines.—Will you kindly inform me where I can get information as to the location of the best paying copper mines in the United States, Canada and Mexico? Also maps and similar information?—F. W. T.

Answer.—You can obtain information as to the location, production and importance of mines from *The Mineral Industry,* Volume IX., or from Stevens' *Copper Handbook.* To procure maps is more difficult. Some of the maps issued by the United States Geological Survey include the important copper districts. The Geological Survey of Canada has also issued a number of maps showing the leading mining districts. The Secretaria de Fomento of Mexico has published an outline map of the country, showing the location of mines, but there are few or no geological maps of Mexico available.

Gypsum.—A gypsum is described by a reputable analyst as 80 per cent. sulphate of lime and 20 per cent water; in other words, pure gypsum. Is it a good and marketable article? What are the ingredients of the best American gypsum?—M. J. S.

Answer.—The gypsum you describe is certainly pure gypsum and ought to be good if it is sufficiently free from mechanical impurities to be mined and shipped without too much expense for freeing it from such impurities—gangue, rock, etc. As to the question of marketing it, that depends on the extent and location of the deposit, facilities of transportation, etc.

The best American gypsum is such as you describe in your analysis; a hydrous sulphate of lime, contaning about 20 per cent of water. The best gypsum is white; that is, free from impurities. With the mixture of other ingredients the color varies from white to gray, brown, red, yellow, etc. The worst impurity is oxide of iron, as it stains the material so deeply that it cannot be used in making plaster.

Consult *The Mineral Industry,* Volumes IV. and VII., where you will find interesting articles on gypsum, its uses and its preparation for market.

Prices of Silver.—Can you give the highest and lowest prices of silver from 1890 up to the present time?—G. B. L.

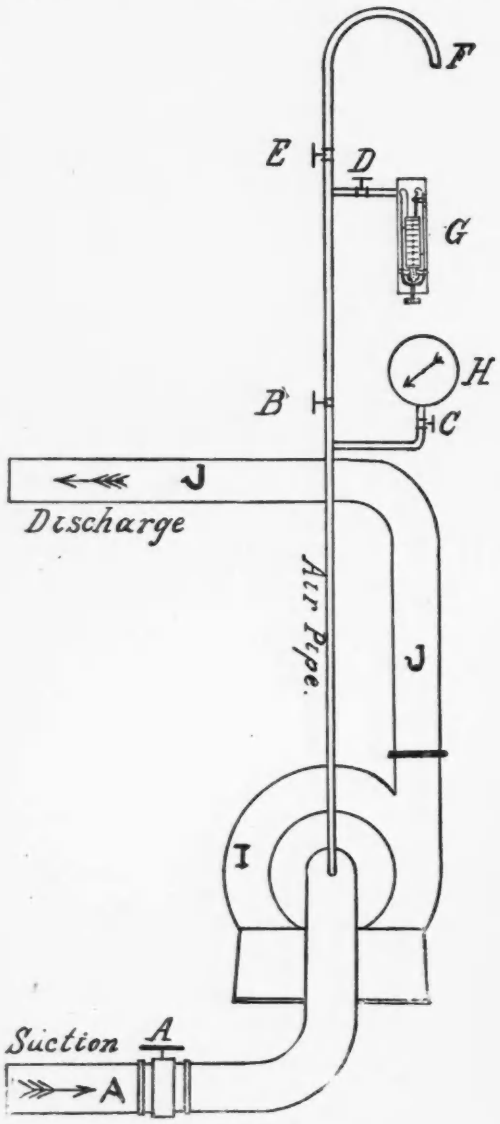
Answer.—In 1890 the average price of fine silver per troy ounce in New York was 104.6 cents; in 1891 it was 98.8 cents. In 1892 it had fallen to 87.6 cents, and in 1893 to 78.2 cents. From 1893 up to date the prices are given in the table below, taking monthly averages as being a fairer expression of the market than single quotations. The prices, as above, are in cents per troy ounce for fine or pure silver in New York:

	Highest.	Lowest.	Average for year.
1894.....	66.63 Jan.	59.49 March	63.00
1895.....	67.64 Oct.	59.69 Jan.	65.28
1896.....	68.75 July.	64.98 Nov.	67.06
1897.....	64.79 Jan.	54.19 Aug.	59.79
1898.....	60.60 Nov.	54.90 March	58.26
1899.....	61.23 May.	58.67 Nov.	59.58
1900.....	64.14 Dec.	59.30 Jan.	61.33
1901.....	62.82 Jan.	55.10 Dec.	58.95

The monthly averages thus far this year have been: January, 55.56 cents; February, 55.09 cents; March,

54.23 cents. The highest daily quotation this year has been 55.875 cents on January 10; the lowest, 50.5 cents, on April 21. It will be seen that while the fall from 1890 to 1894 was 41.6 cents an ounce from 1894 to 1901, inclusive, the extreme variation in the yearly averages was 8.80 cents; while the difference between the years 1894 and 1901 was only 4.05 cents.

Titaniferous Iron Ore.—Will you kindly let me know whether phosphorus and titanium are of value in iron ore? If a magnetic iron ore is of low grade what percentage of titanium is required to make it a paying ore? The reason I ask is that I have a deposit of such ore and a manager of an iron plant has told me that titanium is a very undesirable element in iron ore; but I think he has an object in depreciating the value.—W. A. M.



BEGEER'S CYANIDE PROCESS.

Answer.—Your informant is correct in his statement that titanium is generally considered an undesirable element in iron ore. An ore low in iron and high in titanium and phosphorus has no commercial value. An increase in the percentage of titanium would decrease the value of the ore, instead of making it a paying ore.

Scheelite in New Zealand.—I have a 4-foot quartz lode, found by me last month, that, in addition to about 0.65 ounces of gold per ton, carries some 33 to 25 per cent of scheelite, and it would be quite possible to grade this ore up to 70 or 75 per cent of scheelite, which again, on assays, yields 78 to 81 per cent of tungstic acid. Can you tell me who buys scheelite, and its price, say, in Wellington, New Zealand, for the United States? And in addition to the scheelite in my ore, would I be allowed anything for the free gold? And, if not, would it millitate against the sale of my ore in the United States were it passed first through the battery mortar box and over copper plates to save the free gold? This scheelite ore would be almost clear of gangue, as it would be saved on concentrators. I may add that the ore can be delivered on steamers at Wellington, in bags.—J. P. W.

Answer.—We are informed by parties who use tungsten ores that the proposed treatment by stamping and passing over copper plates to save the free gold, would not probably impair the value of the scheelite as a tungsten ore. There is, however, no demand for scheelite here as other ores of tungsten are preferred by the buyers. It would not pay to ship the ore from New Zealand to the United States, as there is already more tungsten ore to be had here than can be used; in fact, there is an over-supply. There is some demand for scheelite in Germany and Great Britain, and you could possibly find some market for your ore there.

We might suggest the names of J. Kempner, 20 Flinsburger strasse, Berlin, N. W. Germany; E. de Haen, List, near Hannover, Germany; George G. Blackwell, Sons & Company, Limited, the Albany, Liverpool, England; Everett & Co., Liverpool; the Tungsten & Rare Metals Company, 91 Blackfrairs Road, London, S. E. England.

BEGEER'S IMPROVED CYANIDE PROCESS.

The rapid and successful application of cyanide in the treatment of gold ores, has been followed by numerous suggestions by the way of improvements on the simple filtration process.

Mention has already been made of a pneumatic process by which the pulp in the tanks is agitated by air currents forced upward, through the mixture of ore and cyanide solution, from below.

Attention has recently been directed to another modification or improvement on the early methods, in the form of a simple mechanical appliance by which the solution of cyanide is aerated or supplied with an excess of oxygen before it enters the leaching tanks. This appliance is the invention of Mr. Bastiaan Willem Begeer, of Florence, Colo. The chemical formula on which Mr. Begeer bases his claims, that oxygen is positively needed to secure a solution of the gold is stated as follows:

$$2Au+4KCN+O+H_2O=2AuKC_2N_2+2KOH.$$

It is in order that the solution should be assured of an abundant supply of oxygen that the inventor has designed an ingenious combination of an ordinary rotary pump, with an aerating tube, in such a manner that any solution passing through the rotary pump I from supply tube A shall be aerated through a smaller pipe F, which latter pipe is fitted with proper supply and check valves, E and B, together with gauge H.

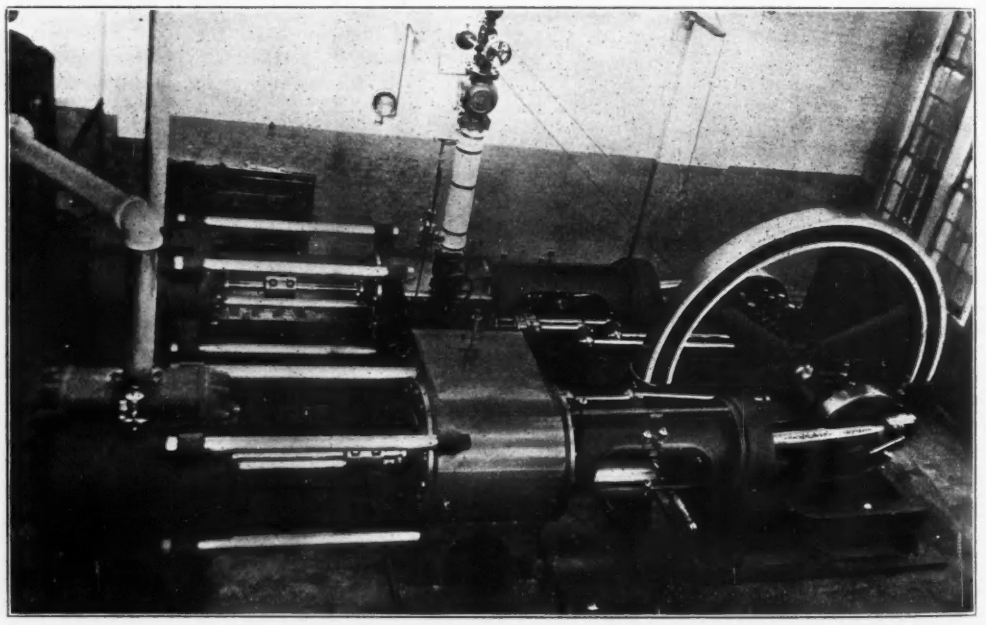
The result of this operation, when concluded as described is to take from the bottom of the tank, through suction pipe A, the normal solution, which is returned to the same tank, through discharge pipe J, the returned solution, however, having received an excess of air or oxygen, by means of the supply pipe F, which passes through the pump.

It is furthermore claimed that by continuation of this pumping process, until the whole solution has passed through the aerating pump at least three times, it will have become saturated with oxygen. In this condition it is drawn off into the ordinary filtration tanks.

Reliable testimony seems to indicate the superiority of this aerated solution over the ordinary normal one, and it is on the establishment of this fact that the future success of the process appears to depend.

FRANKLIN AIR COMPRESSOR.

The accompanying illustration represents a Class D. S. C. air compressor having duplex steam cylinders and two stage air cylinders, with inter-cooler, built by the Franklin Air Compressor Works of the Chicago Pneumatic Tool Company, with offices in Chicago and New York and which has been installed in the Brooks plant of the American Locomotive Company at Dunkirk, N. Y. This compressor has steam cylinders 20 inches in diameter with 24 inch stroke, low pressure air cylinder 27 inches in diameter with 24-inch stroke, and high pressure air cylinder 16½ inches in diameter with 24-inch stroke, representing a piston displacement of 1,580 cubic feet of free air per minute at a working speed of 100 revolutions. The illustration herewith presented



FRANKLIN AIR COMPRESSOR.

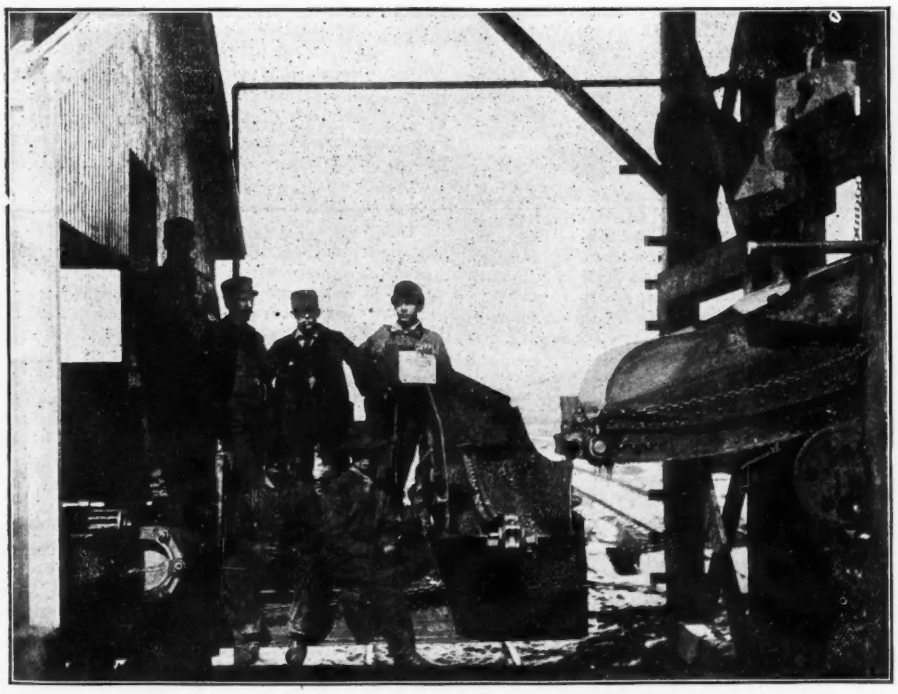
is the first of this type of machine that has appeared. The manufacturers state that the compressor has demonstrated, under test, one of the most efficient performances ever attained by a compressor of this type and capacity. Similar compressors have recently been installed at the shops of the New York Central & Hudson River Railroad Company, at Depew, N. Y.; Lake Shore & Michigan Southern Railway Company, at Collinwood, Ohio; New York, New Haven & Hartford Railroad Company, at New Haven, Conn.; Delaware, Lackawanna & Western Railroad Company, at Kingsland, N. J.; Terre Haute & Indianapolis Railroad Company, at Terre Haute, Ind.; Norfolk & Western Railroad Company, at Roanoke, Va.; Erie Basin Dry Dock Company, Brooklyn, N. Y.; United States Navy Yard, Boston, Mass. (three machines). The manufacturers build this type of compressor in a number of sizes and also duplex and single types, both steam and belt driven.

FURTHER EXTENSION OF WESTINGHOUSE WORKS.

The Westinghouse Electric and Manufacturing Company will begin immediately the construction of new buildings at East Pittsburg, which will greatly increase the size of its works. The new buildings will be known as the East Extension. The plans for them were made two years ago, when it was seen that the natural development of this company's business would, about this time, make the additions necessary. The plans require the building of a river wall along the banks of Turtle Creek from a point near Turtle Creek station to Brinton station, below the works of the Westinghouse Machine Company. Arrangements have been entered into with the Pennsylvania Railroad whereby a special railroad line will be built from East Pittsburg to the new Westinghouse foundries which are now being established at the town of Stewart, several miles to the East. This railroad will be built for the exclusive use of the Westinghouse companies. The construction of this large undertaking has been entrusted to James Stewart & Company, of Pittsburg, St. Louis and New Orleans, whose achievements in erecting, in record time, the new Westinghouse electric works at Manchester, England, have attracted general attention in the English and American press.

SILICON IN CAST IRON.—M. P. Lebeau confirms in *Comptes Rendus*, December 9, 1901, the investigations of Osmond, Troost, and Hautefeuille, Le Chatelier, Carnot, Goutal, Stead, and others, upon the state in which silicon is present in cast iron and in poor ferrosilicons. $SiFe_2$ crystallized in the electric furnace is unattacked by NHO_3, but when powdered it rapidly decays, iron being liberated, and each grain of material becomes surrounded by a layer of opalescent silica. It is, therefore, impossible to admit of the presence of free $SiFe_2$ in cast iron except when in quantities beyond that necessary to saturate the iron about its solidification point.

This explains why the $SiFe_2$ is not found in the residues of chemical attacks by ordinary reagents, although $SiFe_2$ must exist in the cast iron since it does not dissociate either in molten silver or at 1000° in the electric furnace. On the contrary, the compound SiFe heated in silver dissociates according to the equation $2(SiFe) = SiFe_2 + Si$. Neither Si_2Fe nor SiFe can exist in cast iron; the compound Si_2Fe can only be formed in presence of an excess of silicon and SiFe is impossible in connection with an excess of free iron.



OTTUMWA BOX CAR LOADER.

GOLD MINING IN URUGUAY.

Statistics have been forwarded to the State Department by the Department of the Interior of Uruguay in relation to the mining of gold for the past three years. The work has been carried on almost wholly by a French company, and the results are:

The mines in Rivera produced 5,119 tons of ore in 1899, yielding in gold 61.336 kilograms. In 1900, 7,345 tons of mineral quartz were worked, producing 71.234 kilograms of gold.

In 1901, 6,183 tons were worked, yielding 71.946 kilograms gold. The cyanide process is now adopted, and better results are obtained than before. The mines are all small—mostly surface work—and assays made from twelve workings range from 6.75 grams to 30.79 grams—$4.50 to $20.50—per ton. During 1901, 25 new applications for mining privileges were filed, all in other departments (Cerro Largo, Minas, Maldonado, Canelones, and Florida). Lack of water is complained of. The Government gets a percentage on all gold produced.

THE OTTUMWA BOX CAR LOADER AT CUMBERLAND, WYO.

The accompanying cuts show very clearly the Ottumwa box car loader as it appears at the No. 2 Mine of the Union Pacific Coal Company, Cumberland, Wyo., and also the conveyor apparatus erected and installed by the Ottumwa Box Car Loader Company to receive and deliver the coal directly after it leaves the screens.

OTTUMWA COAL CONVEYOR.

The problem at this mine was with the large dump of coal at one time, and the distance necessary for it to be carried to reach the box cars. The Ottumwa Box Car Loader Company has solved the problem. With this conveyor in connection with the loader one man is able to operate both, and load from 125 to 140 tons per hour. It is stated that on a test run a 22½-ton car was loaded in 5 minutes including the time necessary for putting the loader and conveyor in place in the car, and removing the same after the car was loaded. The placing of the conveyor in position in the car is done with a steam cylinder which can be seen in the cut above the conveyor.

This job was a successful piece of work, and one that a good many coal operators similarly situated would be interested in investigating. The loader can be used at all mines under almost any conditions. The Union Pacific Coal Company now has 7 of the Ottumwa loaders in operation at the different mines in Wyoming.

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 April 15, 1902.

697,465. PROCESS OF MAKING CAUSTIC ALKALI.—Hans A. Frasch, New York, N. Y. An improvement in the process of making alkali, which consists in absorbing ammonia in a solution of a salt of an alkali, and adding thereto an oxide of a metal capable of reacting with the ammonia and producing the alkali.

697,505. ROCK-PULVERIZER.—Harry Luckenbach, Seattle, Wash., assignor of one-half to James A. Elwell, Seattle, Wash. A central chamber, wing-compartments, oppositely-disposed nozzles discharging the contents of the wing-compartments into the central chamber, each of said wing-compartments having an opening above the nozzle and a pocket beneath the nozzle, and covers for the openings provided with perforations in their upper parts.

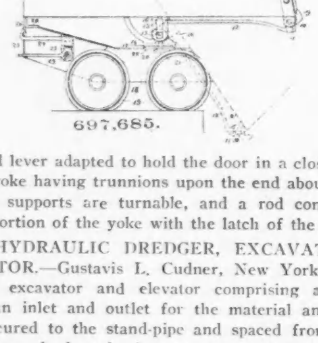
697,544. ALLOY.—Walter Rubel, Ludwigsburg, Germany.

An alloy composed of aluminum and phosphorus containing from 4 to 7 per cent of phosphorus.

697,632. WOOD-PRESERVING COMPOUND.—Carl Kleinschmidt, Seattle, Wash., assignor to Emma Maria Kleinschmidt, Seattle, Wash. A wood-preserving compound composed of blue vitriol, sulphate of iron, cyanide of potassium, sulphuric acid, prussic acid, and refined petroleum.

697,638. PROCESS OF DRAWING MOLTEN METAL FROM RECEPTACLES.—Luther Lincoln, Boston, Mass., assignor of one-half to Charles S. Gooding, Boston, Mass. A process of drawing molten metal from a receptacle which consists in collecting the molten metal in a suitable receptacle; creating a superatmospheric air-pressure upon the surface of said molten mass, thereby maintaining it at a level below its normal level and forcing a portion of the molten metal into a second receptacle to a level higher than its normal level in said first-named receptacle, then tapping said molten mass in said second receptacle at a point above its normal level in said first-named receptacle, and finally creating a superatmospheric air-pressure upon the surface of the molten metal in said second receptacle.

697,685. AUTOMATIC-DUMPING ORE-CAR.—Charles H. Snow, San Francisco, Cal. The combination with a car-body having a hinged swinging gate or door and a truck upon which the body is tiltably mounted, of a fulcrumed



697,685.

latch and lever adapted to hold the door in a closed position, a fixed yoke having trunnions upon the end about which the car-body supports are turnable, and a rod connecting the arched portion of the yoke with the latch of the door.

697,704. HYDRAULIC DREDGER, EXCAVATOR, AND ELEVATOR.—Gustavis L. Cudner, New York, N. Y. A dredger, excavator and elevator comprising a stand-pipe having an inlet and outlet for the material and a nozzle-chest secured to the stand-pipe and spaced from the inlet, the said nozzle-chest having opposite projected nozz'es arranged to direct jets into the material and into the stand-pipe for disintegrating the material, drawing it into the stand-pipe and elevating it.

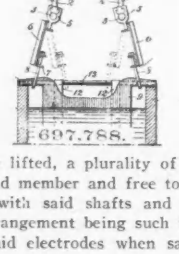
697,731. PROCESS OF MAKING LITHOPONE.—Iens P. Lihme, Cleveland, Ohio, assignor to the Grasselli Chemical Company, Cleveland, Ohio, a corporation of Ohio. A process for preparing from solution, lithopone of various grades and a soluble commercial by-product preferably of sodium, which consists in preparing separate solutions of zinc sulphate and barium sulphide, which solutions are mixed with each other and with that of a third salt adapted to enter into combination with a freed acid group from the first-named salts, the same being brought together in equivalent and calculated amounts to produce and precipitate lithopone of the desired percentage, and leave in solution the soluble by-product.

697,740. BESSEMER-STEEL PLANT.—Charles H. McCullough, Jr., and Leonhard C. B. Holmboe, Chicago, Ill. The combination of a plurality of converter vessels, arranged in groups, receiving-cranes each operative with a group of the converter vessels, and casting-cranes, one for each receiving-crane and co-operative therewith and having their pivotal masts or posts at different fixed distances from the pivotal posts of the receiving-cranes with which they co-operate for the pouring-cranes to pour at different points in relation to the converter vessels.

697,769. CASTING APPARATUS.—Alfred M. Acklin, Pittsburg, Pa. The combination with a traveling carrier, provided with a series of molds, and a furnace, of a means for conducting molten metal from the furnace to said molds, continuously and at constant or regulated speed, comprising a trough interposed between said carrier and furnace and normally so related thereto as to constitute a stationary guide for conducting metal from the furnace to the molds approximately without intermission in the flow thereof, said trough having its forward end in communication with the furnace-spout so as to receive metal therefrom and constructed and arranged to discharge continuously into said molds, and, being constructed, rearward of its said metal receiving and discharging end, to form a reservoir for the accumulation therein of excess metal under abnormal conditions, and means for adjusting said trough so as to cause the metal to be conducted to the molds as rapidly as it flows from the furnace, or cause a regulated portion of the metal to be diverted from the discharge end of the trough and be detained in said reservoir, or to cause metal in the reservoir to flow into said discharge end.

697,774. APPARATUS FOR ASSAYING ORES.—William T. Armstrong, San Jose, Cal. The combination in an apparatus for assaying ores, of a receptacle having a suitable closure, and an ore-containing envelop or cupel of fibrous material adapted to be inserted into said receptable whereby the ore is prevented from coming in contact with the sides of said receptac'e during the process of reduction.

697,788. METALLURGICAL CRANE.—David W. Blair, Perth Amboy, N. J., assignor of one-half to James C. McCoy, Perth Amboy, N. J. A metallurgical crane, comprising a member to be disposed over a metallurgical bath



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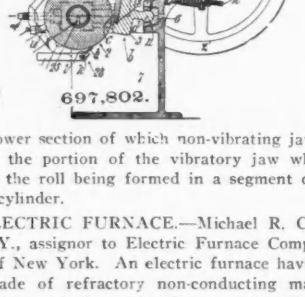
and adapted to be lifted, a plurality of longitudinal shafts connected with said member and free to shift endwise, and hooks connected with said shafts and adapted to engage electrodes, the arrangement being such that said hooks are free to engage said electrodes when said shaft is shifted endwise.

697,789. GAS-GENERATOR FOR GAS-ENGINES.—George W. Bonds, Fresno, Cal. In a gas-generator, a heating-plate having a continuous passage formed on the surface thereof, a plurality of outlets from said passage, all located adjacent to one edge of the heating-plate, and means for controlling said outlets.

697,802. ORE-CRUSHER.—Albert C. Calkins, Los Angeles, Cal., assignor to Frederick William Braun, Los Angeles, Cal. A crusher comprising a vibratory jaw which vibrates in an approximately horizontal arc; and a non-vibrating



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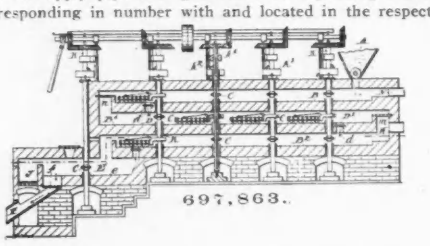
jaw, the lower section of which non-vibrating jaw is formed of a roll; the portion of the vibratory jaw which is contiguous to the roll being formed in a segment of the outer face of a cylinder.

697,810. ELECTRIC FURNACE.—Michael R. Conley, New York, N. Y., assignor to Electric Furnace Company, a corporation of New York. An electric furnace having its body portion made of refractory non-conducting materials and formed with a main inner chamber, a neck at the bottom of said inner chamber, a hearth below the neck, a heating zone forming substantially the wall of the neck and made up of a series of plates or parts adapted to be heated to incandescence by the passage of an electric current through them, and a second heating zone in the hearth formed also of plates or parts which are adapted to be substantially flush with the furnace-wall and incandesce under the influence of a strong electric current.

697,831. METHOD OF RECOVERING METALS BY ELECTROLYSIS.—Hans A. Frasch, Hamilton, Canada. A process of recovering metals by electrolysis, which consists in electrolyzing a double salt of ammonia and metals whose hydroxids are soluble in ammonia, in presence of a soluble anode and an anode electrolyte (anolyte) containing metals different from the one contained in the cathode electrolyte (catholyte) but free from ammonia.

697,842. DYNAMITE DETONATING-CAP.—Archie B. Hoover, Paola, Kan. A cap for cartridges having a plurality of tangs formed about the edge of its open end, some of said tangs being bent to extend inwardly upon the interior of the cap and others bent to extend upon the exterior of the cap.

697,863. ORE-ROASTING FURNACE.—Thomas D. Merton, Spottiswoode, Victoria, Australia. In an ore-roasting furnace, a plurality of superposed communicating hearths, a series of hollow vertical shafts passing through the hearths, a water-supply pipe having a series of depending branches corresponding in number with and located in the respective



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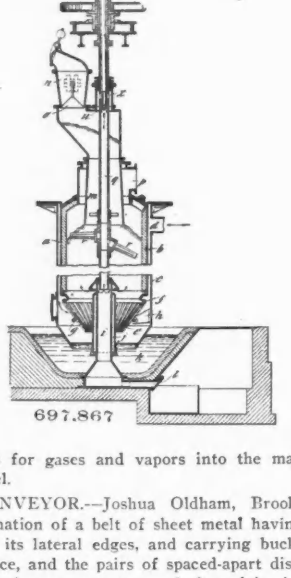
shafts, a driving-shaft common to all and operatively connected with said shafts, arms extending radially from said shafts, means for connecting the arms rigidly yet removably to said shafts, bars connected to said arms, rabbling-shoes detachably depending from said bars, notched lugs extending from said arms, and stay-rods connected to said bars and having eyes to engage the notched lugs.

697,867. GAS-PRODUCER.—Ludwig Mond, Regents Park, London, England. In combination with a cylindrical gas-producer having at the top a bell containing raw fuel and at the bottom a grate in the form of an inverted truncated cone, a central hollow rotative shaft carrying agitating-arms, having at the top of the bell lateral inlets for gases and vapors, a steam-injector within it, and having at its lower



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end outlets for gases and vapors into the mass of incandescent fuel.

697,874. CONVEYOR.—Joshua Oldham, Brooklyn, N. Y. The combination of a belt of sheet metal having notches or recesses in its lateral edges, and carrying buckets upon its outer surface, and the pairs of spaced-apart disks, each pair being secured upon a common shaft and having peripheral teeth engaging said notches of said belt.

697,909. APPARATUS FOR COATING METAL PLATES.—John H. Williams, Abertillery, England. Apparatus for coating tin, terne and like plates, comprising a coating-bath, oppositely-movable plate-carriers mounted therein and means whereby said plate-carriers may be caused to travel forward and backward alternately from the receiving end to the delivery end of the bath, and from the delivery end to the receiving end, and to pass each other in transit.

697,931. METHOD OF MAKING GAS-PURIFYING AGENTS.—Henry S. Blackmore, Mount Vernon, N. Y. A process of making a composition for use in purifying gas which consists in exposing dense or vitreous iron ore to the action of metallic oxide and water capable of liberating heat in the mixture by chemical reaction.

697,954. RECEPTACLE OR TANK.—Robert P. Stewart, Paris, Tex., assignor of one-half to William E. Hogue, Paris, Tex. A method of producing an underground receptacle which consists in first applying a layer of hot asphaltum to the surface of a tank and permitting said layer to stand until it becomes partially set and adhesive, next applying a layer of tarred-felt paper to the asphaltum layer under sufficient pressure to effect an adhesive union therewith, and finally applying to the surface of the tarred-felt paper a second layer of hot asphaltum and permitting the same to set.

GREAT BRITAIN.

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

Week Ending March 27, 1902.

21,623 of 1900. SULPHIDE TREATMENT.—H. W. Wallis, London. Reducing metals from mixed sulphides by roasting with lime and then separating the metallic particles on vanners.

5,800 of 1901. MINE HOISTING CAGE.—D. Davy, Sheffield. Improvements in the inventor's appliance for raising and lowering cages in mines, to allow the cages to be at rest during loading and unloading, though the winding machinery is not stopped.

5,265 of 1901. CYANIDE PLANT.—J. F. Webb, J. E. Lilley and J. Chapman, London. Improvement in barrel cyaniding plant, the barrel being suspended from ropes which rotate it, and electric current passed through, the cathode being in contact with mercury in a trough outside the barrel.

8,257 of 1901. FURNACE FOR REFINING CYANIDE.—Stassfurter Chemische Fabrik, Stassfurt, Germany. A shaft furnace heated externally for refining potassium cyanide, a filter diaphragm being arranged at the bottom to catch the impurities.

9,011 of 1901. ELECTRO DEPOSITION OF METALS.—R. D. Sanders, London. Improvements in the method of electro depositing metals on coils of wire rotating in electrolytes with the object of preventing the coils running together.

26,569 of 1901. ROCK DRILL.—H. Leineweber, Chicago, U. S. A. Improvements in mechanism of rock drills where the reciprocating hammer acting on the drill is actuated by air steam pressure, and the drill rotated by the same means.

26,667 of 1901. SLIMES TREATMENT.—H. Duncan and P. R. Sheriff, Glasgow. A method of treating slimes by drawing the solution carrying the gold through a traveling band by means of a vacuum.

898 of 1902. BLAST FURNACE.—T. Stapf, Ternitz, Austria. A blast furnace having two outlets for iron and slag respectively, for discharging continuously.

PERSONALS.

Mr. H. W. Whedon, of Arivaca, Ariz., visited Gilpin County, Colo., last week.

Mr. R. B. Park, of Cleveland, O., is now assayer at the Gold Bug Mine, at Georgetown, Colo.

Mr. H. T. Tripp is now superintendent of the Sumdum Mining Company at Sumdum, Alaska.

Mr. S. T. Morgan, president of the Virginia-Carolina Chemical Company, is in Europe on business.

Mr. S. C. McClure has been appointed superintendent of the Elgin Gold Mine at Rochester, Mont.

Mr. Samuel Brady, of Rockland, Mich., recently visited the Empire gold mine at Marysville, Mont.

Ex-Senator Charles J. Hartman, of Montana, visited the Michigan copper district a short time ago.

Capt. Thomas Hoatson, of Calumet, Mich., recently returned from a visit to the mines near Butte, Mont.

Mr. H. S. Clark, of the Cherokee Zinc Company, of Kansas, is looking over the Leadville mining field.

Mr. C. S. Thompson has been appointed superintendent of the Corsair Mining Company at Creede, Colo.

Mr. John Stanton, of New York City, recently visited the Mohawk Mine in the Lake Superior copper district.

Mr. D. H. Allen, of Central City, Colo., has gone to Lead and Rapid City, S. Dak., to inspect smelters at those places.

Messrs. E. S. Moulton and John A. Emery, of Boston, Mass., are at Central City, Colo., to attend to mining and milling business.

Mr. J. C. Maben and other directors of the Sloss-Sheffield Steel and Iron Company are in the Birmingham, Ala., District this week.

Mr. T. Moffett, of Butte, Mont., has been appointed manager of the Oregon Monarch Gold Mining Company, at Sumpter, Ore.

Mr. A. E. Clauser, of Toledo, O., one of the principal stockholders in the Two Republics Mine, at Parral, Mex., is visiting the property.

Mr. E. G. Spilsbury, a well-known mining engineer, is in Germany inspecting potash salt mines for the Virginia-Carolina Chemical Company.

Mr. A. C. Luck, manager of the Maguariche Mines at Minaca, State of Chihuahua, Mex., returned there recently from a trip to San Francisco, Cal.

Mr. J. E. Lawrence, consulting engineer for the Sonora Development Company, of Montezuma, Sonora, Mex., has been sojourning at Los Angeles, Cal.

Mr. Seeley W. Mudd, manager of the Small Hopes combination at Leadville, Colo., has just returned home from a much-needed vacation in California.

Mr. J. G. Hopkins, a director of the Arizona Copper Company, has returned to his home in Virginia, after visiting the company's mines at Clifton, Ariz.

Mr. M. B. Shannon has been appointed Southern sales agent of the Missouri Pacific Coal Companies at Dallas, Tex., vice Mr. W. D. Puterbaugh, resigned.

Mr. B. Follett, a pioneer mining man and ore buyer at Leadville, Colo., has retired from the mining business and will go to his ranch near Steamboat Springs.

Mr. S. J. Sullivan, of Leadville, Colo., has returned from a 6 weeks' stay in Mexico, where he has taken an interest in the El Potosi combination, near Chihuahua.

Mayor J. F. McDonald, of Leadville, Colo., one of the heaviest mining operators in the Leadville District, has returned from a 2 months' tour through California.

Mr. J. L. Mitchell, of the Keystone Gold and Copper Company, operating near Central City, Colo., is making a visit to the head office of the company in Cozad, Neb.

Prof. Wm. P. Blake, of the Arizona School of Mines at Tucson, Ariz., has just completed a thorough investigation of the mines at Tombstone, which are now being re-opened.

Mr. L. W. Tatum, after completing his professional work in Arizona, passed through Denver recently on his way East. He stopped at Joplin, Mo., on his way to Chicago.

Messrs. Friederich Fuchs and G. H. Nicholaus, of the German State Railways, are now in this country for the purpose of inspecting American locomotive and machine shops.

Mr. Paul Van Zandt, who has been with the Gates Company works of the Allis-Chalmers Company at Chicago, Ill., has been transferred to the Salt Lake branch of the company.

Mr. G. L. Holmes, who has charge of the placer mining machinery department of the Link-Belt Machinery Company, of Chicago, Ill., is in New Mexico on business for his company.

Mr. John Duncan, assistant superintendent of the Calumet & Hecla copper mine, recently returned to Calumet, Mich., after visiting Los Angeles, Cal., and the southwestern mining region.

Mr. W. B. Angle, who has for the past year been chief chemist for the Guggenheim Exportation Company at Santa Barbara, Mex., has purchased the assaying plant of E. C. Bierce at Parral, Mex.

Mr. Maurice Graham, one of the partners of Graham, Morton & Company, Limited, Leeds, Eng., is on a trip to Chicago, Pittsburg and Cleveland. His visit is in connection with coal handling machinery.

Mr. R. R. Goodell, of Houghton, Mich., agent for the Isle Royale Land Corporation of Liverpool, Eng., controlling nearly all of Isle Royale, recently took an extended trip through the western mining country.

Mr. William P. Snyder, of Pittsburg, Pa., has been elected president of the St. Clair Steel Company, and the St. Clair Furnace Company, building blast furnaces and open-hearth steel plant at Clairton, Pa.

Messrs. D. A. Young, S. A. Smith, W. H. Pinton and Dr. Young, of Brattleboro, Vt., interested in mining in Colorado and Arizona, are in Leadville looking over their interests in the Valley Leasing Company.

Mr. Don H. Bacon, of New York City, chairman of the executive committee of the Tennessee Coal, Iron and Railroad Company, is in the Birmingham, Ala., District again, looking after the affairs of the company.

Dr. Pierre de P. Ricketts, of Messrs. Ricketts & Banks, New York City, has been elected a member of the New York Metal Exchange. The firm of Ricketts & Banks has been licensed as weighers by the Metal Exchange.

Mr. George C. Fogeot, master mechanic of the Bay View plant of the Illinois Steel Company, has resigned to become superintendent of the works of the Allis-Chalmers Company at Scranton, Pa. Mr. George J. Willett will succeed him.

Mr. John M. Franklin, formerly with the W. J. Rainey Coal and Coke Company, at Connellsville, Pa., has been appointed manager of the coal mines of the Tennessee Coal, Iron and Railroad Company, with headquarters at Birmingham, Ala.

Mr. Joseph Qualey, a well known mining man of Chihuahua, Mex., has taken the contract to build the new Jersey City waterworks. Before going to Mexico Mr. Qualey completed one of the most difficult sections of the Chicago Drainage Canal.

Mr. Charles Redpath, formerly superintendent of the Gold Collar Mine, has been appointed superintendent of the John A. Logan, American Eagle and Lucky Gus properties of Mr. W. S. Stratton, at Cripple Creek, Colo. He succeeds Mr. John Stark.

Mr. Gus. F. Meehan, vice-president and manager of the Monterey Iron and Steel Foundry, Monterey, and president of the Coahuila Mining and Smelting Company, Mexico, is now in the States for the purpose of placing considerable contracts for equipment. Fully $200,000, it is said, will be expended.

Mr. Edward N. Hurley, a director of the Chicago Pneumatic Tool Company, is in London, England, where he will meet the president of the company, Mr. J. W. Duntley, and complete arrangements for the sale of the International Pneumatic Tool Company, of London, to the Chicago Pneumatic Tool Company.

Mr. J. A. Thomas, for some time general master mechanic for the Tennessee Coal, Iron and Railroad Company, has tendered his resignation and will engage in other business. Mr. C. V. Norris, who has been master mechanic of the Ensley Furnace division of the Tennessee Company, has also resigned. He will be succeeded by Mr. J. Morgan, now with the Hardie-Tynes Foundry in Birmingham, Ala.

Mr. F. C. White, on May 1 succeeded Mr. P. G. Matheny as manager of the coal department of the Republic Iron and Steel Company, at Springfield, Ill., and has charge of the mine at that place. Mr. Matheny will be transferred to the sales department. Mr. White, though not over 35 years of age, has had several years' experience in the management of coal mines, part of which experience was gained in the Streator District of Illinois. He will reside in Springfield.

OBITUARY.

Nelson Miles Beach, treasurer of the Bridgeport Brass Company, died recently at his residence in Bridgeport, Conn. He was 46 years old.

We hear with much regret that H. Van F. Furman, the well known mining engineer and metallurgist of Denver, died at Mapimi, Durango, Mexico, on April 30. His death was caused by pneumonia. We have received no particulars beyond the brief despatch announcing the fact. We hope to publish an appropriate obituary in our next issue.

Benjamin Franklin Hooper, president of the Colwell Lead Company, and a member of the New York Chamber of Commerce, died at his home in New York City, on April 21. He was a son of John Hooper, and succeeded his father as president of the lead company. He was a graduate of the College of the City of New York, '78. He leaves a widow, 2 sons and 2 daughters.

SOCIETIES AND TECHNICAL SCHOOLS.

ENGINEERS' CLUB OF PHILADELPHIA.—At the meeting on April 19 there were 92 members and visitors present.

Mr. James Christie presented the communication of the evening upon "Modern Developments in the Production of Open-Hearth Steel," and illustrated his descriptions by a series of photographs and drawings reproduced by means of the lantern. A discussion followed, which was participated in by Messrs. Benjamin Talbot, William R. Webster, Henry J. Hartley, Francis Schumann, William Copeland Furber, John Birkinbine, and T. W. Jenks.

SOCIETY OF CHEMICAL INDUSTRY, NEW YORK SECTION.—At the meeting held at the Chemists' Club, on Friday evening, April 25, many resident and out-of-town members were present. Prior to the opening of the meeting an informal dinner was given at the cafe of the Hotel Savoy, Mr. W. F. Fuerst being in charge of the party. At 8:40 p.m., the meeting was opened by Chairman Richardson, assisted by Vice-Chairman Coblentz. It was announced that several new members had entered the society, and that in the ensuing year Mr. Virgil Coblentz would be the chairman and Mr. R. W. Moore, vice-chairman.

The first paper read was by Mr. J. Merritt Matthews on "The Action of Caustic Soda on Wool." This treated fully of the "mercerizing" process, now of considerable importance to textile manufacturers.

"The Stability Tests for Nitro-Explosives," read by Mr. H. C. Aspinwall, was interesting, as the author mentioned, with his own experiments, those made by the British, German and American governments.

Mr. A. G. Stillwell's paper on "Graphite in Ores" described an apparatus used by him for making determinations. The method employed differs little from that for determining the carbon in steel.

Four papers were read by title only, namely, "Some Parts of the Ammonia Soda Process Open for Improvements," by Mr. J. A. Bradburn; "The Determination of Paraffine in Petroleum Residues, Asphaltic Oils, and Asphalts Fluxed with Paraffine Oils," by Mr. Clifford Richardson; "Filterpapers and Soluble Solids," by Mr. H. C. Reed; "Arsenic Contents of Certain Pennsylvania Anthracites," by Messrs. Robert Job and J. B. Young.

At the conclusion of the meeting the Verein Deutscher Chemiker, of which Dr. H. Schweitzer is president, and Dr. Schupphaus, secretary, held its monthly reunion, and incidentally toasted the American Electro-Chemical Society.

INDUSTRIAL NOTES.

R. D. Wood & Company, of Philadelphia, Pa., are shipping large quantities of cast-iron pipe to China.

The H. K. Porter Company, of Pittsburg, Pa., has an order for locomotives for Japan.

The Hendrie & Bolthoff Manufacturing and Supply Company, of Denver, Colo., will remove to its new offices in the Sheridan Building, about May 15.

The Risdon Iron Works, of San Francisco, Cal., is reported to have secured a contract through Montagu T. Barney, a London mining engineer, for a large dredging plant to be shipped to West Africa.

The Dayton-Globe Iron Works, of Dayton, O., has recently secured a contract from the Royal Aluminum Company, of Shawinigan, Canada, for 2 59½-in. turbines, having a capacity of 3,200 h. p. under a head of 125 ft.

The Harrison & King Perforating Company, manufacturing perforated metals for all purposes, has removed its New York City office to 114 Liberty street in the new Engineering Building, where it will carry a full line of samples.

Westinghouse, Church, Kerr & Company, of New York City, have closed a contract with the Cleveland, Elyria & Western Railway for 2 1,000-k.w. Westinghouse-Parsons steam turbines, and with the Pittsburg, McKeesport & Connellsville Railway for 3 1,000-k.w. turbines of the same type.

It is officially stated that the American Bridge Company will in the near future erect comprehensive structural steel and iron works of the most modern type at Chicago, Ill., Pittsburg, Pa., and Elmira, N. Y. The other bridge plants will then be discontinued.

The American Pulley Company, of Philadelphia, Pa., has orders in hand for shipments to Australia, New Zealand, Mexico and South America. Recent deliveries include shipment in car-load lots to San Francisco, Cal.; Montreal, Canada; New Orleans, La., and Chicago, Ill.

The I. & E. Greenwald Company, of Philadelphia, Pa., reports a fine trade in coal washers. The firm is

rearranging its shops to increase capacity, and has added new tools to its equipment. The company has had a number of orders for heavy coal washing machinery from the Birmingham District in Alabama.

The John A. Roebling's Sons Company, of Trenton, N. J., has, it is stated, just completed negotiations for the purchase of a large tract of land near St. Louis, Mo., on which the company will shortly begin the erection of an extensive plant. The object of the company is to fill orders more quickly from the Western States.

The American Concentrator Company, of Joplin, Mo., manufacturers of the New Century drop motion jig, reports the following sales in the Eastern part of the United States: The Almedia Mining Company, of Espy, Pa.; the National Lead, Zinc and Fluorspar Company, of Fredonia, Ky., and the High Falls Pyrites Company, of Canton, N. Y.

The Nova Scotia Steel Company, of Sydney, N. S., is reported about to start a department for the manufacture of pressed steel cars. Shops are to be erected and equipped for the manufacture of at least 10 cars a day, calling for the consumption of about 150 tons of steel. The department will be in charge of experienced men from Pittsburg and Philadelphia, Pa.

Articles of incorporation have been filed under the laws of New Jersey for the United States Sulphur Reduction Company, with a capital of $2,500,000. The officers are Francis B. Clark, president; Prof. John S. Fleming, vice-president; Harold C. Dayton, secretary and general manager; Chas. A. Hogue, treasurer and chief engineer; and Prof. Henry Froehling, consulting chemist.

The St. Louis Clay Burning Company, of St. Louis, Mo., has purchased about 30 acres of ground near Bond Station, on the St. Louis, Kansas City & Colorado Railroad, where it will erect a brick-making plant at a cost of about $125,000. The entire equipment of machinery has been purchased through Chambers Brothers' Company, of Philadelphia. Young H. Bond is president.

The Rider-Ericsson Company, of New York City, has recently received contracts for hot-air engines for shipment to Australia, South Africa, Burmah and Canada. Shipments are now pending for Sydney, New South Wales; for South Africa, and for Rangoon. A lot of engines lately went forward to the Rhodesian Railroad, South Africa, and an order has just been executed for the Imperial Palace, Constantinople, Turkey.

The Niles-Bement-Pond Company is said to have recently secured a number of crane orders for shipment from its Philadelphia crane plant to various parts of the world. A 60-ton crane, also a 20-ton outfit, have been ordered by the Monterey Foundry Company, of Mexico. A 10-ton electric traveling crane has been called for by the Mulliners Company, of Coventry, Eng., and Shewan, Tomes & Company, with offices in New York City, have sent in an order for one 25-ton and 2 10-ton cranes for shipment to Hong Kong.

The Wm. B. Scaife & Sons Company, of Pittsburg, Pa., states that its system of treating valve feed water requires very little floor space and is the cheapest to maintain and operate. Plants are furnished for any horse-power. Following are some of the recent contracts taken by the firm: American Sheet Steel Company, for New Philadelphia, O., plant, 1,500-h.p.; Harrisburg Rolling Mill Company, Harrisburg, Pa., 1,500-h.p.; Antrim Iron Company, Mancelona, Mich., 1,500-h.p.; National Mining Company, Pittsburg, Pa., 1,000-h.p.

The Detroit Iron and Steel Company, which is to build a blast furnace on Zug Island, in the Detroit River, below Detroit, Mich., has filed its articles of incorporation. Its capital stock is $1,500,000, of which $1,200,000 is paid in. The stockholders are: Daniel R. Hanna, Cleveland; Frank B. Richards, Cleveland, and C. B. Warren, Detroit, 50 shares each; Frederick R. Hazard, Solvay, N. Y., 12,250; Charles W. Baird, Detroit, 75,000; Andrew H. Green, Detroit, 28,125; Frank West, Detroit, 28,125; Theo. H. Eaton and A. M. Parker, Detroit, 2,500 each.

The Standard Diamond Drill Company, recently formed at Chicago, Ill., has these officers: President, C. S. Bartholf, for 8 years secretary, and for 2 years president, of the M. C. Bullock Manufacturing Company; vice president, M. S. Bullock; secretary, Harold Hart, formerly assistant secretary of the M. C. Bullock Manufacturing Company; treasurer, H. T. Clark, formerly general office manager of the M. C. Bullock Manufacturing Company. The company states that it has retained the services of engineers formerly connected with the old Bullock Company.

A combination of flint spar and clay manufacturers has been effected in East Liverpool, O., by William S. Hancock, Barker Gummere, Jr., and Hugh H. Hamil, of Trenton, N. J., under the name of Golding Sons & Company. One of the main branches of the new concern will be the Eureka Flint and Spar Company, with mines controlled by Thropp's Sons & Company, and located in Ohio, Maryland, Pennsylvania, Maine and Connecticut. The new concern proposes to control the market for flint spar and clays, and is capitalized at $1,000,000. The main offices are to be in East Liverpool.

The Crocker-Wheeler Company, of Ampere, N. J., reports a very satisfactory increase in the demand for its crane motors and equipments. Several new sizes have lately been added to this line, which is now in such shape as to supply machines of from 1 to 60-h.p. The various types are designed to fulfill the several crane applications which call for trolley, bridge and hoist work. The following recent shipments show the variety of outputs that have been ordered in the past few weeks: Four motors, size 45, 50-h.p.; 11 motors, size 22, 30-h.p.; 25 motors, size 14, 15-h.p.; 4 motors size 8, 10-h.p.; 11 motors, size 6, 7½-h.p.; 14 motors; size 2½, 2½-h.p.

The Pittsburg Gage and Supply Company, of Pittsburg, Pa., reports an excellent demand for its "White Star" filter. A recent shipment was an order for 4 filters to the Yarbic Mines, Japan. The company has also recently booked orders for continuous oiling systems using the duplex types of the "White Star" filter, one of 6,000 gals. filtering capacity per day for the Union Steel Company, Pittsburg, and one for the Citizens Railway, Light and Power Company, of Mansfield, O., supplying a Cooper tandem compound, a Bates cross compound, and an Allis simple type engine with a continuous flow of clean oil by mechanical means upon all bearings.

At the annual meeting of Jones & Laughlins, Limited, at Pittsburg, on April 22, reports of the various superintendents containing suggestions for additions to works were read. The firm is considering large additions to its plant. The following officers were elected: B. F. Jones, chairman; Willis L. King, vice-chairman; Irwin B. Laughlins, treasurer; William C. Moreland, secretary; Wm. A. Jones, general manager, and Thomas K. Laughlins, assistant treasurer. The board of managers consists of B. F. Jones, Jr., Willis L. King, Irwin B. Laughlins, William C. Moreland, William L. Jones, James B. Laughlins, Roland Gerry and Thomas O'C. Jones.

The Baldwin Locomotive Works, of Philadelphia, Pa., is operating its works at fullest capacity. New tools are being added to the equipment, in fact, the company may be said to be always in the market for tools, etc., of one class or another. Large additions and equipment are being made to the Baldwin plant and the Standard Steel Works, at Burnham, Pa. A new 50-ton steel furnace is being erected and two cupolas are being added to the gray iron foundry. Recent deliveries of locomotives include 10 compound 10-wheel passenger engines for the Oregon Short Line, while deliveries of the 40 consolidated freight engines for the Pennsylvania lines have been completed.

Henry H. Humphreys, of St. Louis, Mo., is reported to have been awarded the contract for designing the complete electric power plant, including buildings and refrigeration plant, for the De Beers Explosive Works, Kimberly, South Africa, which works are to manufacture the dynamite, etc., for use by the great South African diamond mining concern. One thousand horse-power of 3-phase inductor motors will be installed in the works, also a large air compressor to be steam driven and another to be electrically operated, mechanical stokers, coal and ash handling machines, also fuel economizers and induced draft apparatus. The contract price is said to be about $220,000.

The sale of the Kinney-Hawkins-Crosby Mine, near Hibbing, Minn., to the Deering Harvester Company, of Chicago, has caused the publication of a story that the company will erect a new steel mill in South Chicago, Ill., to turn out material for its agricultural implement factory. It is said that the necessary buildings will be erected within a year by the South Chicago Furnace Company, near the new blast furnace that the furnace company is now building. This action, according to newspaper reports, has been taken because of the desire of the Deering Company to become independent of the steel trust. Officers of both the Deering Company and the South Chicago Furnace Company refuse to discuss the matter for publication. The new plant, it is said, will employ about 2,000 men.

The first cement plant in Canada to use electric power is that of the National Portland Cement Company at Durham, Ont. All of the cement making machinery in this plant will be driven by induction motors supplied with current by two Westinghouse 450-k.w., 3-phase alternators. These machines are of the engine type with revolving fields and run at 125 revolutions per minute, 3,000 alternations and 600 volts. Two exciting units are provided, 1 being a 62½ k.w., 125-volt, engine type, direct-connected generator and automatic engine, and the other a 56½-k.w. machine coupled to an induction motor. The output of the exciters will be used not only for exciting the fields of the alternating current generators, but also for arc and incandescent lighting throughout the works and grounds. The Westinghouse Company also furnishes the 8-panel switchboard and instruments.

At the regular quarterly meeting of the board of directors of the Allis-Chalmers Company, held in New York City, the usual quarterly dividend of 1¾ per cent upon the preferred stock was declared, payable May 1. Philetus W. Gates, president of the Gates Iron Works, of Chicago, manufacturers of mining machinery, was elected a director to fill the vacancy caused by the death of William L. Elkins, Jr. The annual meeting of the company will be held June 5.

The Allis-Chalmers Company has removed its San Francisco, Cal., offices from 137 Montgomery street, to the Hayward Building, corner California and Montgomery streets.

The Salt Lake branch of the Allis-Chalmers Company recently closed a contract with C. M. Spence, manager of the Black Forest Mining and Smelting Company, of Wells, Elko County, Nev., for a silver-lead smelting plant, including the necessary appurtenances. It is expected this plant will be in operation by May 15.

A. L. Ide & Sons, of Springfield, Ill., report among recent sales of "Ideal" engines the following: One 14-22 by 16 direct connected, Northern Pacific Railroad, Livingston, Mont.; 2 24 by 20, belted, Ashland Iron and Steel Company, Ashland, Wis.; 1 18 by 16, direct connected, Manhattan Light, Heat and Power Company, St. Paul; 2 15-22 by 16, direct connected, Atchison, Topeka and Santa Fe Railroad, Albuquerque, N. Mex.; 1 11-18 by 14, belted, Champion Copper Company, Painesdale, Mich.; 1 11-18 by 14, direct connected, Bingham Consolidated Mining and Smelting Company, Salt Lake; 1 14 by 14, direct connected, Hecla Coal and Cement Company, Bay City, Mich.; 1 15 by 14, belted, University of Wisconsin, Madison, Wis.; 1 13-22 by 16, direct connected, Michigan Alkali Company, Wyandotte, Mich.; 2 13 by 12, belted, Allis-Chalmers Company, Chicago, for Mexico; 1 10-16 by 12, belted, Leland Stanford University, Palo Alto, Cal.; 1 13-22 by 16, direct connected, N. W. Malleable Iron Works, Milwaukee; 1 24 by 20, direct connected, Springfield Electric Light and Power Company, Springfield, Ill.; 1 15 by 14, direct connected, Ludlow-Saylor Wire Company, St. Louis, Mo.; 3 15 by 14, direct connected, Washington University, St. Louis, for Administration Buildings, World's Fair, 1903; 2 13 by 12, direct connected, Wagner Electric Manufacturing Company, St. Louis, Mo.

TRADE CATALOGUES.

Bristol's recording volt, ampere and watt meters are described in a 28-page pamphlet published by the Bristol Company, of Waterbury, Conn. These instruments are stated to be constructed on the electric balance principle without permanent magnets, and to be extremely simple in design. The recording device is similar to that used in other well-known Bristol instruments.

Marlin repeating rifles, carbines and shotguns are described in detail in a pamphlet of 118 pages published by the Marlin Fire Arms Company, of New Haven, Conn. The pamphlet states at some length various claims of superiority made for Marlin fire-arms and describes the different classes of ammunition used. In addition, directions are given for the proper care of rifles, including the adjustment of sights, and there are directions for reloading cartridges. The pamphlet has an artistic cover design.

Catalogue No. 50, sent out by the Peerless Rubber Manufacturing Company, of New York City, describes the company's "Rainbow" packing, also the "Eclipse" gasket and the "Peerless" spiral piston and valve rod packing, extension ring packing, "Arctic" ammonia ring packing, "Germane" sheet and flange packing and "Success" semi-metallic diagonal expansion ring packing. The construction of the various brands of packing is briefly described and prices are given. The company also manufactures "Anaconda" steam hose and "Peerless" steam hose.

A trade catalogue of more than usual interest is issued by the Trenton Iron Company, of Trenton, N. J. It is a pamphlet of 64 pages entitled "The Application of Wire Rope to Surface and Underground Haulage." The pamphlet describes the tail rope and endless rope systems of haulage, giving diagrams showing the general plan of each and the various devices employed. Formulae and tables for making necessary calculations in installing haulage plants are given and reference is made to some large haulage systems. Under the caption of "Hoists," cages, skips and gravity hoists are discussed. Inclined planes, whether gravity or power, come in for mention and the catalogue discusses also approved designs for sheaves, rollers, mine cars, tipples, etc. The pamphlet is to be commended as an excellent summary of present practice and should interest mining men generally.

A new 16-page ventilator catalogue of the Buffalo Forge Company, of Buffalo, N. Y., illustrated with half-tone engravings, describing in detail the many different types and sizes of ventilators manufactured by the above company, is now ready, and

any one interested can secure a copy by writing to the company for it. The company states that with a quarter century of experience in heating and ventilating of buildings of all classes it has come thoroughly in touch with the conditions which make stationary ventilators efficient and most desirable apparatus. Their value, when in use with the fan system, is too often under-estimated. In certain cases they are alone amply sufficient for proper ventilation. The improved Buffalo ventilators are built of heavy gauge iron, and, the company claims, will resist any strain of reasonable magnitude they may be subject to. Many interesting special types are shown in the catalogue.

Rumsey & Company, Limited, manufacturers and hydraulic engineers, of Seneca Falls, N. Y., have issued the 1902 edition of their illustrated catalogue of hand and power pumps and hydraulic and pumping machinery for all purposes. The catalogue is a cloth-bound book of 256 pages, containing complete price lists of a very varied line of pumps and pumping machinery. Aside from a large assortment of pumps for ordinary domestic use, the catalogue mentions windmill pumps, pumps for deep wells, and diaphragm pumps; also double-acting power pumps, and triplex power pumps, single and double-acting for elevator service, feeding boilers or general service. These pumps may be driven by a belt or direct-connected to an electric motor or geared to a gasoline engine. The company also makes rotary pumps of small and large size and centrifugal pumps for irrigation, etc., besides hydraulic rams of improved design and earth augurs for boring wells. The company states that this is the 53rd edition of its catalogue and that its pumps have been shipped to every part of the world.

Catalogue "B" issued by the Green Engineering Company, of Chicago, Ill., describes the Green traveling link grate, a mechanical stoker for which numerous points of merit are claimed. The company states that in bringing this stoker into the field, it has endeavored to profit by all past developments in the construction of the chain type of stokers. The girders of the frame are of wrought iron, all pinions are cast from a special composition or cut from steel, while the driving mechanism of ratchet, pawls and gear train is claimed to permit quick adjustment within a wide range of travel. The clips forming the chain are slotted, the bars are oval and when engaged by the links are locked by the binding links at each end. It is stated that any link can be removed and replaced without breaking the chain, removing the bars or interfering with service. The regulating feed gate is said to be especially adapted to meet the requirements of hard firing. Illustrations are given of the boiler rooms of a number of large industrial plants where the Green grate is in use.. In addition the pamphlet contains tables of the heat value and chemical composition of bituminous coals from Pennsylvania, Ohio and Illinois, particular attention being given to the Illinois coals. These tables will be found of value by all owners of boiler plants in the Middle States.

GENERAL MINING NEWS.

ALABAMA.

(From Our Special Correspondent.)

At the meeting of the Governor and board of trustees of the Girls' Industrial School at Montevallo, May 12, propositions looking to the purchase of 25,000 acres of land in the State donated by the Government to this school will be considered and probably acted on. There is considerable coal land in this lot and already some of the larger companies have made an offer for a purchase or a lease of portions of the property belonging to the school through the grant. Lands belonging to the State University at Tuskaloosa, granted by the Government, are now being worked on the royalty basis by coal companies in Bibb and Tuskaloosa counties, bringing in large revenues to the University. The Girls' Industrial School board expects to realize quite a sum either from a sale outright or a lease of much of these 25,000 acres.

ALASKA.

Sea Level Mining Company.—This Seattle, Wash., concern owns gold claims at Sea Level, in the Ketchikan District. The Hammond Manufacturing Company is installing a 30-stamp mill. The mill building, shafthouse, tramway and wharf are completed, and some of the machinery installed. The work was delayed by the non-arrival of over a mile of 26-in. steel pipe and some parts of the machinery. The material is landed within 300 ft. of the mill building. There have been 35 men at work, and by May 1 the mill was expected to be crushing free milling quartz at the rate of over 100 tons per day. The shaft has been enlarged to 3 compartments, 7 by 19 ft. Water pipe is being laid, and 5 Pelton wheels installed to develop 224 h. p. An incandescent electric light plant, a 6-drill Leyner air compressor, a gyrating crusher of 500 tons a day capacity, 30 stamps of 1,000 lbs. each, vanners, etc., are some of the improvements.

ARIZONA.

COCHISE COUNTY.

(From Our Special Correspondent.)

Elwell Springs.—What are likely to prove good placer diggings are reported near what is known as Elwell Springs, at the foot of Chiricahua Mountains. It is stated that the gold-bearing gravel extends along the foothills of the range for 5 miles and down toward Sulphur Springs Valley for 3 miles.

MOHAVE COUNTY.

(From Our Special Correspondent.)

The Richardson Brothers, at Union Pass, have resumed work on their gold properties.

More work is being done in the gold mines in Gold Basin than for many years past. Some properties have also changed hands of late.

American Flag.—This mine, on Wallapai Mountain, 15 miles east of Kingman, is about to begin work again. There are more than 1,200 ft. of development, but long neglect necessitated much dead work before the ore bodies could be touched. The mine was once a big producer of rich silver ore.

Climax.—Two shafts on this mine in Union Basin are producing free milling gold ore. The mine belongs to James Dundon.

John Kay.—This silver mine, at Mineral Park, has a 20-in. streak of very rich ore. There is a car-load of the ore on the dump which has been taken out within a month by a man and a boy.

Levy Mill.—Levy Brothers, at Signal, have their new 50-ton mill in operation and the first car-load of concentrates has been sent out.

Tennessee Mill.—This mill, at Chloride, has been in operation since April and is producing a car-load of concentrates daily. These go to the El Paso, Tex., Smelter under a 3-years' contract.

Vulcan Smelter.—Grading is being done for this new 50-ton smelting plant at Chloride.

YAVAPAI COUNTY.

Black Prince.—At this mine of the Copper Basin Gold and Copper Company, a cross-cut is being run at a depth of 10 ft. for the purpose of determining the width of the dyke on which the claim is located. The cross-cut has been run over 100 ft., and no signs of a wall have yet been encountered. The rock for the entire distance is reported mineralized, containing sulphurets, though no big values are obtained.

CALIFORNIA.

AMADOR COUNTY.

(From Our Special Correspondent.)

Horn.—A strike of rich rock is reported in the tunnel being run to tap the ore body in this mine, in Pioneer District. Something over 150 ft. has to be run in order to reach the vein.

Old Price.—The Plymouth Rock Gold Mining Company last year purchased the interest of the Chicago Mining Company in this property, known as the "Old Price" claim, near Plymouth, and is running a tunnel to cross-cut the formation 710 ft. The tunnel will cut the main vein at 208 ft. An upraise will be made from the tunnel to the shaft, which may be sunk 500 ft. deeper. A mill probably will be erected as soon as the tunnel is completed.

Werle.—In this gravel mine, at Chili Gulch, about 2 miles from Mokelumne Hill, some rich gravel has been found in virgin ground. There is a 200-ft. shaft to the channel and a 300-ft. drift northeast from the shaft. The channel is 120 ft. wide, with an average of 10 ft. of blue gravel, said to average $1.50 to the car-load. The capacity of the mill is 100 tons a day.

NEVADA COUNTY.

(From Our Special Correspondent.)

Red Cross.—This mine, at Omega, has been sold to the Western Exploration Company. Besides the Red Cross, the company has also obtained control of the Green Pine, Forest, Omaha and Marchands quartz claims. What the terms of the deal are is not known. The property at present is under lease to some miners, who are keeping the mill running on ore.

SHASTA COUNTY.

(From Our Special Correspondent.)

The copper mines on Pit River are said to be very promising. The deposits are carbonates. The Davis & Vaughn mines are reported to have 6 and 12 ft. ledges and 2 ore bodies over 200 ft. wide.

New Smelter.—It is said that a third smelter will soon be erected in Shasta County. It will be located near the town of Copley, on the Southern Pacific, about twelve miles north of Redding. James J. Chambers, of Redding, is interested. The plant, as projected, is to have a capacity of 100 tons daily, and ultimately 500 tons.

Shasta May Blossom Copper Mining and Smelting Company.—On this property, 2 miles from Winthrop, the east vein has been opened, first on the north end by surface work, and a tunnel now in 170 ft. which is being driven to cross the contact, 300 ft. south. A second tunnel driven through the hanging wall formation, has cut the vein, showing a body of gossan ore about 6 ft. wide against the footwall, and other vein matter consisting of talc mixed with gossan ore, the total width being 30 ft. between walls. Morton Lindley is general manager.

SIERRA COUNTY.

(From Our Special Correspondent.)

New Independence.—Work has been resumed at this mine in Plumbago District. Capt. George A. Nihell has been placed in charge of putting up the hoisting plant and other improvements. The vein is said to be a true fissure one, averaging 4 ft. wide. The foot wall is serpentine and the hanging wall black slate. Recent actual mill tests are said to show that the ore will yield an average of $10 per ton in free gold without the concentrates. The shaft is down 230 ft. on the vein. The owners expect to be milling ore within 60 days. The mine is 10 miles south of Downieville and 25 miles north of Nevada City.

SISKIYOU COUNTY.

(From Our Special Correspondent.)

Callahans Dredge.—This plant has shut down temporarily, as the governors to the electric plant had to be replaced.

TUOLUMNE COUNTY.

(From Our Special Correspondent.)

Black Oak.—This mine is said to be in rich rock.

Confidence.—This famous mine, at Confidence, above Tuolumne, is said to have been practically sold to a syndicate for $250,000.

New Era.—A rich strike is reported at this mine, 6 miles southeast of Carters, and the property has been sold to New York parties. The new owners expect to increase the mill and put on a larger force. A 10-stamp mill is used at present.

Soulsby.—Colorado miners are reported negotiating for this mine. The mine is an old one, with over a mile of old shafts and tunnels, and the rich ore now comes from the 200-ft. level in a new shaft.

COLORADO.

BOULDER COUNTY.

Boulder Oil Wells.—The Republic is putting in tanks and has started to case its well. The Maxwell well is down over 500 ft. The Citizens is down 900 ft. The report that oil had been struck was premature. The Martin well recently lost its bailer and quite a quantity of steel cable. The Olean, near Hygiene, down 2,040 ft., struck sand. The Cleveland is down about 2,300 ft. The Rose crude is still in the sand at 1,750 ft., with faint traces of oil. The Bradford has been spudded. This company controls land north of the Arnold. Its stockholders are mainly Rocky Ford people. The Wolff-Boulder Oil Company has been organized. The company has a 30-year lease on land belonging to James Wolff, north of Boulder. The officers are: George S. Adams, president; R. J. Werley, vice-president; C. E. Crittenden, secretary, and L. R. Johnson, treasurer. The Cleveland, at a depth of 2,300 ft., has struck some very hard rock and is making progress slowly. It is believed this is cap rock. The McAfee is over 1,000 ft. deep. Possibly 30 drills are now at work, and more are to follow.

The Boulder North Bend is getting ready for work. The Boulder-El Paso has its derrick up, its rig irons in place and is awaiting the arrival of the engine and boiler. The Crawford is drilling at a depth of 900 ft. The fourth car of oil from the McKenzie well has been shipped to Florence. The well is pumping 4 bbls. an hour. The stationary tanks are again being filled.

The Hygiene Oil Company, on the farm of Assessor Webber, is down 200 ft. The well is being cased. The Pioneer Oil and Gas Company has its drill down 300 ft. The Eagle Company is holding back on work. The company owns the land on which it is to operate. The New York-Colorado Oil and Gas Company has filed articles of incorporation. The organizers are: J. E. Turner, J. J. Gano and E. C. Loveland. The well on the Williamson ranch, 2 miles northeast of Ni-Wot, is down 2,480 ft.

CHAFFEE COUNTY.

(From Our Special Correspondent.)

Vivandiere.—Under the direction of Superintendent Butterfield surface improvements, including new boilers, are rapidly approaching completion.

CLEAR CREEK COUNTY.

(From Our Special Correspondent.)

Edinburgh.—This claim, on Republican Mountain, and the Hidden Treasure group, on Lincoln Mountain, at Empire, have been consolidated under one management and a new company, called the Hidden Treasure Gold and Silver Mines and Mills Company. E. G. Hovey, of Denver, is president, and J. F. Stanish, of Georgetown, general manager. The properties include 9 lode claims. A cross-cut tunnel is being driven on the Hidden Treasure group to cut the main

lode. The company also contemplates driving a large cross-cut tunnel from the base of Lincoln Mountain to develop its own group as well as the other properties.

Maxwell.—This mill at Silver Plume, recently purchased by Superintendent Olds, of the Mendota, is undergoing repairs.

Pacific.—Col. C. P. Baldwin has sold his interest in this property on Republican Mountain, near Georgetown, to his partner, Dana W. Hartshorn, of Cincinnati, O., who will start development. The Pacific was last worked over 25 years ago.

Seven-Thirty.—J. H. Robeson, manager of the Seven-Thirty, Bismarck, Dives-Pelican, Illinois, Burleigh and other properties at Silver Plume, has let a contract for about 1,300 ft. of drifting and an upraise of 250 ft. to connect the shaft of the Seven-Thirty with the workings of the Burleigh. This contract, when completed, will unwater approximately 5 miles of underground workings and will also open a large area of unexplored territory.

Wisconsin.—This mine, at Silver Plume, continues to ship steadily. Higgins, Smith & Co. are driving an adit to encounter the ore at greater depth. Bruce & Lacey have 3 streaks of good silver ore, while Thompson & Mitchell are stoping on another streak.

GILPIN COUNTY.

(From Our Special Correspondent.)

Mining Deeds and Transfers.—Colorado Investment Company to J. H. Porter, the Success Placer, Bay State District; Fannie Josephine Grant to H. W. Mabee, to the Town Topics Gold Mining Company, the Notaway Lode, Russell District; W. Leigh to Tom George, 1-12 interest, and to W. H. George, 1-3 interest, Harry Leigh, Jessie Leigh and Crown King Lodes, Wisconsin District; W. H. and Tom George to W. Leigh, 1-3 interest Fannie G. and Nora G. Lodes, Wisconsin District; E. H. Rider to W. Wylie, the Maggie Lander placer claim, South Boulder and Central Districts; G. W. Stillhammer to Charles Stillhammer, the Hawthorne and Ivanhoe lodes, Wisconsin District.

Blue Ribbon Mining and Milling Company.—Nebraska and Iowa parties have taken the Blue Ribbon property in Peck Gulch, and developments will be under the management of J. N. Bradley, of Idaho Springs.

Cashier Gold Mining and Reduction Company.—Employment is furnished 70 men. Daily shipments of about 25 tons of milling ores are maintained, and the smelting product is about 200 tons per month. The milling ores are very fair grade, and the smelting ores above the average of the county. B. L. Campbell, Central City, is superintendent.

Town Topics Gold Mining Company.—This company has made the final payment for the East Notaway Mine in Russell District, the full payments standing in the neighborhood of $70,000. The company has had hold of the property for nearly 18 months, during which time it has paid 4 dividends of $5,000 each and another dividend of the same amount has been declared payable on May 1 at the office of the company in the Barth Block, Denver. One lot of ore this week brought returns of over 20 ozs. gold per ton and another lot ran over 14 ozs. The company will install a heavier hoist, probably of the electric kind. Marshall D. Draper, Central City, is in charge.

Wilkesbarre Gold Mining Company.—A 10-h.p. Weber gasoline plant is being installed and an addition to the shaft house of 22 ft. x 44 ft. erected. The shaft, now down 185 ft., will be sunk deeper as there is good ore in the bottom and the lower drifts. E. C. Sherman, Central City, is manager.

HINSDALE COUNTY.

(From Our Special Correspondent.)

Tobasco.—O. W. Pierce, of Lake City, manager, is preparing for active operations. The improvements include a dam at Sherman, and an electric plant.

Twin Lakes Gold Mining Company.—New York City parties are behind this combination working under the direction of J. D. Bartlett & Son, of Twin Lakes. They have driven a tunnel 2,300 ft. on Mt. Elbert and a vein that carries 200 to 300 ozs. silver and a trifle in gold. The main vein was cut at 2,200 ft. The vein lies against a massive porphyry dike and the streak varies from 1 to 3 1-2 ft. The tunnel along the vein is at a depth of 800 ft., while upraises and drifts are run in all directions and a good grade milling ore is being opened up. The old mill is to be overhauled and it may be running steadily in 30 days.

Twin Lakes Gold Mining Syndicate.—This concern, operating the Cache Placer, near Twin Lakes Creek, has resumed operations with 40 men, using the hydraulic system. Plans have been made for extensive work. London, Eng., men are back of the enterprise.

LAKE COUNTY—LEADVILLE.

(From Our Special Correspondent.)

Mining Conditions.—Work in the outlying sections has opened on a larger scale than ever in the history of the camp. Over a dozen distinct sections of the outer rim are receiving attention. Besides work under way in old prospected territory, like Lake Park, Weston Pass, St. Kevin, Sugar Loaf, Taylor Hill and Iowa Gulch, there is new work in virgin ground, like Alicante, where there is a showing of low-grade milling ore; English Gulch, with a similar showing; Homestake, with its remarkable fissure vein; Mosquito Range, with its high-grade veins of silver and lead; Half Moon, another free-milling proposition; Empire and Big and Little Union gulches, with veins of iron, lead, copper and gold; Dwyer Mountain, where rich patches of gold have been located; Prospect Mountain, where a large deposit of magnetic iron has been located, and still other fields.

Leadville Zinc Tonnage.—The new owners of the Canon City zinc plant are preparing for a large volume of business. A contract has been closed with the Yak for 3,000 tons, and if the ore is satisfactory the company will take regular shipments from Leadville. Quite an active movement is announced in zinc.

Placer Transfers.—A. D. Hunt, of Leadville, has sold 320 acres of placer ground, sloping towards the Park from the Mosquito Range, to the Flower Brothers and other New York men. He has also placed his Oliver Twist group, adjoining the London Mine, with Attleboro, Mass., men, while Salt Lake people have an option on another large placer acreage lying along Beaver Creek.

California Gulch Mining Company.—B. F. Follett has resigned as president, and H. H. Norton has been elected. H. W. Gaw has been elected chairman of the board of directors. A meeting will be held next week to determine plans.

First National.—Important development is under way. Shipments of sulphides are coming from the 160-ft. level.

Fryer Hill Mines Company.—This company was launched with a capitalization of $3,000,000 on May 1. It has secured long-time leases on 150 acres on Fryer Hill, embracing all of the old Union Leasing and Mining Company's territory, the old Dunton and surrounding territory. Operations will be conducted through the El Paso shaft. There are large bodies of low-grade ore exposed, but capital was necessary to handle the water. A pumping plant of 1,400 gal. capacity will be put in. The water stands 325 ft. from the surface, while the shaft is 585 ft. deep. It will take 3 to 6 months to drain the ground. The officers are E. A. Shedd, of Chicago, Ill., president; J. W. Newell, of Leadville, vice-president and manager; R. H. Malone, of Denver, treasurer; W. F. Page, of Leadville, secretary. Other directors are Geo. Ross-Lewin; B. M. Malone, R. W. Speers, of Denver; C. H. Marshall, of Chicago; W. W. Allen and T. S. Johnson.

Gold Basin Mining Company.—Two levels are being driven and a very rich gold streak is being followed. This work is on the old Big Four ground, and the operators are after the main vein. At the annual election E. J. McCarthy, J. F. Walsh, J. M. Ahern, P. Barker, P. H. O'Brien, C. W. Rogers, W. A. Polkinghorn and J E. Mulligan were elected directors.

Greenback.—In sinking at 1,315 ft. an entirely new sulphide shoot has been cut, showing now over 8 ft. of ore, dipping away from the old workings. It is a cleaner iron sulphide than the main shoot, and bucket samples showed 45 oz. silver, with a trace of gold and copper. At 1,350 ft. a drift will be run to connect with the old workings, and the Greenback can then ship 250 tons a day of good iron sulphides. P. Mulrooney and T. S. Wood, of Leadville, and a Mr. Peters, of Springfield, Ill., are interested.

Helen Gould.—This new copper proposition, in East Tennessee Park, is operated under the direction of M. Mankuss, of Louisville. The work is through a tunnel that has followed a rich copper vein 100 ft. The streak has widened to 18 in.

New Leadville Home Mining Company.—Development work is progressing from the Penrose toward the Alice ground. The low-grade iron shoot is very large and improving in grade. Shipments have increased from 150 to 225 tons a day.

Sierra Nevada.—This zinc-sulphide producer, operated through the Yak Tunnel, has just been sold to Kansas City parties by Reynolds & Hanifen, of Leadville, and arrangements are being made by the new owners to increase the output.

Youman Combination.—This is the Axiom, Camp Bird and Veldt claims in virgin ground, north of Mount Elbert, on which a number of prospecting tunnels show encouraging results. Arrangements are under way to run a 6,000-ft. tunnel on the vein. Geo. A. Youmans, of Leadville, is at the head of the concern.

MONTEZUMA COUNTY.

Mancos Consolidated Gold Mining and Development Company.—This concern, in which J. Doyle, locater of the Portland Mine at Cripple Creek, is the largest stockholder, is opening gold-bearing claims at the head of East Mancos River, 16 miles northeast of Mancos. Some 1,500 tons of ore taken by former workers from two of the claims, the North Star and the Sundown, averaged, it is said, about $40 per ton. A 10-stamp mill is in place, which will be used as a testing plant. The ore is said to lie in a blanket formation between limestone and quartzite and to be from 2 to 10 ft. thick.

MESA COUNTY.

(From Our Special Correspondent.)

Grand Junction Smelter.—W. C. Laughton has been appointed superintendent of the proposed new smelter at Grand Junction. The location is on the river, and 2 furnaces are to be constructed. Ore supply is counted on from the La Sal, Unaweep, Aspen, Red Cliff, Lake City and the northwest slope of the San Juan.

OURAY COUNTY.

Bachelor.—This mine, at Ouray, has increased its output of late. A monthly average of 25 cars of concentrates is now maintained. There is a high percentage of zinc in the ore produced, which requires very close concentration by an elaborate system of canvas slime tables. The mill is of the roller pattern and the only one of its kind about Ouray.

Judson.—This mine, at Gladstone, on the Silverton side of the range, is to resume operations before long. It is owned by A. Humphrey, of Ouray. It was first opened up about 16 years ago, when considerable work was done on it. Since then it has remained idle.

Ruby Trust.—This mill was compelled to reduce the number of stamps worked recently on account of a shortage of water, but is again working at its full capacity. About 60 tons of mill ore is taken out of the mine every 24 hours, and 50 men are employed in the mine and mill.

SAN JUAN COUNTY.

(From Our Special Correspondent.)

Sultana Mining Company—J. W. Conway is at the head of this company, which proposes to work the Grand Duke group of claims on Sultan Mountain.

Western Gold Mining Company.—This company has bonded from E. O. Buskirk and W. Haas the Crookson and Sunset claims, located in Deer Park. The company proposes also to develop the Montana group. A. H. Mundee, of Silverton, is general manager.

Zuni.—This mine, in Red Mountain District, is reported to have developed a fissure containing high-grade copper and silver ore.

SAN MIGUEL COUNTY.

(From Our Special Correspondent.)

German-American Consolidated Gold Mining Company.—This company, of Milwaukee, Wis., is to work a group of 12 claims just above the mouth of Swamp Canon, in Ophir District. The directors of the company are: Peter Barth, F. H. Blank, C. L. Brown, Max Wackler, A. L. Nickey, C. H. Morse and M. H. Case.

Tomboy Gold Mines Company, Limited.—This company has received all the lumber (over 1,000,000 ft.) and 4 car-loads of machinery for the new mill and other buildings to be constructed at the mines. Much of the lighter material has been taken in, and as soon as the snow is off the trail the heavier timbers and machinery will be taken up. The output at present is greater than ever before. From 50 to 60 cars of concentrates are shipped weekly to the smelters, and a large gold retort is brought to Telluride every 6 days. John Herron, of Telluride, is manager.

SUMMIT COUNTY.

(From Our Special Correspondent.)

Puzzle.—The concentrator at Breckenridge is working ore from this mine.

TELLER COUNTY—CRIPPLE CREEK.

(From Our Special Correspondent.)

Acacia Gold Mining Company.—The old Wrockloff shaft, on the north end of the Burns claim, has been sunk to 825 ft., and cross-cutting for the vein has started. Several cars of ore have been sent out recently from this lease, which is operated by McFarland & Ownbey. On the south end of the claim, in the old workings, Lessee Falve is taking out some fair ore.

Golden Cycle Mining Company.—The quarterly report for the first quarter of the year shows that the company earned $48,709. During this time the shaft was sunk 200 ft. and a large amount of new equipment bought. The tonnage in January was 3,552 tons, of an average value of $13.48, amounting to $47,906; in February, 3,342 tons, of an average value of $10.99, making $36,744; March, 3,419 tons of a value of $11.30, making $38,625. Cash on hand January 1, 1902, $7,588. Profits for January, $21,355; for February, $14,480; for March, $12,874. Received for rent of hoist, $136. Cash on hand April 1, $56,433. There are about 110 men on the pay roll. The

property is near the town of Goldfield, south of the Vindicator. Frank Campbell is general manager, and A. T. Holman superintendent.

Home Mining Company.—It is understood that the franchise held by this company, to mine ore under the streets and alleys of Cripple Creek, has been revoked. Considerable development done by the company some time ago failed to disclose any ore. Of late no work has been done. The company was under the superintendence of Cy. Hall, and consisted principally of outside capital.

Mint Gold Mining Company.—No work is underway now on this property on Gold Hill, near the town of Anaconda. The company includes the Pointer, Mollie Dwyer and Union Belle properties, which consolidated some time ago. A large plant of machinery was erected and considerable development work done in the main shaft. The Pointer has shipped considerable ore, but at present there is no sign of life around any of the shafts. The exact state of the company's affairs is not known to the public.

Strattons Independence, Limited.—This company has begun suit against the Strong Gold Mining Company for $1,750,000. The suit was filed in the United States Court in Denver. The plaintiff alleges that the amount is due for ore extracted by the defendant company from veins belonging to the Independence. It is understood that there will be a bitter fight. The Independence stockholders are principally Englishmen, while the Strong stockholders are mostly Colorado Springs people. The Strong is a close corporation. The properties are situated in and adjoining the town of Victor. Some years ago a big suit between the Strong and the Portland companies was pending, but was later compromised. William Lennox, of Colorado Springs, is general manager of the Strong, and H. A. Shipman, of Victor, is general manager of Strattons Independence, Limited.

Vindicator Consolidated Gold Mining Company.—The quarterly report shows that during the first 3 months of this year the output was 3,586 tons of ore of the gross value of $172,743, while the net returns were $139,013. After deducting operating expenses the profits were $60,523. The treasurer's report shows that the company had on January 1 $168,567. Out of this, however, $88,000 was paid to the stockholders as a regular 3c. dividend and an extra 5c., which reduced the reserve to $80,567. This, with the profits for the quarter ending March 31, makes the amount $141,000 on hand, but the last dividend of 3c. regular and 2c. extra, amounting to $55,000, will leave a balance of $88,090 in the treasury. It is understood that the mine is showing up in good shape. F. J. Campbell, of Denver, is general manager, and A. T. Holman, of Independence, is superintendent.

GEORGIA.

CARROLL COUNTY.

Bonner Gold Mining Company.—This company has added to its 10-stamp mill at Carrollton a Chilian mill, made by the Mecklenburg Iron Works, of Charlotte. This completes the company's mill equipment for handling the large body of saprolite ore now exposed. The soft rock is washed down by giants, run through a log washer, cleaned and sized for the mills, the stamps handling the coarse and the roller mill the fine product.

LUMPKIN COUNTY.

(From Our Special Correspondent.)

Cook Placer.—Henry V. Maxwell has leased this property from the Consolidated Company and is preparing for work.

Crown Mountain.—This company is running full time on the Preacher and Crown Mountain cuts, and keeping the mill fully supplied. Auxiliary reservoirs have been constructed for saving the surplus water. Ten more stamps and one additional Huntington are being installed. Some very rich ore has recently been encountered.

Dahlonega Consolidated.—This company is under the management of George H. Breyman. An electroplating plant has been installed, and the plates are being re-silvered. Tests of the various veins are being made, with a view to supplying the 120 stamps with ore. Twenty stamps are dropping at present, and more will be employed. The present ore supply is taken from an open incline on the Benning. This vein is a 25-ft. contact fissure, carrying free gold, chalcopyrite and galena. A recent mill test from the face gave an average value of $2 per ton on the plates and 50c. concentrates. As fast as conditions will admit, additional hands are employed. Mining and milling costs are said to be under $2 per ton. One Dimmick sizer and 4 tables have been installed, resulting in an increased saving of sulphuret values. The chlorination plant is employed, treating 200 tons of accumulated concentrates.

Standard Company.—This company is preparing to begin work at once on the Singleton, Tahloneka and Mary Henry mines. The ore will be treated on the Singleton and Mary Henry mills.

IDAHO.

ADA COUNTY.

Delhi.—The 10-stamp mill, near Boise, is now crushing ore. The mine and mill are owned by W. A. Magee, of Pittsburg, Pa. The ore is said to be milling $12 per ton in gold. The ledge is large and opened up to a depth of 400 ft.

Friday.—An Eastern company has bought this mine, near Pearl, and it is to be reopened immediately.

Overlook.—This group, in Neal District, consisting of 21 claims, owned by G. M. Parsons, E. W. Johnson and J. W. Murphy, of Boise, and people in Chicago, Ill., and Madison, Wis., is to be developed on a large scale. The company is to erect a mill with a capacity of 60 tons per day.

ILLINOIS.

SANGAMON COUNTY.

(From Our Special Correspondent.)

There is another scheme on foot for the consolidation of all the coal mines in the Springfield District, and the parties interested met in Springfield on April 28. This, like the previous schemes, is reported a sure go, but the mine owners of the district are beginning to lose faith in consolidators in general.

INDIANA.

DELAWARE COUNTY.

(From Our Special Correspondent.)

Home Oil Company.—This company, which has been operating near Selma, has sold its leases to the John Rock Oil Company, of Cleveland, O. The deal is said to be the largest of its kind that ever took place in the state. The exact figures are not obtainable. The new owners have already begun work and are sinking several new wells.

SULLIVAN COUNTY.

(From Our Special Correspondent.)

Little Grant Coal Company.—This company, of Pleasantville, has filed articles of incorporation with $100,000 capital, and will sink a large shaft. The company will also put down another shaft of about the same capacity.

W. S. Bogle Coal Company.—This company is sinking a mine that will have a capacity of 2,000 tons a day and employ 600 men. The company has purchased over 1,700 acres of land. The new mining camp will be called Glendora. The home office of the company will be located at Sullivan.

VERMILLION COUNTY.

(From Our Special Correspondent.)

Torry Coal Company.—This company, of Chicago, has closed its mine at Geneva and the machinery, tipple and many of the tenement houses will be shipped to Glendora, a new mining camp 3 miles north of Sullivan, where the company owns 1,800 acres of coal land. The Geneva mine has been the most steady-running in the district, and employed a large number of men.

MICHIGAN.

COPPER—HOUGHTON COUNTY.

(From Our Special Correspondent.)

Atlantic.—William S. Tretheway, head mining captain for the past 12 years, has resigned and will go to England.

Champion.—The Wisconsin Bridge and Iron Company has finished the steel work on the new boiler house at the stamp mill location. The work of installing 5 250-h.p. Scotch boilers, each 9 ft. in diameter and 16 ft. long, made by the Springfield Boiler Works, commences at once. At the mill work is delayed by the non-arrival of the stamps and pumping engine and it is uncertain when stamping will begin. Several jigs are in place and the concrete work for 2 heads is under way. One head at the Atlantic Mill is stamping 200 to 250 tons of rock daily.

Osceola.—The Tamarack Junior branch of this mine will not be closed down as reported. It is shipping nearly 525 tons per day, enough for 1 stamp.

COPPER—ONTONAGON COUNTY.

(From Our Special Correspondent.)

Adventure.—The intake tunnel at the stamp mill site on Lake Superior is out under Lake 400 ft., and it is being extended 175 ft. per month. It will furnish water for the mill. At the mine 16 power drills are in commission.

Victoria.—No. 2 shaft at this mine is sinking to the 16th level. Another boiler is being installed in the boiler house at No. 2 shaft.

IRON—MARQUETTE RANGE.

At the Richmond, Chester, Jackson and South Jackson mines in Negaunee, it is stated, work will be resumed as soon as necessary men can be secured.

Pickands Iron Company.—This company has been incorporated. The capital stock is $30,000. Among the incorporators are H. S. Pickands, of Cleveland, O., of Pickands, Mather & Co.; H. G. Dalton, of Cleveland, and J. R. Van Evera, of Marquette. The purpose of the company is given as to acquire, explore and develop mineral ore lands anywhere in the United States. The headquarters of the company will be in Marquette, with Mr. Van Evera in charge.

IRON—MENOMINEE RANGE.

Aragon.—The new No. 5 shaft is down about 890 ft. at this mine at Norway. Excellent progress is being made. The shaft is one of the best on the range.

Chapin.—Work on the 12th level cross-cut at this mine, at Iron Mountain, has started. It is proposed to drive the cross-cut between 300 and 400 ft. south and sink a new shaft. Superintendent Davidson is uncertain regarding the time when sinking will start, but it will be some time during the summer. At this shaft the great Cornish pump, built by the Allis Company, will be re-erected.

MINNESOTA.

(From Our Special Correspondent.)

Last week 23 large ships loaded ore at the docks of the Duluth and Iron Range road, amounting to about 100,000 tons. The shipments of this road for April are almost 400,000 tons gross, a big start. The rate is now established at 75c. from the head of Lake Superior, and all outside vessel owners have their ships in commission. The tug strike at all ports, arising from the strike at Duluth, is about over, and has hindered ships very little.

IRON—MESABI RANGE.

(From Our Special Correspondent.)

Eighteen loaded ore trains leave the Hibbing District daily for the docks at Duluth and Allouez Bay. This is at the rate of 1,000,000 tons a month. The Duluth, Missabe & Northern and Eastern Minnesota roads handle all this in addition to their traffic from other points.

Fayal Iron Company.—This company is working 4 steam shovels in the mine and shipping very rapidly. A large amount of stripping is under way by Drake, Stratton & Company.

Republic Iron and Steel Company.—This company has a small property in the s e ¼ of section 11, T. 58, R. 19, which will probably be opened this season. The company is now hoisting steadily from its Franklin, Bessemer and Union shafts at Virginia; it has the water at its Pettit Mine in section 25, T. 58, R. 17 under control; and it is mining in section 14, T. 58, R. 19. Its output this year will be reasonably large.

IRON—VERMILION RANGE.

(From Our Special Correspondent.)

Miller & Brown are exploring with diamond drill the fractional lots north of the Pioneer Mine between it and Long Lake. Dr. Conan owns the tract.

Oliver Iron Mingin Company.—This company has optioned the d'Autremont land in the n w ¼ of section 15, T. 62, R. 14, and will explore there at once. This joins the McComber property on which explorations are now in progress. The Oliver Company has also taken considerable other land in that vicinity.

Silverman.—Eastern parties have taken an option on the Silverman lands in section 25, T. 63, R. 12, between the Ely mines and Section 30, and will explore there. Parts of these lands were explored by the Minnesota Iron Company, and by Jones & Laughlins some years ago.

MISSOURI.

JASPER COUNTY.

Tornado Damages.—A terrific storm struck Joplin on April 25 and damaged mining property to the amount of $100,000. The destruction extended from the mining camp of Central City on the west to Duenweg and Prosperity on the east. The new mill of the Cumberland Lead and Zinc Company east of Joplin was totally destroyed. The mill and machinery cost $9,500. The plant of the Gussie K., south of Carterville was destroyed, the loss being $3,000. The mill and hoist house of the Olympia Mine south of Joplin was blown down with a loss of $1,000. Damage was done to the buildings of other mines as follows: Triangle Mine, Joplin, $1,000; Aida No. 3, Carterville, $200; West End, Duenweg, $600; East End, Duenweg, $5,000; Aida No. 1, $700. The damage was general for a distance of 8 miles east and west and from 1 to 4 miles north and south.

Joplin Ore Market.—The struggle for the mastery of the ore market between the smelters and the ore producers' pool continues, and the pool has about 4,500 tons of high-grade zinc ore piled up in the bins, for which it is said to be asking $37.50 per ton, while the highest price paid during the past week was $2.50 less. Most of the zinc ore bought, however, was much lower grade than that held by the pool and members of the pool are sanguine concerning the outcome.

The highest price paid for zinc ore during the past week was $35 per ton, for the Excel Mining Com-

pany's product, near Joplin. The next highest price was $33 per ton, which was paid for a number of other lots. Lead ore production was all sold at $21.75 per 1,000 lbs., the same price as has been paid since the first of the year.

Following is the turn-in by camps of the Joplin District for the week ending April 26:

	Zinc. pounds.	Lead. pounds.	Value.
Joplin	1,859,060	404,990	$37,573
Galena	1,791,280	127,970	26,070
Carterville	1,439,860	392,150	27,967
Carthage	204,290	.....	3,064
Aurora	741,200	34,610	9,264
Spurgeon	224,550	51,200	4,802
Duenweg	894,420	30,990	14,090
Cave Springs	179,770	2,180	2,744
Central City	123,810	.....	1,548
Webb City	379,680	18,150	5,331
Oronogo	246,930	11,010	3,901
Zincite	371,770	9,780	5,975
Carl Junction	241,860	.....	3,749
Granby	386,000	43,000	5,100
Fortuna	133,620	.....	2,205
Stotts City	126,200	.....	1,956
Wenworth	34,930	.....	524
Gillam, Ark.	32,000	.....	320
Total	9,411,230	1,126,930	$157,078
Total, 17 weeks	169,409,960	21,561,910	$2,815,192

Zinc value for week, $132,584; lead, $24,494; zinc value 17 weeks, $2,349,904; lead, $465.207.

MONITEAU COUNTY.

(From Our Special Correspondent.)

Moniteau County Mining and Smelting Company.—This company, of California, Mo., with a full paid capital stock of $48,000, has officers and directors, as follows: Fred R. Goerisch, president, St. Louis, Mo.; V. O. Bay, general manager, California, Mo.; W. H. Marshall, secretary, St. Louis, Mo.; H. W. Wirtz, treasurer, St. Louis, Mo.; F. S Spencer, director, St. Louis, Mo. The company has 262 acres of mineral-bearing land in this county under lease, with lead ore developed by shafts and drill tests.

MONTANA.

CARBON COUNTY.

Red Lodge Coal Mines.—The coal miners at Red Lodge returned to work recently, the troubles having been settled satisfactorily. In the future, whenever any grievances arise, the men are not to strike until an effort is made to settle the trouble with the local managers or with the officials of the company at Roslyn, Wash.

FERGUS COUNTY.

Abbey Cyanide Gold Mining and Milling Company.—Development is being pushed on the property. A large body of ore is reported encountered.

Barnes-King.—The company recently bought a steam hoist which will be used in development. Work is to begin on a shaft to prospect the ground between the present mine workings and the mill, and will be sunk 250 ft. At the present workings when the ore is blasted it falls into chutes, and is hauled out in 2-ton cars, drawn by a single horse. Two men are employed in loading and unloading them. Often as much as 100 tons are broken by one round of shots. The mill at Kendall has been running since last September, and over 100 tons of ore a day are put through the cyanide tanks.

Kendall Gold Mining Company.—The ditch to the company's power plant is completed, and water is going through the 6-mile pipe line to the Kendall Mill.

North Moccasin Gold Mining Company.—A shaft is being sunk on the Santiago lode at Kendall, and another will be started on the Santiago Fraction. The company intends to sink on the Santiago far enough to determine if the ore bodies on that ground continue in depth. Eight men are employed in the shaft.

GALLATIN COUNTY.

(From Our Special Correspondent.)

Montana Corundum Company.—After the organization of the company last November little work was done until the new year when operations started on the Section 23 shaft, which since has been sunk to 80 ft. and a drift has been run west 60 ft. In the west drift the workings are in rock of the same richness as in the shaft. To the east the deposit has been developed to a depth of 40 ft. for 250 ft.

A 10-h.p. Weber gasoline hoist has been put in and sinking will be continued at an early date.

On the Sunset claim one mile west a shaft has been sunk 50 ft. in rock and drifting started on the vein. Sinking will be resumed as soon as the drifts are far enough from the shaft.

Between the east and west workings, Elk Creek cuts the strike of the deposits at right angles, and one the west slope, which rises abruptly to 400 ft. and then gradually to nearly 1,000 ft. above the creek, several openings have been made and work has started on the lead. Work on the shafts is being pushed to give a mill supply until the tunnels open the rock to advantage. In the gorge work has started on the foundations for a mill and concentrator, the machinery for which has been purchased of the Colorado Iron Works of Denver, Colo., and will be delivered during June.

The plant consists of a Blake crusher, 2 sets of Improved Standard rolls, the necessary jigs, tables, dryer and graders, tromels, etc. It is expected to have the mill in operation before August 31.

The following are officers and directors: Harris Kirk, president; E. A. Stiefle, vice-president; Fred L. Klein, secretary; L. S. Ropes, manager; and Wm. Wraith, director. George Cox is treasurer. The principal place of business is at Bozeman and the manager's office is at the mine at Salesville.

JEFFERSON COUNTY.

Miner.—N. W. Pierson recently took a 2-years' lease on this claim, near Wickes. He is shipping regularly to Butte and has a crew of 30 men employed.

LEWIS & CLARKE COUNTY.

Big Indian.—The machinery and timbers for the 60-stamp mill at this mine, 4 miles south of Helena, are coming from the Allis-Chalmers Company, and construction has begun. The 12 heavy battery blocks, each weighing 12,500 lbs., are being put in. The total quantity of lumber to be used is 400,000 ft. The main working tunnel started last November is in 400 ft. and taps the ore at a depth of 150 ft. From this tunnel an upraise has been made to the bottom of the big open cut, and a boiler and hoist have been installed at the head, and sinking commenced on the shaft, which will go to 200 ft. Water has been struck in the tunnel, doubling the supply for the mill.

Wire has been purchased for the power line from East Helena and for the telephone line, which is being constructed up Holmes Gulch. A contract has been made for 160-h.p. from the Missouri River Power Company. A new bunk house and boarding house are being built. The force employed soon will be largely increased. Allen C. Mason is president of the company.

East Helena Smelter.—Furnace men employed at this plant of the American Smelting and Refining Company are out on strike, and the entire plant may be closed. The men are striking because the company refuses to recognize the Smelters' Union. It is alleged that the company has been gradually discharging union men who were leaders in the strike over a year ago. About 500 men have gone out. It is reported that the company may close the smelter and send its ore to its Denver, Pueblo and other smelters.

Montana Mining Company.—This company has begun the development of the Noya claim, owned by Jacob Shafer, in the Park District, south of Helena. The Noya is an undeveloped claim a short distance from the old Whitlach-Union, which is on the low divide between Grizzly and Oro Fino gulches. It has a large surface showing of gold-bearing ore. Work has begun with 6 men in 2 shifts who are sinking a shaft with a horse whim.

MADISON COUNTY.

Red Chief.—This mine, at Red Bluff, is owned by S. T. Hauser and A. M. Holter, of Cleveland, O., and the estate of R. O. Hickman. A recent shipment of 2 cars of ore to the Colorado Smelter, at Butte, is reported to have netted $1,983.

SILVER BOW COUNTY.

Judge Harney, of Butte, on April 26, ordered John Forbis and Lo Evans, two Butte attorneys, representing the Amalgamated Copper Company, committed to jail for contempt. They were released shortly after on a writ of habeas corpus issued in Helena by Chief Justice Brantley in Chambers. Judge Harney's action was due to the refiling of the affidavits reflecting on him in the decision of the Minnie Healey mining case in favor of F. Augustus Heinze. When motion was made by Miles Finlen for a new trial Judge Harney ordered these affidavits stricken out. In their new bill of exceptions Forbis and Evans again included the objectionable affidavits.

United Copper Company.—It is announced that all the Heinze copper properties in Montana have been turned over to this new company, and that a strong syndicate of bankers and copper people has underwritten the financial arrangement. It is stated that the arrangement provides for a large working capital, as also provision for acquiring additional properties. The common stock of the company will probably not be ready to be issued for a few weeks.

The capital stock is divided into $5,000,000 preferred and $75,000,000 common stock. It is provided that the issued capital stock shall not exceed $5,000,000 preferred and $45,000,000 common, except upon the affirmative vote of ¾ of the directors of the company, and the holders of 2-3 of the stock of each class. It is provided that the preferred stock shall draw 6 per cent cumulative dividends, payable semi-annually. The articles have a proviso that the company may sell its entire plant with the consent of ¾ of the directors and the holders of 2-3 of the stock of each class. The registered agent of the company is the Hudson Trust Company, of Hoboken, N. J., and the incorporators are Horatio Whitridge Trumbull, of New York City; Arthur A. Brownlee, of Princeton, N. J., and John French, of New York City.

It is stated that the new company will have 95 per cent of the capital stock of the following concerns:

	Shares.	Par Value.	Total.
Montana Ore Purchasing Company	100,000	$25	$2,500,000
Nipper Consolidated Co.	150,000	25	3,750,000
Minnie Healey Copper Mining Co.	2,000,000	1	2,000,000
Cora-Rock Island Copper Mining Co.	2,000,000	1	2,000,000
Belmont Copper Company	2,000,000	1	2,000,000
Total			$12,250,000

The company will also have $1,000,000 of the first mortgage bonds of the Montana Ore Purchasing Company and $2,500,000 first mortgage bonds of the Nipper Company. These bonds represent the only bonded indebtedness of the companies named.

A peculiar feature of the new combination is that fractional interests are held out. Besides the undivided interest in these companies held by the Anaconda Company, there are other small fractional interests in some of the claims, as the Nipper, held by third parties.

NEVADA.

STOREY COUNTY.

Mexican Mill.—This old mill at Empire, on Carson River, 3 miles from Carson, is being turned into junk. This concern was known as the Silver State Reduction Works, and ground out more of the bonanza ore of Gold Hill and Virginia than any other. It once belonged to Senator Sharon, subsequently to Senator Jones and the Union Mill and Mining Company. Now the most interesting point of its demise will be the clean-up around its old batteries and pans. The water power will be utilized by ex-Governor Adams in the grinding of gypsum from his mine nearby for plaster and also for furnishing electric light and power to Carson.

WHITE PINE COUNTY.

Monitor.—This claim, at Ely, owned by Governor Sadler, Sol Hilp, Judge Cheney and Thomas Wren, has been sold to a New York Company.

Phoenix.—This group of mines, near Ely, is reported sold for $65,000 to Boston, Mass., men.

NEW JERSEY.

HUDSON COUNTY.

Arlington Copper Company.—This company has a large plant in North Arlington that has been closed several months owing to its failure to treat the ore successfully. At a recent meeting of the directors at Rutherford the officials of the concern opposed, it is said, any change in the system installed. Propositions were received from two mining engineers in reference to assuming charge of the mine and plant. Another offer was received from the Closedale Mining Company, of Denver, Colo., which was willing to take a part interest in the mine and run it successfully. Addison Ely, the general counsel of the company, said that the plant would be started under some system within a very short time. The general office of the company has been transferred to Rutherford. The plant, which, up to the present time, has been a failure, cost, it is said, nearly $75,000.

NEW MEXICO.

COLFAX COUNTY.

Willow Creek Placer Company.—This company has been organized by Las Vegas men and has a capital stock of $100,000. The officers are: H. G. Coors, president: D. C. Winters, vice president; C. C. Gise, treasurer: J. A. Carruth, secretary; F. A. Edwards, superintendent. The company will operate the Willow Creek placers on the southwest slope of Baldy Mountain, 4 miles east of Elizabethtown. The property comprises more than 300 acres of unworked ground, as well as a large quantity of tailings. The company desires to put in larger dams, several hydraulics and other improvements.

NEW YORK.

Oatka Mining Company.—Articles of incorporation were filed with the Secretary of State recently by Edward M. Bassett, attorney for the company. The capital of the company is $500,000, divided into shares of $100 each. This company has been formed for the production of rock salt. The incorporators are Lieut.-Gov. Timothy L. Woodruff, ex-Gov. George E. Lounsbury, of Connecticut; S. G. Whiton, president of the Worcester Salt Company; Joseph M. Duncan, vice-president of the Worcester Salt Company; Lorenzo Benedict, secretary of the Worcester Salt Company; Lucius H. Bigelow, president of the Duncan Paper Company and a director of the Merchants' Exchange National Bank; and Edward M. Bassett, attorney, of New York City. The company will do business in the Genesee Valley.

This company is working on the Moulton farm just over the Middlebury line, near Warsaw. A salt

well was sunk upon this property in 1883, but owing to business complications nothing came of it. The extent of the salt deposit however is said to have been all that could be desired.

OHIO.

Eighty-four thousand acres of coal land located in Belmont and Monroe Counties, Ohio, and Wetzel County W. Va., were recently purchased by New York people at a cost of $1,500,000, the rate being $18 per acre. Clarence Birseye, a New York attorney, headed the Eastern people, who are said to represent M. A. Hanna & Company, of Cleveland, O. The Hanna interests have been after the property 2 years. Immediate development will be undertaken.

BELMONT COUNTY.

The C. Troll's Sons' holdings north and south of St. Clairsville, consisting of 5,327 acres, the Troll property proper, the Glen mines, 1,327 acres, and Cox Run property of 2,800 acres, a total of 9,500 acres, have been sold. There are 4 operating mines in the transfer, and all are available to 4 different lines of railroads. The purchasers are Captain Alfred Hicks, of Pittsburg, and Thomas K. Maher, of Philadelphia. Prices reported paid on each tract are: Trolls' mines, $550,000; Glen mines, $80,000; Cox Run property "not opened," $150,000; a total of $785,000.

OREGON.

BAKER COUNTY.

Gem Consolidated Mining Company.—This company has been formed to work the Gem Mine in the Sparta District. The incorporators are Albert Geiser, William Pollman and D. W. French. The place of business is Baker City, and the capital stock is placed at $1,000,000.

JACKSON COUNTY.

Shorty-Hope Mining Company.—Five men are at work under the foremanship of T. W. Hill in cleaning out the ditch, repairing storm damages and repairing tunnels, etc. A 750-ft. drift tunnel is to be driven on the ledge, which will give 110 ft. of stoping. This work is to begin on the Northwest Extension of the property, 750 ft. north of the Shorty shaft. The mine has been idle 2 years. There is a 10-stamp mill and other equipments on the property. The mine is 3 miles from Ashland.

JOSEPHINE COUNTY.

Bill Nye.—Major Andrus is superintendent of this mine, 4 miles west of Grant's Pass. A rich strike is reported in a 50-ft. shaft on the ledge.

Champion.—A. C. Merrill and George St. John own this mine at Williams. They have had Sullivan drills, compressor, boilers and receivers, etc., taken to the property, where they will do some extensive development work.

Gold Bug.—This property, on Mount Reuben, closed down temporarily to put in a stronger hoist and a new pump.

Oregon & California Gold Fields, Limited.—This new company is headed by George A. Cole, a Missouri zinc miner, who is also a large stockholder and president of the Oregon Consolidated Company and the Victory Mining Company. The Oregon & California Company recently bought the Eureka Mine. Walter de Varila is vice president and manager, and F. D. Russell, secretary and treasurer. The capitalization is $1,000,000. The company's machinery has arrived. It consists of a 10-stamp Hammond mill, 4 drill Leyner compressor, a complete electric light plant, and a hoist to be operated by compressed air. The company is also putting in an additional 50-hp boiler. All this machinery is now being hauled out to the property, and the Eureka will soon be working a large force of men.

Roaring Gimlet.—This mine, 2 miles from Grant's Pass, on Kane's Creek, recently shipped 20 avoirdupois pounds of gold to the mint at San Francisco. The gold was panned out by hand from a rich pocket struck in the ledge. The present owner, Mr. Mendenhall, purchased this property a month ago from Sutton & Reese, paying $10,000 for it. The strike was made in a drift in a 70-ft. shaft.

PENNSYLVANIA.

ANTHRACITE COAL.

Philadelphia & Reading Coal and Iron Company.—This company makes the following statement for March and the nine months of the fiscal year from July 1 to March 31:

	March.	Nine Months.
Earnings	$1,772,285	$21,928,904
Expenses	1,725,273	20,102,800
Net earnings	$47,012	$ 1,826,104

For the nine months there was an increase of $799,222 in gross earnings; an increase of $638,046 in expenses; and an increase of $161,176 in net earnings.

Algonquin Coal Company.—The Delaware & Hudson Coal Company has purchased the Pine Ridge and Laurel Run collieries of the Algonquin Coal Company and will take charge May 1. The mines are considered very valuable. The Pine Ridge has an output of 225,000 tons a year and employs 620 men, while the Laurel Run has an output of 125,000 tons and employs 460 men.

The Delaware & Hudson Coal Company is reported to have decided to erect a new breaker at the Pine Ridge colliery.

BITUMINOUS COAL.

Thomas G. Murray, of Blairsville, has secured a contract for erecting a modern coke plant with 126 ovens at Oklahoma, south of Graceton, Indiana County, for Joseph Wharton, of Philadelphia, who is developing coal fields there. The contracts will amount to over $100,000.

J. L. Gill, of Flinton, and R. Smith, of Lilly, who last summer secured options on 3,600 acres in Chest and White townships, have sold their holdings to R. E. Jackman, of Carrolltown. The sale also included a mine and 400 acres of coal land on the premises of J. L. Gill, near Flinton. One-half the stipulated price, $45 an acre, is to be paid on May 18, and it is said Mr. Jackman will at once pay off the options and develop the coal.

Bituminous Coal Production.—According to the statistics just issued by the Pennsylvania Bureau of Mines the 12 bituminous districts of the State in 1901 produced 80,914,235 tons of coal. The total production of coke in the State was 13,125,156 tons. A total of 117,602 persons, exclusive of the coke drawers, were directly employed in the coal industry. Pennsylvania has a total of 31,841 coke ovens.

Merchants' Coal Company.—This Baltimore, Md., concern, of which Thos. T. Boswell is president, denies the report that negotiations are pending for the sale of its holdings in Somerset County to the Berwind-White Company.

Penn Gas Coal Company.—This company is about to develop 2,500 acres of land at Marchand Station, near Irwin. It will be a slope mine, with an automatic chain haulage. The power will be steam and compressed air, and the output will be about 1,500 tons daily. The 50 coke ovens nearby are being overhauled and 50 new ovens will be constructed.

TEXAS.

BREWSTER COUNTY.

(From Our Special Correspondent.)

Cinnabar Discoveries.—Considerable excitement has been occasioned over the discovery of cinnabar about 5 miles east of the known belt and in a different formation. The ore so far taken out is of low grade, but appears to be quite a body in an eruptive rock. Some of the ore is in a jet black soft substance like asphaltum, and some is found in a yellowish clay. A number of claims have been staked off, but development work has been done on only a small piece of ground. This discovery proves the mineral-bearing territory to be about 11 miles in length east and west. Some of the claim holders without capital are anxious for some one to erect a customs quicksilver smelter.

Lindheim & Dewees Company.—This company's 45-ton quicksilver furnace near Terlingua has been running about 6 weeks and is turning out a large lot of quicksilver.

Tigner-Colquitt Company.—This company is having brick made for a 20-ton quicksilver furnace at Terlingua. It has about 10 claims located on sections 38 and 44, block G 12.

UTAH.

(From Our Special Correspondent.)

Ore and Bullion Settlements.—Settlements at Salt Lake for the week ending April 19 are reported as follows: Silver lead ores, $113,400; copper bullion, $19,000; auro-cyanides, $5,000; gold bars, $99,700; bullion, $47,700.

For the week ending April 26 the settlements reported by the banks are as follows: Silver lead ore, $143,800; bullion, $57,100; gold bars, $17,500; auro-cyanides, $3,000.

BEAVER COUNTY.

(From Our Special Correspondent.)

Frisco Shipments.—For the week ending April 19 the Horn Silver shipped 7 cars ore to the samplers in Salt Lake. The Majestic Company during the same week shipped 13 cars copper ore that is reported to have assayed 40 per cent copper, 7.7 oz. silver and high in gold.

In the week ending April 26 the Horn Silver shipped 12 cars ore to the smelters.

Blackbird Company.—It is reported that the disputes between Samuel Newhouse and the Blackbird Company have been settled out of court. The Blackbird Company property entirely surrounds the Cactus group in Copper Gulch, belonging to Mr. Newhouse. In the compromise each party takes a portion of the ground claimed by both. It is said also that the water pumped from the old shaft on the Blackbird is being used at the experimental mill on the Cactus, now in charge of J. M. Callow.

Hayseed.—A find of telluride ore is reported in surface rock badly leached, but an assay showed $2.50 in gold. It is stated the property will be worked this summer to ascertain the extent of the lode.

Majestic.—Through A. B. Lewis, president of the company, final payment has been made on the bond covered by deed to this company, and the deed is delivered. It is said that the company will devise plans for a smelter and increase the working force immediately.

BOX ELDER COUNTY.

(From Our Special Correspondent.)

Century.—The last monthly clean-up from the new mill made a $2,000 gold brick. John Rosevear, of Park Valley, is superintendent.

JUAB COUNTY.

(From Our Special Correspondent.)

Tintic Shipments.—During the week ending April 19 the following consignments of ore and concentrates were sent to the smelters at Salt Lake: Eagle & Blue Bell, 2 cars ore; Grand Central, 7 cars ore; Carisa, 5 cars ore; May Day, 2 cars ore and 2 cars concentrates; South Swansea, 1 car ore; Yankee Consolidated, 4 cars ore; Mammoth, 6 cars ore; Lower Mammoth, 4 cars ore; Bulion-Beck, 6 cars ore.

Shipments to the smelters at Salt Lake during the week ending April 26 are as follows: Yankee Consolidated, 6 cars ore; Bullion-Beck, 4 cars ore; Lower Mammoth, 4 cars ore; Scranton, 3 cars ore; Mammoth, 1 car ore; Carisa, 19 cars ore; May Day, 2 cars concentrates; Utah Lease, 1 car ore.

Mining Freights Situation.—It is reported that officials of the railroads from the various camps are anxious to join with the smelting companies in securing lower rates and prices for handling low-grade ores of Utah camps. The railroads want increased tonnage, which would result in increased passenger lists. There is a strong feeling among mining men that the smelters ought to reduce treatment charges decidedly, even though this should mean less profit.

Mammoth.—The mill, which closed down for repairs on March 2, has again started up. It has been fully overhauled and is in excellent condition.

South Swansea.—Manager L. E. Rite reports a new strike on the 850-ft. level. What was supposed to be the footwall was broken into and found but a few inches thick. On the other side lay a body of ore that up to the latest advices is said to be 14 ft. thick.

SALT LAKE COUNTY.

(From Our Special Correspondent.)

Bingham Shipments.—During the week ending April 19 the output from the camp was as follows: Storey, 1 car ore; Ben Butler, 1 car ore; New England, 2 cars ore; Burning Moscow, 2 cars ore; Columbia, 2 cars of concentrates. The Utah Consolidated shipped 3 cars of copper bullion to the eastern refineries, aggregating 180,000 lbs.

During the week ending April 26 the following cars of ore were sent to the Valley samplers: Neptune, 6 cars; Phoenix, 1 car; Storey, 2 cars; Ben Butler, 4 cars.

Bingham Consolidated.—The big blowing engines at the new smelting furnace have been given a trial run, and the plant is reported practically ready for work.

Niagara Mining and Smelting Company vs. United States Mining Company.—William Steele and other stockholders of the Niagara Company at Bingham have made some sensational charges in an action filed in the District Court against that company, the U. S. Mining Company, the Union Trust Company, the American Trust Company, and C. A. Hight, F. W. Bachelder, Wm. P. Moller, and A. F. Holden. The intent is to set aside the sale of the Niagara Company to the United States and have a receiver appointed for the Niagara. It is also asked that the 30c. a share assessment on the capital stock of the Niagara Company be declared illegal and void and the collection of the assessment enjoined; that the trust companies mentioned be enjoined from attempting to foreclose the mortgages or deeds of trust upon the property of the Niagara Company, and that the Niagara be compelled to return all of its records to this state in order that the attorneys for the plaintiffs may have free access to them. This action is based on allegations that the United States has employed unfair methods in trying to acquire title to the property of the Niagara stockholders.

SUMMIT COUNTY.

(From Our Special Correspondent.)

Park City Shipments.—During the week ending April 19 the following consignments were received at the Macintosh Sampler: Quincy, 449,710 lbs.; Daly-West, 2,355,610 lbs.; Ontario, 1,276,200 lbs.; Anchor, 208,020 lbs.; Silver King, 1,345,840 lbs.

During the week ending April 26, shipments were as follows: Anchor, 432,550 lbs. ore; Daly-West, 2,864,780 lbs. ore; Ontario, 1,187,700 lbs. ore; Silver

King, 1,649,580 lbs. ore, making the total 6,134,610 lbs. for the week.

Daly-Judge.—A reported interview with Manager J. J. Daly says that the first work planned is to find the ore bodies and determine their size and value, then a mill adequate to the demands of all the ores the holdings would yield would be a matter of course.

Daly-West.—J. E. Bamberger has returned from his tour of inspection and is reported as saying that the mine is looking better than ever since the consolidation. The Quincy part of the holdings is producing about 70 tons daily and the Daly proper is turning out about 170 tons, but the tonnage will be increased as soon as the roads are in good condition. J. McSorley has resigned as foreman and accepted the position of superintendent of the Daly-Judge. His position at the Daly-West is still vacant.

TOOELE COUNTY.

Ophir Queen Mining Company.—With a capital of $250,000, divided into shares of the par value of 25c. each, this company, owning the Ophir Queen group of 5 claims adjoining the Ophir Hill in Ophir District on the east, has been incorporated. The officers are: Brigham T. Cannon, president; Robert Mulhall, vice president; J. B. Weimer, secretary and treasurer; H. G. Twomey and J. Weimer completing the board of directors. A shaft is now down 30 ft. on the claim. In addition to the 5 claims owned by the company, bonds have been secured on 2 or 3 adjoining claims.

(*From Our Special Correspondent.*)

Dug-Way Shipments.—The Belcher reports 1 car of ore sent to the smelters during the week of April 26. This was hauled 90 miles by wagon, and is some of the first ore from this promising district.

Fish Springs Shipments.—The Utah reports 2 cars of ore and the Emma 1 car of ore for the week ending April 26.

Stockton Shipments.—During the week ending April 19 the following consignments were made to the smelters at Salt Lake: Ophir Hill, 8 cars of concentrates; Cygnet, 1 car of ore.

During the week ending April 26 the following consignments were sent to the smelters: Ophir Hill, 32 cars of concentrates; Stockton, 1 car ore.

VIRGINIA.

ALLEGHENY COUNTY.

Virginia Coal and Ore Company.—This company has secured a tract of land at Low Moor, consisting of 15,000 acres. It was the property of the Rich Patch Ore and Iron Company. About 9,000 acres are said to carry iron ore and the balance to contain a vein of steam and coking coal from 6 to 7 ft. thick.

WASHINGTON.

FERRY COUNTY—REPUBLIC.

(*From Our Special Correspondent.*)

Black Tail.—Work will be resumed about May 1.

Butte & Boston.—Ore has again been struck on the lower level, assaying, it is said, over $50 per ton.

California.—A 7-mile wagon road is under construction to a site selected for an ore bin. A side-track will run from the main line of the Washington & Great Northern Railway to the ore bin.

Flag Hill Gold Mining Company.—A new board of trustees has been elected as follows: Phillip Creasor, J. A. Bangs, Fred Birney, D. F. Hallahan and F. E. Elmendorf. President, P. Creasor; Vice-president, F. O. Birney; secretary and treasurer, J. A. Bangs.

Gold Ledge.—A contract has been let to continue the tunnel to the intersection of the vein, at 100 ft. north of the bore hole. The tunnel is now in 916 ft.

Morning Glory.—Rich ore is being stoped on the 235-ft. level from a 12-in. vein. Two others are also being stoped. The ore is assorted outside the mine, and first class runs up to $500 per ton, showing native gold.

North San Poil Gold Mining Company.—H. E. Forster, president; J. W. McCann, vice-president, and J. A. Bangs, secretary and treasurer, compose the board of directors.

Princess Maud.—The north drift on the tunnel level is in 110 ft.

Quilp.—Work on this property will be resumed about May 1, depending on the completion of a spur of the Washington & Great Northern Railway to the ore dump.

San Poil.—Work will be resumed about May 1.

Trade Dollar.—The shaft is down 255 ft.

Washington & Great Northern Railway.—Spurs and side-tracks are under construction for reaching every mine in Republic likely to ship ore.

OKANOGAN COUNTY.

Waukegan-Washington Mining Company.—This company, operating near Bossburg, is planning extensive improvements. The company has purchased from C. F. Bruff, manager of the Bradley Engineering and Machinery Company, of Spokane, a $10,000 plant, including Corliss engines and a 10-drill compressor, which will be installed at once. A concentrator is being secured for the ore, which is a gold-copper proposition. The officials expect to spend about $75,000 in equipping the property.

WEST VIRGINIA.

HARRISON COUNTY.

The Columbia Coal and Coke and the Cleveland, Fairmont & Baltimore companies are reported absorbed by the Fairmont Coal Company and Clarksburg Fuel Company. The Short Line Fuel Company recently purchased almost 10,000 acres, and expects to open a number of mines this summer and develop the territory as fast as possible. The Fairmont Company is said to have practically closed a deal for the purchase of the Luhrig Coal Company, an Ohio corporation.

MARION COUNTY.

(*From Our Special Correspondent.*)

Riverdale Coal Company.—This company, C. F. Evans, president, on April 24, sold its mine, located on the Monongahela River Division of the Baltimore & Ohio Railroad, near Fairmont, to the Fairmont Coal Company.

WYOMING.

CARBON COUNTY.

Towers for the 15½-mile Encampment-Battle Lake aerial tramway have recently been erected up to the snowline in the mountains. Another saw mill has been set up, and work on the towers will go forward more rapidly. Four miles of cable have been strung, and additional cable is being hauled in from the railroad at Walcott.

FOREIGN MINING NEWS.

AFRICA.

RHODESIA.

The gold output for March is reported at 16,891 oz. crude, the largest production ever made in one month. For the three months ending March 31 the total was 56,050 oz. crude, against 37,313 oz. in the corresponding period in 1900; an increase of 8,737 oz., or 23.4 per cent. The total this year was equal to 40,985 oz. fine gold, or $847,160.

ASIA.

KOREA.

Oriental Consolidated Mining Company, Limited.—This company, incorporated some time ago under the laws of the State of West Virginia, with a capital of $5,000,000, for the purpose of developing a number of gold mining properties in Corea, has placed an order, through the Allis-Chalmers Company, for an outfit to electrically light an 80-stamp Allis-Chalmers mill. This will mark the introduction of electric lighting in Korea for mining purposes. The company's mines embrace an area of about 50 miles, and are located some 250 miles north of Chemulpo. The company has offices in New York Cit. James B. Haggin and Ogden Mills are interested.

AUSTRALIA.

NEW SOUTH WALES.

Sulphide Corporation.—The Australian *Mining Standard* of March 6 says: "Great interest attaches to the distillation of zinc from briquetted ores, as now carried on at the works of the Sulphide Corporation at Cockle Creek. The first of the furnaces was started a few days ago, and in five days 12 cwt. of crystallized zinc had been obtained. The success of the initiatory experiments has been so pronounced that a second furnace will be put into operation as soon as possible, and the manager, Mr. Savage, expresses confidence that the manufacture of zinc will prove a source of profit. The furnace, which has been set to work, employs 10 men. It is fired by gas, which is produced from small coal on the spot. In the furnace are a number of retorts, which are charged with briquetted ores, and the zinc when distilled is drawn off. Success is rendered possible mainly by the concentration of the zinc ores by the magnetic process."

CANADA.

BRITISH COLUMBIA—BOUNDARY DISTRICT.

Boundary Ore Shipments.—Shipments for the week ending April 19 and for the year to date are given as follows:

	Week.	1902.
Granby Mines, Phoenix	9,862	89,967
Snowshoe, Phoenix	....	660
Mother Lode, Deadwood	2,432	41,352
Sunset Deadwood	150	150
Winnipeg, Wellington	95	490
Golden Crown, Wellington	30	540
No. 7 Mine, Central	....	250
Sewal, Long Lake	270	1,140
Granby Smelter treatment, tons	9,898	89,115
Mother Lode Smelter, tons	2,950	43,195

Number Seven.—This mine has cut the vein at the 300-ft. level and has drifts at the 60 and 120-ft. levels. The ore at the 300-ft. level is reported of the same character as higher up.

BRITISH COLUMBIA—EAST KOOTENAY DISTRICT.

Mining Conditions.—At Marysville work is progressing steadily on the shelter. At the North Star Mine, at Kimberley, about 50 men are busy. On the Sullivan it is the intention of the management to put a large force at work as soon as the smelter is completed. The mines on Tracy Creek, near Fort Steele, are showing up well. On Wild Horse Creek there will be considerable placer mining this summer. On Perry Creek a great deal of work has been done during the winter, particularly on the deeper properties. A company of Wisconsin men has purchased a number of placer leases and is putting in a hydraulic plant on this creek to work not only the bed of the creek, but also the bench placer lands.

Crow's Nest Pass Coal Company.—Col. E. J. Taylor, of Pittsburg, Pa., the mining engineer, who examined this company's coal field, and having been sent to recommend to the Canadian Government, the proper place to make a selection of the 50,000 acres, which would be of an average value of the entire coal field, has made his report. He states that the coal field is located in mountainous country surrounded by the valleys of the Elk River, Michael Creek, Flathead River and Lodge Pole Creek. The length of the field from south to north is 30 miles, and its width about 12 miles. He states in some places there is a total workable thickness of 60 ft., and if 2 seams of coal were found in Morrissey Creek, these, together with the 5 seams already exposed, would make a total thickness of 152 ft. of coal, and adds that he does not see any reason why these seams should not be found to extend to Michael Creek.

He recommends to the Government that all the coal lying between Morrissey Creek and the out-cropping of the seams on Lodge Pole Creek be selected and that a dividing line be drawn from a point at the junction of the north and south branch of Morrissey Creek, near the openings of the Crow's Nest Pass Company, from this point north until it intersects with a line running east and west, through the most southern side of the property now owned by that company on Marten Creek, and that the greater part of the 50,000 acres be selected to the east and south of these lines. In conclusion, he strongly recommends the selection of the field at Morrissey Creek as the present developments indicate that the coal there is at its maximum thickness and lies in the mountain so that it can be economically mined, that 2 main lines of railways will be easily accessible.

BRITISH COLUMBIA—NELSON DISTRICT.

Queen.—The surface tramway from the portal of the main shaft to this mine, at Ymir, to the Yellowstone Company's 10-stamp mill is completed. The plant is to start on ore from the Queen. The mill has a capacity of 25 tons per day. The Queen has been developed by 3 tunnels, and is reported under bond to Judge P. McL. Forin, Archibald Cameron, Gerald Hopkins and M. Holmes for $50,000.

Ymir.—At this mine, near Ymir, the big Blake 10 by 20-in crusher has been installed at the mill. It has a capacity of over 600 tons per day, and is designed to replace the rotary crusher now in use. The tramway from the mine to the mill will probably be used for some months, but everything is ready for work through the long tunnel. Drifting is under way on the vein at the end of the 1,000-ft. tunnel. At the cyanide works about 200 tons are treated daily, and the values saved are reported greater than anticipated.

BRITISH COLUMBIA—ROSSLAND DISTRICT.

Rossland Ore Shipments.—Shipments for the week ending April 19, according to the Rossland *Miner*, were as follows:

	Week.	Year.
Le Roi	5,890	82,419
Le Roi No. 2	1,650	19,050
Cascade	....	300
Bonanza	....	90
Velvet	....	250
Centre Star	270	2,830
Rossland, Great Western	250	1,800
War Eagle	....	90
Spitzee	20	20
	8,080	106,849

Centre Star.—Interest centers in the program of development in the lower levels. This is prosecuted steadily.

Le Roi.—Development of the lower levels is proceeding steadily.

Le Roi No. 2.—No alteration has been made in connection with the programme of development, save that the shipments are being steadily maintained at the increased figures. The March shipments were 5,175 tons, containing 3,013 oz. gold, 7,900 oz. silver, and 146 tons copper.

Spitzee.—Cross-cutting has started on the 100-ft. level to the south of the west drift. A car of ore taken out in the development has been shipped to the Trail Smelter.

BRITISH COLUMBIA—SLOCAN DISTRICT.

Slocan Ore Shipments.—The total amount of ore shipped from the Slocan and Slocan City mining divisions for the year 1901 was, approximately, 30,000 tons. Since January 1 to April 12, 1902, the shipments, according to the New Denver *Ledge*, have been as follows:

	Week.	Total.
Payne		235
Ivanhoe		255
Sunset (Jackson Basin)	20	641
Reco		302
American Boy	41	349
Arlington	40	1,051
Hewett		596
Bosun		420
Last Chance		130
Wonderful		60
Enterprise	20	260
Monitor		402
Queen Bess		142
Silver Glance		35
Whitewater		1,698
Ottawa		7
Neepawa		60
Hartney		20
Marion		88
May		5
Paystreak		5
Surprise		20
Slocan Star	41	125
Duplex		7
Emily Edith		20
Prescott		4
Rambler		1,260
Total tons	162	8,467

Arlington.—It is said that March was one of the best months in the history of the mine, the ore running high grade, while one car of 20 tons is reported to have netted the company $3,000. The mine is in excellent shape. J. Frank Callow, of Slocan, is managing director.

Payne.—The connection completed between No. 5 and No. 8 levels gives opportunity to open up the 3 levels which are being run into the large ore zone below No. 5 tunnel, in which but little prospecting has been done. The concentrator is ready for operation. The electric plant, to furnish the power for the concentrator and for the drills, will soon be in position, and it is thought that all the machinery will be ready to start by June 1. Development is pushed by a force of 60 men. The electrical drills put in several months since are reported doing good work. A. C. Garde is manager.

BRITISH COLUMBIA—YALE DISTRICT.

Fraser River Gold Dredging Company.—This company, which operates a dredge near Lytton, adopted the designs prepared by F. Satchell Clarke, an Australian engineer. Recent test runs are reported very satisfactory, and the company has placed an order for 3 more dredgers of similar type.

Other companies owning ground on the upper reaches of the Fraser and on the branches of the Thompson River, one of the largest tributaries of the Fraser, have been watching the experiments with considerable interest, and will commence active operations. The Boyd Company, which completed last fall a $60,000 dredge, has secured ground and started work.

ONTARIO—LAKE OF THE WOODS DISTRICT.

(*From Our Special Correspondent.*)

Wendigo.—This gold mine, at Witch Bay, has been sold to United States capitalists and development work will be pushed as soon as the boats run. A mill will be erected during the summer. There are two shafts of 125 and 75 ft. respectively and a lot of drifting. A 300-ton mill test on the ore went over $6 per ton.

Combine.—As soon as navigation opens this mine will start its 10-stamp mill. The company intends expending a large amount of money in developing the several veins that are known to exist on the property.

Flint Lake Gold Mining Company.—Theo. Bridenbach goes out to Flint Lake by the first boat to erect a mill on the property. This is a subsidiary company to the Westfield Investment Company and has a large body of good grade ore exposed.

QUEBEC.

Walker Mining Company.—This company has filed a charter at Trenton, N. J., with an authorized capital stock of $1,125,000. Of this, $375,000 is to be 6 per cent cumulative preferred and $750,000 common stock. The Canadian corporators are R. W. Scott, K. C.; F. Clemow and W. H. Walker, K. C., C. L., all of Ottawa, and C. W. Dawson, of Montreal. Mr. Walker is the owner of the Walker Plumbago Mines, at Graphite City, which, it is understood, are to be operated by the new company.

YUKON TERRITORY.

Treadgold Concessions.—It is stated that the terms of this concession are now quite satisfactory to the Yukon delegates, who had gone to Ottawa to protest against the Government's arrangements. The monopolistic rights respecting the furnishing of water and the closing up of abandoned claims are done away with. The charter is to be rescinded and a new charter is to be granted from which the objectionable features have been eliminated.

MINING STOCKS.

(Complete quotations will be found on pages 645 and 646 of stocks dealt in at):

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

New York. May 1.

The copper shares are apathetic, as the public is awaiting the next move by professional operators. The incorporation of an $80,000,000 company by F. Augustus Heinze has aroused some interest in the local market. The United Copper Company controls all the Heinze properties in Montana, including the Montana Ore Purchasing Company, which has already paid $2,322,000 in dividends. The company is heavily capitalized, as only $5,000,000 of the $80,000,000 authorized is preferred stock, carrying 6 per cent cumulative dividends. Of the $75,000,000 common stock, $45,000,000 will be issued, the balance to remain in the treasury to acquire new properties. It is claimed that subscriptions to the underwriting of the company have been largely in excess of the amount of stock offered, and were distributed in the leading copper consuming countries, both here and in Europe. Some business was done on curb in the common stock "when issued" at prices varying from $32½ to $36¾.

Amalgamated, which has nearly twice the capitalization of the United Company, sold at $66⅞@$65⅛. Anaconda was almost featureless, selling at 114@111 per cent, or $28.50@27.75. On curb brokers endeavor to hold attention by quoting Aberdeen, of New Mexico at $37⅛@37¼; Greene Consolidated, of Mexico, at $23½@$23; Tennessee, $11@11⅝; White Knob, of Idaho, $27¼@25¼; British Columbia, $9¼@$9⅜; Montreal & Boston, $3¼@$3⅞; Union of North Carolina, $3¾@$4; and Gold Hill, $3@$2¼.

The Cripple Creek gold shares continue weak, and record low prices are being made. Portland slumped to $1.85, Elkton to 75c., and Isabella to 26c.

Alice, of Montana, reappeared at 55c.

Comstock shares show a recovery. Consolidated California & Virginia rose to $1.70 from $1.30, Ophir to $1.60 from $1.35, and Mexican to 60c. from 55c.

Standard Consolidated, of California, brought $3.60.

Auction sales were: Empire Consolidated Quicksilver Mining Company, of California, 1,500 shares at $3 a share, 500 at $2.75, and 333 at $2.50; total, 2,333 shares of a par value of $100.

We note recent auction sales at Philadelphia of 200 shares Albemarle Zinc and Lead Company of Virginia at $1, and 33 shares Locust Mountain Coal and Iron Company at $50.

Boston. April 30.

(*From Our Special Correspondent.*)

Mining shares show a lower range of values for the week and to-day they were paticularly weak. The market has not been helped by the reduction in the Calumet & Hecla dividend nor by the current talk on the metal situation. The rumor that Calumet people were out of the market under 14c. was not based on fact. The floating of Heinze's United Copper Company has also detracted from the market, and although the Boston public is not taking much interest in the stock considerable trading has been done at from $32⅜ to $37. There are a great many who believe that the flotation of this company is the beginning of Heinze's end and there has been some talk that eventually it would be taken into the Amalgamated fold. Certain it is that some of the heaviest underwriters are known to be allied with Standard Oil interests.

Calumet & Hecla dropped $32 to $534, selling to-day at $533, ex the $5 dividend. Arcadian has lost $1 to $7. The visit of President Burrage to the property has brought no inspiration of better things to come. Trinity has likewise been weak and is quoted at 50c. lower at $12.62½. Parrot has dropped $2 to $25 on the failure to declare a dividend. Adventure stiffened to $24.50, but easily yielded to $22. This company's mill is expected to be in operation this summer and with its 4 miles of underground openings is expected to be a fair producer. Victoria has declined from $5.50 to $4.75 on knowledge that an assessment will be called to build a mill.

Bingham has been active and the best bought stock on the list. Although the price is off $2.25 to $35.50, its friends believe that its success will warrant better prices. The company will be running four furnaces next month and is expected to handle between 800 and 1,000 tons of ore per day. The Dalton & Lark properties yield more or less lead and it is probable that a lead stack may be put in the smelter at a later date. United States has varied from $22 to $21. This company has called the $320,000 7 per cent bonds outstanding for payment September 1, 1903, when interest closes. These bonds were put out to finance the company over a tight period.

Mohawk mining spurted to $28, but yielded to $35.50. Any buying easily advances the stock and on the other hand selling easily undoes what has been accomplished on the up side. Utah Consolidated does not get far away from $23. Old Dominion has not done much since the change in the management. It dropped $2.37 to $17.50, with $1 recovery. Rumors are prevalent that the company has a debt of some $400,000. Copper Range Consolidated broke away to-day and sold down to $56.75, with the final $57.25, a net loss of $3.25 for the week. The Dominion securities have been quiet, Coal closing at $1.40; Iron and Steel at $69.

Colorado Springs. April 24.

(*From Our Special Correspondent.*)

The market showed a decided improvement the beginning of the present week. There was a general gain all along the line, with Portland and Elkton leading the advance. During the latter part of last week and the first of this, Portland recovered much of its past losses. A rush of buying orders from the East, prompted by the very low prices of the past week, and the attempt to execute them on a sensitive market, caused an advance to $2. On April 18 the shares sold rapidly from $1.80 up to $1.87. By the 21st $2 was reached, the price then sagging to $1.91. From that point the shares fluctuated, selling down to $1.79 and back again to $1.85 to-day. The closing quotation was $1.83 bid with $1.90 asked, indicating a wide margin between buyer and seller.

Elkton followed the advance of Portland, selling up to 75, April 21. There has been but little demand for these shares during the past 10 days so that the falling off in Portland caused a weakening in Elkton. The closing quotations to-day were 70@73. El Paso touched the high point to-day at 46⅞c. The rich ore shoot opened four months ago in the 330-ft. level has been discovered during the past 10 days in the 475-ft. level. The company, however, is facing an expenditure of $50,000 for surface improvements.

Golden Cycle shares strengthened during the past week, selling from 60 to 62, but weakening to-day to 61, owing to the fact that the net profit during the month of March was but $17,000 out of a net production of $40,000. This was due to heavy expenditures on machinery.

San Francisco. April 26.

(*From Our Special Correspondent.*)

Business on the Exchange has been fair and prices generally well maintained. The sensation of the week has been in Ophir, which has been worked up until it is now the leading stock, so far as price is concerned.

Some quotations noted are: Ophir, $1.40; Consolidated California & Virginia, $1.30@$1.35; Mexican, 50c.; Silver Hill, 45c.; Overman, 28c.; Potosi, 27c.; Best & Belcher, 25@26c.; Hale & Norcross, 21@23c.

On the Producers' Oil Exchange business has been fairly active and prices well maintained. The prospects and low-priced shares showed the larger part

DIVIDENDS.

Name of Company.	Latest Dividend—Date.	Per Share.	Total.	Total to Date
Anaconda Copper, Mont.	May 15	$0.50	$600,000	21,450,000
†Alaska-Treadwell	Apr. 28	.37½	75,000	4,970,000
†Allis Chalmers, pf.	May 1	1.75	284,375	1,137,500
†Amalgamated Copper	May 26	.50	769,439	18,117,809
*Bald Butte, Mont.	May 10	.06	15,000	1,192,148
*Bunker Hill & Sull.	May 5	.07	21,000	1,390,000
Calumet & Hecla	May 22	5.00	500,000	78,850,000
*Central Lead, Mo.	May 15	.50	5,000	200,000
*Cherry Hill, Cal.	Apr. 15	.00¼	2,500	45,000
*Con. Mercur, Utah.	May 9	.03	30,000	270,000
De Lamar, Idaho.	May 8	.72	288,000	2,874,000
*La Fortuna, Ariz.	May 9	.05	12,500	1,151,000
*National, Mex.	Apr. 25	1.72	4,128	127,404
*Natividad, Mexico	Apr. 25	1.72	4,128	127,404
†Ontario, Utah.	Jun. 20	.30	45,000	14,827,000
Peerless Oil, Cal.	May 1	.05	5,000	5,000
*Providencia, Mex.	Apr. 18	.86	5,160	121,020
Quicksilver, pf., Cal.	May 9	.50	21,500	1,909,911
*Rocco Homestake, Nev.	May 10	.01½	4,500	76,500
*San Carlos, Minillas, Mex.	Apr. 25	4.30	10,750	255,892
*Silver King, Utah.	May 10	.66⅔	100,000	5,250,000
*Sta. Maria Guadalupe	May 10	4.30	10,750	336,125
†Texas & Pacific Coal	Apr. 26	1.50	30,000	1,980,000
Town Topics, Colo.	May 1	.00½	5,000	25,000

*Monthly. †Quarterly.

ASSESSMENTS.

Name of Company.	Location.	No.	Delinq.	Sale.	Amt.
Ben Franklin	Cal.	..	May 19	.....	.01
Coe	Cal.	..	May 19	.....	.25
Con. Imperial	Nev.	..	Apr. 27	May 27	.01
Gold Hill	Cal.	..	May 22	.....	.25
Gould & Curry	Nev.	98	May 1	May 20	.10
Joe Bowers	Utah.	..	May 12	.....	.01
Larkin	Cal.	20	Apr. 12	May 5	.02
La Suerte	Cal.	..	May 13	.....	.02½
Little Standard Oil	Cal.	3	Apr. 12	May 12	.10
Marina Marsicano	Cal.	28	Apr. 19	May 12	.03
Martha Washington	Utah.	9	Apr. 22	May 10	.01
Occidental	Nev.	..	May 12	June 5	.05
Ophir	Nev.	..	Apr. 14	May 6	.15
Potosi	Nev.	62	Apr. 16	May 7	.05
Savage	Nev.	106	Apr. 15	May 6	.10
Tomboy	Utah	..	Apr. 19	May 19	.00¼
Va. Con.	Cal.	12	May 5	May 26	.02
West Morning Glory	Utah.	11	May 15	May 29	.01
Yellow Jacket	Nev.	11	May 10	June 19	.10

of the business, but there was also a demand for dividend-paying shares. Some prices noted are: Hanford, $85@$87; Peerless, $6.75@$7; Kern Oil, $5; Home Oil, $3.65@3.75; Sterling, $1.70; Reed Crude, 33@34c.; Petroleum Center, 15c.; Piedmont, 11c.

The business done in oil stocks on regular call for the first quarter of the year was as follows:

Months.	Shares.	Value.
January	187,854	$81,633
February	288,562	76,447
March	214,293	109,364
Three months	690,709	$267,444

April will probably show a better record than any of the preceding months of this year.

London. April 19.

(From Our Special Correspondent.)

The South African mining market has been very quiet all week and practically no business has been done. The departure of the Boer leaders from Pretoria without any agreement about peace was a disappointment to the City, and it is felt that haggling about terms of surrender will go on indefinitely and at the same time the war will not be pressed vigorously. As I have said in these columns before, the City does not believe much in peace by bargain, so that these negotiations are not looked on with favor. Other sections of the mining market have been extremely dull, though they have not been quite devoid of incident.

The report of the Montana Company for the half year to December 31 last shows that profits are still being made by treating the ore remaining in the Drumlummon Mine. In all 12,900 tons of ore were treated in the stamps and 64,000 tons of tailings cyanided. The former did not yield any profit on working, but the latter fully compensated, so that a net profit of £11,000 was made. The new properties acquired by the company, the Lucky Girl group in Nevada, have been fully equipped with machinery, and work was started at the beginning of January. It has been found that the concentrating system in vogue at the Drumlummon is not suited to the ore at the Lucky Girl, so that a cyanide plant is to be substituted. The directors speak hopefully of the new property. The £1 share in the company stands at the same low figure, about 4s., that it did when the news of the exhaustion of the Drumlummon Mine was made public. With the new property now in hand one would think the shares worth rather more.

I have several times within the past year mentioned the Clifton Consolidated Copper Mines of Arizona, Limited, which was formed to consolidate the Clifton and the Morenci companies. It appears that many of the shares allotted when the company was formed have not been paid for, but that loans have been made to enable the company to proceed with developments. It has now become necessary to issue debentures to give security for these loans and also to enable the directors to provide more working capital. It is intended to erect concentrates to deal with 500 tons a day and to build ropeways and connecting railways, as it is the intention of the directors to work on a large scale. Both Mr. W. A. Farish, of Denver, the consulting engineer, and Mr. Maurice Fontaine, the manager, are of opinion that there is plenty of ore averaging 4 per cent copper, $3 of gold and $1 silver per ton; but their reports lack detail and it is obvious that the copper values are very irregular. At present, the mine is not in a position to yield a large regular supply of ore, but the directors hope for the best. The shares of this company are very largely held in France.

The British Columbian market has been upset again this week by the very poor return for March by the Le Roi Company. The shares have suffered considerably and the group that acquired control last year are very much disappointed with their speculation. The £5 share now stands at £3 1-2, as compared with £7 and £8 six months ago, and there are more sellers than buyers. It is evident that the mine will have to be worked on first-class lines if anything like satisfactory dividends are to be paid. Shareholders are aware of the onerous nature of the task before the managers and are hoping for the best. The shares are no longer of any use as speculative counters. Le Roi No. 2 is in a stronger position as regards the London market, as the reports of developments are hopeful and the £5 shares are above par. The committee appointed to suggest a scheme for the reorganization of Rossland Great Western and Kootenay Mining has issued a proposition for amalgamation. It is proposed to form a new company called the Rossland-Kootenay Company, Limited, with a capital of £150,000, in 150,000 shares of £1 each. One share will be given in exchange for each one in the Rossland Great Western and three for each one in the Kootenay Mining Company. This is a drastic reduction of capital and will much more nearly represent the value of the properties. The ore in the Rossland Great Western is said to be of much better quality than that at the Kootenay, and is ready for shipment. On the other hand, the Kootenay Company has some £27,000 in cash. The new company will therefore start with working capital, with a mine ready to ship ore, and without overcapitulation. Its prospects will therefore be promising. The shareholders in both companies are somewhat disgusted at the sudden writing down of their nominal capital from £900,000 to £150,000, but they will no doubt acquiesce in the proposition.

For over a year we have had preliminary rumors of the proposition to form a big public company to work the Edison magnetic separating process at the Dunderland iron ore deposits in Norway. Negotiations are now nearly completed and I expect the prospectus will be published within a month. It is a well known fact that English iron-masters have within recent years found increasing difficulties in obtaining a good quality of iron ore from Spain, from which country 80 per cent of the ore used in English furnaces at present comes, so that a source of new supply has become a question requiring immediate consideration. The deposits in Norway are so intermixed with silica that some form of concentration is necessary before the ore can be treated in the blast furnace. The iron occurs as magnetite and hematite and is in schistose layers alternating with quartz. There is also phosphorus present as apatite in large enough quantities to make it desirable that it should be removed. The Edison process which is to be applied to the concentration of the ores has already been described in the technical press, but details of the briquetting of the fine concentrated ores have not been published, and particulars of the process are not being disclosed now. It has always been understood that the separating and briquetting processes were abandoned by the inventor in America, firstly, because the expense of concentration was too great and secondly because no suitable means of briquetting could be devised to prevent the briquettes from crumbling in the furnace under the weight of the burden and the high temperature of the reaction. In the reports that are being prepared for publication nothing is said as to whether the briquettes have stood the test of practice in English blast furnace and only a single example of American practice is given, and that is date January, 1897. The directors estimate the total cost of production of the briquette at 8s. per ton and the freight of English blast furnaces 4s. 6d., bringing the total cost to 12s. 6d. per ton. These figures are calculated on the basis of an annual production of 750,000 tons of briquettes. Though there is this absence of information to enable one to form an independent opinion on the process, it should be mentioned that the company is supported by all the iron-masters in the country and that the directors will all be leading iron men. Whether their presence on the board is to be taken as a guarantee that the progress is an undoubted success, or whether it is due to their desire that any process promising to provide a new source of supply of iron ore should have every opportunity of proving its value, remains to be seen.

COAL TRADE REVIEW.

New York. May 2.

ANTHRACITE.

The demand for anthracite coal continues active and comes from a wide stretch of territory. A heavy tonnage that early buyers thought to get at April figures will be taken at the May prices as the April demand was larger than the producing companies could supply. The advance of 10c. per ton on May 1 has little effect, for every dealer realizes that there are other advances to come later and early buying means so much clear profit next winter. Dealers at eastern and western points are after coal, and though the demand has been heaviest from the east, yet dealers in the west, particularly in Chicago territory, have ordered much more promptly than last year. Production at the mines is active, those collieries that suffered from floods are getting their output up to normal figures and with better car supply the shipments would be much heavier. The output for April was large and probably exceeded that of April, 1901.

Representatives of the operators and of the United Mine Workers met in New York City on April 26 to talk. The operators were represented by George F. Baer, E. B. Thomas, R. M. Olyphant, W. H. Truesdale and John Markle. The Civic Federation, acted as harmonizer. Just what was said at the conference is not stated, but little was accomplished. The distinguished chairman of the conciliation committee who is not interested in anthracite mining, but is interested in politics, was hopeful. A sub-committee of 7 has held several meetings this week, at which there was more talk. The daily papers have printed some pretty wild statements, as was to be expected. It is probably safe to say, however, that there will be no strike, that the mine workers have obtained recognition, and that the prolonging of the conference is largely for effect.

Trade at the head of the Lakes is not active. Little anthracite is arriving as yet, at the Duluth and Superior docks. In Chicago territory business has been brisk and the amount of coal ordered much greater than a year ago. Arrivals have been fairly good, considering the demands of points farther east, while the amount of coal going to outlying territory is large. Arrivals by lake will improve somewhat, but are dependent on supplies at the lower lake shipping ports and these again are largely determined by the car supply. Trade along the lower lakes and in Canadian territory is fairly active, Canadian trade will improve with the opening of canal navigation. Along the Atlantic seaboard demand continues brisk. A shortage of vessels is interfering with coastwise shipments somewhat, particularly to points beyond Cape Cod. There is a good demand for the steam sizes yet and the market generally is as firm as a rock. The May prices for free burning white ash coal f. o. b. New York Harbor ports are: Broken $3.85, egg, stove and chestnut, $4.10.

BITUMINOUS.

The demand for coal in the Atlantic seaboard bituminous trade continues strong and active. Car supply, however, is still inadequate and very variable. The average number of empties brought to the collieries is probably a little over 50 per cent of the number wanted; some days the supply rises to 75 per cent only to fall off again a day or two later. This irregularity makes much trouble for producers who are unable to tell beforehand whether they will be able to ship according to schedule or not. Another factor in restricting shipments is a scarcity of vessels for coastwise business. There is a considerable fleet unloading coal at points beyond Cape Cod, but many of these are chartered to carry lumber, being able to get the tempting rate of $1 per 1,000 ft. Norfolk and Newport News are better off in regard to vessel supply than Philadelphia and the New York Harbor shipping ports, a number of vessels are waiting at the two Chesapeake Bay ports named to load. Contracts for the present year are still being closed though most producers show little interest, having about all the contracts they want.

In the far East there is a good, strong demand for coal. A great number of vesels are unloading there, but very few are on the way with cargoes and many orders from this territory are in the hands of producers. Along Long Island Sound demand for lower grades is being satisfied but the demand for the better grades is as active as ever. At New York Harbor points most of the consumers are better off than those elsewhere, but there is a steady demand prevalent. In the all-rail trade consumers have had some relief and are getting coal more freely, though a very heavy tonnage is wanted still.

Transportation from the mines to tidewater is fairly good and, with the small car supply, leaves but little coal sidetracked along the roads for shippers to calculate on in filling orders. In the coastwise vessel market vessels are scarce and in strong demand. We quote current rates from Philadelphia as follows: Providence, New Bedford and Long Island Sound, 75@80c.; Boston, Salem and Portland, 95c.; Wareham, Lynn, Bath and Gardiner, $1@$1.05, with towages to last port; Newburyport, $1.05@$1.10; Bangor, $1.10; Saco, $1.05, and towages. Rates from the further lower ports are 10c. above these figures.

Birmingham. April 28.

(From Our Special Correspondent.)

Half a dozen new mines will be in a position to begin shipping coal within the next 90 days and each of them will have an output of not less than 150 to 200 tons a day. All the coal that is being mined now is finding a ready sale. Prices have not dropped.

During the past week a meeting of the Coal Operators' Association of Alabama was held in Birmingham. Exactly what was done at this meeting is not given out, but there was some discussion as to conditions in the State and as to what will be done by the operators in June when the miners meet them for the signing of a new contract for the ensuing year. The present contract expires June 30. The miners are now receiving the maximum price for coal digging in this State, 55c. per ton. Some intimation was given that the miners were likely to ask for a better maximum. This the operators will hardly accede to.

Chicago. April 29.

(From Our Special Correspondent.)

Under the stimulus of the 50c. reduction per ton from the nominal price of $6, for all coal sold in April, sales of anthracite have been very satisfactory to wholesalers during the last week and heavy for the month. It is expected that the May price will be 10c. more per ton, but this is not definitely settled yet. The condition of the Chicago River has almost done away with the prospect of lake business along the South Branch; only one firm is doing anything worth speaking of in that part of the harbor. Shipments by lake are likely to be tied up indefinitely by the strike of tugmen, but no apprehension is felt on that score yet; there is a plentiful supply on hand of all grades and rail shipments can now be depended upon, speaking comparatively, with last winter's experience.

The trade in bituminous coals is slack, but no more so than the season naturally warrants. Supplies are plentiful and prices are as follows: Hocking, $3 (sale price. 35c. under nominal quotation of $3.35); West Virginia, $3.47; Youghiogheny, $3.55; Indiana block, $2.45; Indiana semi-block, $2.10; Clinton lump, $1.90; Indiana lump, $1.80; Northern Illinois, run-of-mine, $1.80; Southern Illinois, run-of-mine, $2. There is little demand for smokeless coals and the only kind of bituminous really being sought is smithing coal, at $3.40.

Chicago's coal interests are leading a fight of dock owners along the Chicago River against the condition of navigation due to the Washington street tunnel and the current in the Drainage Channel. Unless something is done soon by the city or Sanitary District authorities, an appeal is more than likely to be made to the authorities of the United States, asking the removal of the tunnel on the ground that it is an obstruction to inter-State navigation. The present condition of things, if allowed to continue without change, will certainly drive the deep-draft commerce of the South Branch away for good.

Cleveland. April 29.

(From Our Special Correspondent.)

The coal shippers are still in a dilemma. They have a large call for material at the head of the lakes and they have no end of boats at their disposal at loading ports. They cannot supply the demands of consumers or carriers. The receipts at the lake ports have been short almost beyond precedent and some of the railroad traffic officials were called in by the shippers yesterday in an endeavor to get more cars. The result has been not very satisfactory. It has been impossible to get loads enough even to take care of the contract vessels and many boats which are owned by large shippers are actually going to the head of the lakes in ballast, not being able to get cargoes. The shippers are also reporting instances where boats have been chartered for the season and have had to go up without cargoes because the coal supply has been so short. The situation is very difficult to analyze. The railroads have had a month in which to get their equipment together for the coal trade and while cars seem to be plentiful enough to handle the larger bulk of the ore that is coming in they do not seem able to find cars nor engines with which to move the coal. The natural result is that some of the consumers at the head of the lakes are seriously hampered, to say nothing of the plight in which the shippers and the vessel owners find themselves. Rates are stable simply because there is not enough business being done to force an issue on the price, but it is conceded that the advantage, as to rates, is all with the shipper. Coal is carried to Duluth for 35c. and to Milwaukee for 45c.

San Francisco. April 26.

(Special Report of J. W. Harrison.)

Receipts of coal at this port during the week have been as follows:

From:	Tons.
Washington, 2 cargoes	6,800
Oregon, 1 cargo	680
British Columbia, 2 cargoes	8,450
Australia, 2 cargoes	3,345
Cardiff, Wales, 1 cargo	3,093
Total for the week	22,368

For the preceding week, April 19, the receipts were 33,367 tons. The cargo from Cardiff, above noted, was 300 days reaching this port, and although the coal is reputed to be very ignitable, no damage appears to have been done to the cargo, though nearly one year making the trip. The quantity at hand this week is fully equal to the demands of the market. Asking rates remain unchanged, but buyers for large quantities are scarce, even at a marked concession in price. The Australian list of vessels to be loaded is swelling in number, although quotations for same leave a particularly small margin of profit. Importations from the North will, in the next few months, diminish in quantity, as several steam carriers have been retired from the service. Fuel oil is losing none of its present customers, but is gradually adding to the number. There is no perceptible improvement in the price of oil, although its consumption appears to be more general. New names are being added to the loading list at Swansea with anthracite coal for this port. Prices for this grade of coal have been materially reduced within the past couple of months.

Pittsburg. April 30.

(From Our Special Correspondent.)

Coal.—There is but little change in the situation. The demand continues and all the mines in the district are in full operation. The strike is still on at the mines along the West Penn Railroad and the mills and factories in that section are handicapped for want of fuel. Operators are firm in their refusal to recognize the United Mine Workers and a long suspension may result. The strikers have pledges of substantial financial aid and will be able to continue the struggle for several months. The Pittsburg District operators are not benefited by the strike as they are not permitted to ship any coal into that field. The rivers are still navigable and the Monongahela River Consolidated Coal and Coke Company is sending coal to the lower ports as it is mined. The Pittsburg Terminal Railroad and Coal Company received a Pennsylvania charter yesterday. The company is composed of Pittsburg capitalists and will be capitalized at $8,000,000. It will absorb the West-side Belt Line, a road extending through the coal fields and connecting with the Wabash, the Baltimore & Ohio, the Pittsburg & Lake Erie and the Panhandle railroads, and also the 12,000 acres of valuable coal lands recently secured from John S. Scully and others located near this city. It is proposed to open 10 mines at once. The company expects to soon be able to ship coal and have an annual production of about 2,000,000 tons.

Connellsville Coke.—Prices are firmer this week, some contracts having been placed at a trifle above the new price of $2.50 for furnace coke. Foundry coke is quoted at $2.75@$3 and some large contracts have been placed by foundrymen. It is reported that a lower rate can be secured for future delivery, all sales at above the circular price being for prompt shipment. The *Courier* in its last issue gives the production for the previous week at 222,284 tons. The shipments for the week aggregated 11,579 cars, distributed as follows: To Pittsburg and river tipples, 3,814 cars; to points west of Pittsburg, 5,643 cars; to points east of Connellsville, 2,122 cars. This was an increase of 222 cars compared with the shipments of the previous week.

Foreign Coal Trade. May 1.

Export trade continues quiet, with little doing beyond the usual business to the West Indies and South America, and a moderate amount of Mediterranean ports. Freight rates show a somewhat firmer tendency and quite possibly a reaction from the low figures of the past few months may be expected.

In Germany there has been some revival in the coal trade, largely due to the labor troubles in Belgium, which have resulted in sending some orders to German mines.

Exports of coal and coke from the United States for the three months ending March 31 are reported by the Bureau of Statistics of the Treasury Department as follows, in tons:

	1901.	1902.	Changes.
Anthracite	425,523	293,198	I. 132,325
Bituminous	1,253,207	1,200,859	D. 52,348
Total coal	1,678,730	1,494,057	D. 184,673
Coke	96,778	95,052	D. 1,726
Total	1,775,508	1,589,109	D. 186,399

The decrease in anthracite this year was 31.1 per cent.; in bituminous, 4.2 per cent; in the total coal, 11.0 per cent. The decrease in coke was 1.8 per cent. The distribution of these coal exports was as follows:

	1901.	1902.	Changes.
Canada	1,084,129	965,470	D. 118,659
Mexico	144,900	131,498	D. 13,402
Cuba	103,431	120,597	I. 17,166
West Indies	114,685	106,519	D. 8,166
Europe	119,002	84,115	D. 34,887
Other countries	112,583	85,858	D. 26,725
Totals	1,678,730	1,494,057	D. 184,673

Cuba was the only country to which exports showed an increase. The falling off of 11 per cent in the exports to Canada is difficult to account for, except by increased use of Nova Scotia coal in Quebec and Ontario. The coke exports are made chiefly to Mexico.

Messrs. Hull, Blyth & Co., of London and Cardiff, report, under date of April 19, that the general tone of the Welsh coal market remains very firm and higher prices may be looked for in the immediate future. Quotations are: Best Welsh steam coal, $3.78@3.84; seconds, $3.66; thirds, $3.36; dry coals, $3.30; best Monmouthshire, $3.36@3.48; seconds, $3.24; best small steam coal, $2.28; seconds, $2.04; other sorts, $1.80.

The above prices for Cardiff coals are all f. o. b. Cardiff, Penarth or Barry, while those for Monmouthshire descriptions are f. o. b. Newport, exclusive of wharfage, but inclusive of export duty, and are for cash in 30 days, less 2½ per cent discount.

The tone of the freight market remains unaltered for Mediterranean and Eastern ports, but River Plate rates have stiffened considerably. Some rates noted from Cardiff are: Marseilles, $1.35; Genoa, $1.38; Naples, $1.32; Labang, $2.76; Singapore, $2.76; Las Palmas, $1.50; St. Vincent, $1.68; Rio Janeiro, $3.06; Buenos Ayres, $3.18.

IRON TRADE REVIEW.

New York. May 1.

The iron market has been comparatively quiet this week; few long contracts are noted, and the pressure for immediate deliveries is less marked. While nominal quotations are generally unchanged, prices for material wanted soon are irregular.

With regard to purchases of foreign raw material the Treasury returns show that the imports of pig iron into the United States for the quarter ending March 31, were 33,374 tons, against 5,311 tons for the first quarter of 1901. Imports of steel billets and blooms were 14,119 tons, against 1,917 tons last year. While these figures show large proportionate increases, the totals are still small. They do not, however, show the extent of the contracts made, to be filled in later months. Present reports show that a considerable tonnage is now being placed abroad, both in billets and in structural steel.

Birmingham. April 28.

(From Our Special Correspondent.)

There is evidence that orders have been accepted in Alabama for Nos. 1 and 2 foundry iron as high as $15 per ton, while a statement was made recently that No. 1 foundry, immediate delivery, a small lot brought $16 per ton. The shipments from this district are steady. The railroads are not much short on equipment and demands for cars with which to move the iron are being met. The furnaces are a little short on labor and it is a hard matter to keep common labor steadily. One or two of the furnaces are losing a little time on this account.

Shipments during the month of April have been satisfactory; much of the product is going to the West.

During the past week Lady Ensley furnace of the Sloss-Sheffield Company at Sheffield went into blast. The furnace has been thoroughly repaired and will be capable of making a daily average of 200 tons.

As soon as the Republic Iron & Steel Company put their new and large furnace at Thomas in blast with the two old ones, now running, a new system in the way of a stock house will be operated. Bins costing $60,000, equipped with electrical engines and dumps, are attached so that three men will hereafter load tram cars, pull them from the bin, attach them to the cable on the incline and dump contents into the furnace, while that work now takes 15 or 20 men.

The following quotations are given: No. 1 foundry, $12.50; No. 2 foundry, $12; No. 3 foundry, $11.50; No. 4 foundry, $11; gray forge, $10.50; No. 1 soft, $12.50; No. 2 soft, $12.

In finished iron and steel circles there is no change in conditions to report. The rolling mills are handling their usual quota. At the steel plant at Ensley 7 or 8 of the 10 open-hearth furnaces are constantly in operation and some heavy shipments are being made. An order for 5,000 tons of steel for the Carnegie Steel Works is being filled from the Ensley plant, an expert being in this district examining the product shipped. The local consumption of steel is still heavy, there being plenty of work at all the plants.

Buffalo. April 30.

(Special Report of Rogers, Brown & Co.)

During the past week there has been practically no change in the conditoins affecting the pig iron situation in this district. Furnaces are doing their utmost to take care of their customers' wants and supply the required iron on existing contracts, but foundries everywhere continue to call for their iron at the maximum rate allowed by their orders and the resulting shortage calls for a great deal of patience on the part of both consumers and producers. The difficulties which furnaces have experienced in obtaining their raw materials have made it a physical impossibility to meet all the demands made upon them. Occasionally a special lot of iron is offered for early delivery and is quickly absorbed. A noticeable fact is that a great many buyers who had apparently covered for their season's requirements are sharply on the lookout and quickly snap up offerings of odd carloads. There is a little improvement in conditions with coke ovens tributary to this territory, most of them being now able to make shipments on their contracts with more promptness than heretofore. This is largely due to the fact that the railroads are better able to handle freight on account of the absence of snow blockades and floods.

Chicago. April 29.

(From Our Special Correspondent.)

A sharp advance in the price of pig iron marks the week ending to-day. No. 1 Northern is now selling at $20.50, No. 2 Northern at $20, No. 1 Southern at $19.15 and No. 2 Southern at $18.65. The increase of $1.50 per ton over last week's prices was inevitable, and is apparently only a beginning; there are furnacemen who declare that October will see foundry iron selling at $25. Producers are independent; "you can take it or leave it," is the answer to buyers who hesitate or express the opinion that prices will decline. Certainly the outlook seems promising enough for the producers; for every new furnace going into blast there is practically another going out of blast, and looking ahead, pig iron men see no danger of crowding for a year at least. For the foundryman who bought months ago there is a prospect of more profit out of pig iron than out of castings, and there are a few wise ones who have large contracts running well into next year. In general, furnacemen appear to be steering clear of 1903 business, not yet having made contracts for supplies in that year; sales are confined to the last quarter of this year. Small spot

deliveries bring $23 easily for No. 2 Northern, and occasionally these can be made. The selling of iron seven to nine months in advance seems bound to continue without regard to calendar distinctions; within a month contracts for the early part of 1903 will doubtless be freely made.

West Virginia coke is fairly plentiful and sells for $5.25; Connellsville coke is scarcer and readily brings $5.50 for prompt delivery.

Cleveland. April 29.

(From Our Special Correspondent.)

Iron Ore.—The market has settled down for the season with few sales being made and with few to be expected. The matter of transporting the ore has come to be the principal question of interest in the trade. The question of carrying rates is of paramount importance now to the shipping interests, and in this the market is almost colorless. Shippers are getting cargoes very slowly at the head of the lakes and are having a flood of tonnage offered every day which they are unable to employ. When the cargoes are received at the lower lake docks, although fewer in number by far than during the midsummer season, the docks are unable to take care of them, being short of cars into which to load the material. In all everything is ripe for a break in the rates, but this does not come as the shippers seem indisposed to force any change. The rates, therefore, remain 75c. from Duluth, 65c. from Marquette, and 55c. from Escanaba. Selling prices are unchanged at $4.25 for bessemer old range, $3.25 for non-bessemer old range and bessemer Mesabi, and $2.75 for non-bessemer Mesabi.

Pig Iron.—The pig iron market would be very active were there any iron for sale. Valley furnaces are all sold up on bessemer and basic, with but little of foundry left for sale, and that only in driblets for quick shipment and small amounts upon which to base contracts. The only sales of consequence are of off irons and charcoal irons, with a few Southern Ohio and Southern furnaces sending in standard grades of foundry. Valley quotatoin of No. 2 is $20 and Southern quotation is $16 Birmingham. Bessemer and basic prices do not change because no sales have been made here. Southern Ohio furnaces quote $20 at the stacks.

Finished Material.—The demand for all grades of finished material keeps up and many consumers are at the point where they will soon have to import or go without steel. This is particularly true of structural steel and at least three big concerns at Cleveland have inquiries in with foreign producers for large amounts of steel, but are hesitating about placing orders on account of the prices. Nominally mill prices in this district do not change from 1.70c. while the store prices hold firm at 2.25@3c. Plate producers who have any material, and especially the smaller dealers in this territory, are taking premiums, but this tendency is offset in a measure by the action of Eastern mills, which are selling plates here at only the excess over Pittsburg, basing quotations that will cover the difference in freight between the mill and the market. Bar iron has been advanced by all mills to the 1.80c. Pittsburg quotation, while the bar steel prices are holding firmly at the 1.60 c. Pittsburg base on bessemer and 1.70c. Pittsburg on open-hearth. Sheet sales are brisk and deliveries are fairly prompt with a plentious supply for extensive operations hereafter. No. 27 is the base on gauges between 17 and 28, the quotation being 3.50c., and No. 10 is the base at 2.50c. on gauges from 10 to 16. Rail demands are good and sales of seconds are heavy or as heavy as the market will permit.

Old Material.—The scrap market is lively, with plenty of material being offered on the market, and with prices having a downward tendency, which has been expected since about the maximum had been reached in that direction.

Philadelphia. May 1.

(From Our Special Correspondent.)

Pig Iron.—The situation is more difficult to define than last week. Strained conditions continue. There is a noticeable falling off in the number of early delivery buyers, a class who have been giving furnace people a good deal of trouble for a few weeks past. Another class of buyers continue to be heard from who want to know how they are to be taken care of later in the year, but they are not pressing their case very hard. Large consumers who were interviewed to-day profess to have inside information that a little relaxation will arrive by midsummer. Their theories are interesting, but while they are pursuing an enforced conservative policy they do not lose sight of the fact that unforeseen developments may upset all theories. The fact remains that a great deal of new work is coming forward and buyers will be obliged to seek sellers. It is hardly worth while to quote prices, but the following are as good as any for midsummer delivery: No. 1X foundry, $21@$21.50; No. 2X, $20.50; No. 2 plain, $19@$19.50; standard gray forge, $18.50; ordinary, $17.50@$18; basic, $19.

Billets.—The deficiency of local stock will be temporarily compensated for by arrivals from abroad, but the high cost delivered discourages further negotiation. Consumption is heavy and makers are making the best promises they can under the circumstances. In two or three cases consumers are threatened with suspension of work for want of stock. The price is supposed to be $35.

Merchant Bars.—Retail demand is keeping capacity well sold up, particularly in steel bars, which are quoted at 1.80c., but frequently sell for more. We continue to send a good deal of iron west and even now have business offered which will, if taken, put us in splendid shape for the summer months.

Merchant Steel.—Hardware manufacturers, tool makers, vehicle and implement interests are all using more steel and quite a number are obliged to buy in a hand-to-mouth way. Prices are at the top notch and buyers are not encouraged by the slightest concessions.

Pipes and Tubes.—As the season advances retail requirements appear to increase. Prices have moved up and buyers are barely able to keep material enough on hand to turn out work. Merchant pipe is particularly active.

Skelp.—New orders have just been booked and new requirements are looming up. The mill capacity East is taxed and prices have been marked up on account of raw material.

Plates.—Our small shop demands all over the eastern territory are quite numerous and the marked up prices are eagerly paid on urgent deliveries. Locomotive fire-box is quite an important feature at present and the volume of business now in sight for late delivery is calculated to force smaller buyers to scramble for supplies. Universals are nominally 2c.; sheared, 2c.; flange, 2.10c.; fire-box, 2.20c.; marine, 2.30c.

Structural Material.—A great deal of trouble is still experienced over the irregular way in which deliveries are made. Small buyers pay as high as 2 1-2c. on angles. Some hope is now held out that foreign angles will help us out. Domestic, nominally, 1.75 @1.85c.

Steel Rails.—Rumors of bonus prices for small lots are heard. The office people here intimate that two or three large railway systems will be in the market and that one road will want rails for 300 miles of road.

Old Rails.—Old iron rails are $27.

Scrap.—The appearance in the market of new buyers has started nominal quotations upward. Choice railroad brought $26, and heavy melting steel $23. Other kinds are high and scarce.

Pittsburg. April 30.

(From Our Special Correspondent.)

The iron and steel markets are unusually quiet this week as to sales, but prices in all lines are firmer and in many instances higher than at any time during the year. All the mills are busy and have orders that will keep them in continuous operation all year unless labor disturbances occur, which does not seem likely at this time. The most serious trouble that had been threatened, a strike of blast furnace workers, has been sidetracked for a month at least, and the possibility of a shutdown is not giving the manufacturers as much concern as it was a week ago. After a meeting of the executive board of the workers' organization it was announced that as the manufacturers would not accept the publication of the action of the meeting at which a three-turn system had been decided upon, as official, that they be formally notified. In order to give them a month's notice it was decided to postpone the date from May 1 to June 1, and, according to the announcement, the secretary was instructed to send a formal notification to all blast furnace owners. Several days have elapsed and the notice has not been received. In the meantime, however, organizers have been busy endeavoring to add to the membership of the union. This is taken as an indication of weakness and the real cause of the postponement is now believed to be that the union is not strong enough to attempt to enforce the demand. The merchant furnaces have practically sold the bulk of the anticipated product for the entire year. Occasionally a small lot can be had for early delivery by paying a stiff premium. No sales of bessemer iron are recorded this week except one good order for last quarter delivery, and only a few hundred tons of gray forge and foundry iron were taken at the highest prices paid this year.

All danger of trouble over the annual wage scales of the Amalgamated Association of Iron, Steel and Tin Workers seems to be over. As already noted, settlements were made with the American Sheet Steel Company, the American Tin Plate Company, the American Steel Hoop Company and the Republic Iron and Steel Company at preliminary conferences by continuing the present scales for another year. The action taken, however, was subject to ratification by the convention now in session in Wheeling. While the delegates expressed themselves as strongly opposed to ante-convention conferences the action taken has been approved for the reason that it would be impossible to secure better terms.

The wire interests met during the week and reaffirmed prices; as a result a number of small concerns have been forced out of the market, the price of wire-rods, which ranged from $37 to $40, preventing the manufacture of wire products by concerns that are compelled to buy rods. The large interests that produce their rods are now in full control of the market. A meeting of cut nail manufacturers is scheduled for this week, but as prices are the same as wire nails it is not likely that any change will be made.

The entire product of the rail mills, as has already been mentioned, has been sold for the year at $28, but there is still a heavy demand and relaying rails now bring a higher price than new steel rails now being delivered. A New York interest has just bought a lot of relaying rails aggregating 10,000 tons at $27.50. They will be sold at from $29 to $30.

The report that the American Bridge Company will concentrate its works in this district in a $3,000,000 plant at Economy has been confirmed. It is also reported that a similar plant is to be erected at Chicago in which the works in the western district will be concentrated. This company may have trouble with its workmen in this district, a strike having been ordered for to-morrow by the International Association of Bridge and Structural Iron Workers. This organization made a demand for 50c. an hour and an 8-hour work day for the year beginning May 1 for the Pittsburg and Cleveland districts. Vice-President C. F. Lyons, of Cleveland, held a conference with the officers of the company in New York on Monday, at which an offer of 47 1-2 cents an hour was made. The compromise was rejected by the Pittsburg organization and will be considered to-night at a meeting of the executive board of the Cleveland local union. The offer is for all work within a radius of 100 miles of Pittsburg and for the entire State of Ohio. The American Bridge Company employs about 1,200 men in this district and has some important contracts. Several independent concerns are expected to sign the new scale.

Pig Iron.—No sales of bessemer pig iron for early delivery were made this week, the only transaction of importance being an order for 10,000 tons for delivery in the fourth quarter at $19.50, Valley Furnaces. The price is firm at $20, Valley, for delivery in the second and third quarters. About 300 tons of gray forge were sold for delivery before July 1 at $20, Pittsburg, and for third quarter delivery $19.25 and $19.50 is quoted. Foundry No. 2 is very scarce and it is reported that as high as $25 could be obtained for spot shipment. For the second half $20 and $21 is quoted.

Steel.—There is still a great scarcity of domestic bessemer steel billets which are nominally quoted at $32@$33. A great deal of foreign steel is being bought. There is no change in the price of steel bars and tank plate.

Sheets.—The market is firm and prices are unchanged. No. 28 black sheets are quoted at 3.10 to 3.15c. and galvanized sheets at 4.47c. in car-load lots and 4.67c. in less than car-load lots.

Ferro-manganese.—The leading producer continues to quote 80 per cent domestic at $52.50.

New York. May 1.

Pig Iron.—Quotations now are nominal for deliveries before the third quarter. We quote for tidewater delivery: No. IX. foundry, $20@$22.50; No. 2X. $19 @$19.50; No. 2 plain, $18.50@$19.50; gray forge, $17.75@$18.25. For Southern iron on dock, New York, No. 1 foundry, $16.75@$21; No. 2, $15.75@ $19.50; No. 3, $15.50@$17.50.

Bar Iron and Steel.—Trade is active. We quote for large lots on dock, refined bars, 1.83c.; soft steel bars, 1.83c.

Plates.—Demand continues heavy. We quote for tidewater delivery in car-loads: Tank, ¼-in. and heavier 1.78@2c.; flange, 1.88@2.05c.; marine, 1.98 @2.10c.; universal, 1.78@1.98c.

Steel Rails.—No change. Standard sections are still nominally quoted at $28 at Eastern mills; light rails at $30@3, according to weight. Prompt delivery commands a big premium.

Structural Material.—The market is as strong as ever. We quote for forward delivery on large lots at tidewater as follows: Beams, 1.90@1.95c.; tees, 1.85c.; angles, 1.80c.

Nails.—The demand for both cut and wire nails is fair. We quote for caload lots on dock: Wire nails, $2.20; cut nails, $2.18.

CHEMICALS AND MINERALS.

(For further prices of chemicals, minerals and rare elements, see page 650.)

New York. **May 1.**

The month of April has shown a good trade in most lines. Prices have been well maintained, owing to the high cost of raw materials.

Heavy Chemicals.—Business is principally in future shipments at slightly lower prices than for prompt deliveries.

Domestic chemicals, we quote, per 100 lbs., f. o. b. works, as follows: High-test alkali, in bags, 80@82½c. for prompt shipment, and 75@77½c. for forward; caustic soda, high-test, $1.90@1.92½ for early delivery, and $1.85@1.87½ for futures; bicarb. soda, ordinary, $1, and extra, $3; sal soda, 55c.; chlorate of potash, 8@8¼ for prompt, and $7.75 for contracts. For foreign goods we quote per 100 lbs. in New York: Alkali, high-test, 90@92½c.; caustic soda, high-test, $2.25; sal soda, 65@67½c.; chlorate of potash, $10¼@$10¾; bleaching powder, $1.55@1.75, according to make and seller.

Acids.—Usual contract deliveries at practically unchanged prices. Blue vitriol exports from the United States in the quarter ending March 31 were 15,709,-180 lbs., against 26,269,019 lbs. in the corresponding period last year; showing a decrease of 10,559,839 lbs., due chiefly to the smaller demand in Italy.

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

Blue Vitriol	$4.50@4.62½	Oxalic com'l	$4.60@5.00
Muriatic, 18 deg.	1.50	Sulphuric, 50 deg., bulk ton	14.00@16.00
Muriatic, 20 deg.	1.62½	Sulphuric, 60 deg.	1.00
Muriatic, 22 deg.	1.75	Sulphuric, 60 deg., bulk	18.00@20.00
Nitric, 36 deg.	4.00	Sulphuric, 66 deg.	1.20
Nitric, 38 deg.	4.25	Sulphuric, 66 deg., bulk	21.00@23.00
Nitric, 40 deg.	4.50		
Nitric, 42 deg.	4.87½		

Brimstone.—Market continues quiet. Spot best unmixed seconds hold at $23 per ton, and shipments, $22½@22¾. Best thirds are $2½ per ton less than seconds. The imports into the United States in the three months ending March 31 yere 45,858 tons, against 27,171 tons last year; showing an increase of 18,687 tons, credited to the pulp mills.

Pyrites.—The restricted vessel room from Spain has stiffened freight rates, the latest charters being on a basis of 10s. ($2.40). Higher rates are anticipated. Consequently imports show a falling off. In the quarter ending March 31 the United States received 92,461 tons, against 101,622 tons last year. This decrease of 9,161 tons is equivalent to about 4,122 tons sulphur.

Domestic production is moderately active. Recently the Virginia-Carolina Chemical Company, known also as the Southern fertilizer combination, purchased a pyrites mine in Georgia. The sulphuric acid manufactured will be consumed by the company's various fertilizer plants.

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@13c. per unit, New York and other Atlantic ports. Spanish pyrites contain from 40 to 51 per cent of sulphur; American, from 42 to 44 per cent.

Sulphate of Ammonia.—Sales of foreign gas liquor are reported at $2.92½@$3 per 100 lbs. c. i. f. New York. The firmness in Great Britain is attributed to the increased deliveries, resulting in depleted stocks. Undoubtedly the high price for nitrate of soda has stimulated buying of sulphate of ammonia.

Nitrate of Soda.—Easier at $2.17½@$2.20 per 100 lbs., ex-*Cumbal.* Futures can be had at below $2 which is asked for June to December deliveries. Imports into the United States for the quarter ending March 31 were 36,058 tons, showing a falling off of 18,065 tons, as compared with last year. High prices and interference with shipments in Chile explain this decrease.

In Europe, more particularly in Germany, the market is depressed, and prices are weaker. The shipments from Chile to Europe in April are cabled as about 81,800 tons, and loadings on May 1 as about 21,400 tons. Last year the April shipments were 77,801 tons, and loadings on May 1, 71,614 tons.

Concerning the Chilean market Messrs. Jackson Brothers, of Valparaiso, Chile, write us under date of March 22 as follows: During the first week of the fortnight the nitrate market showed great activity, the inquiry for 95 per cent being principally for immediate or season loadings; the former, which is scarce, advanced from 6s. 8½d. to 6s. 9½d., steamer terms, 6s. 10d. being paid for small parcels; but the latter, although not freely offered, only advanced ½d. per qtl., the last transactions being effected at 6s. 9½d. A comparatively large business has also taken place in the refined quality at 6s. 9½d@ 6s. 11d. for deliveries throughout the year. The article closes quiet, and it is doubtful whether buyers would even pay the last prices obtained. On the other hand, but few producers show any inclination to operate in forward deliveries. The production during February is advised as 1,675,000 qtls., making a total of 3,958,000 qtls. this year, against 3,920,000 qtls. in 1901. The consumption of the world for the first two months of this year was 5,257,000 qtls., against 5,384,000 qtls. last year. We quote 95 per cent., March-April, 6s. 9½d.; May-June, 6s. 9d.; July-December, 6s. 9½d.; and 96 per cent, 6s. 10½d.@6s. 10d., according to date of shipment, all ordinary terms, sellers. The price of 6s. 9½d., with an all round freight of 18s. 9d. stands in 8s. 6d. per cwt., net cost and freight, without purchasing commission. Sales in the fortnight ending March 17 were 1,091,502 qtls., and resales, 132,000 qtls.

Potash Salts.—Press reports intimate that representatives of the Virginia-Carolina Chemical Company—the Southern fertilizer combination—are in Germany negotiating for potash mines. An able American mining engineer accompanies the party, and it is believed some property will be secured. The announcement that the mines of the German Kali Syndicate, which has the monopoly in the potash salts industry, will be bought is premature, as the shares of the constituent companies are not for sale. Neither is it likely that the Prussian Government will dispose of its lands. Consequently the only deposits to be had are those of independent companies, or individuals, and these properties are mostly in a prospective stage. The result of this move by the Virginia-Carolina Chemical Company to further control the raw material for its manufactures will be watched with interest.

Phosphates.—Owing to the persistent efforts of European superphosphates makers to delay purchases of raw material so as to obtain lower prices, exports of phosphates from the United States are below last year's. In fact, Florida high-grade rock people have seen fit, in view of the low ocean freights, to reduce prices. They have taken 1903 contracts at 6@6¼d. per unit ($9.36@$9.75 per ton), c. i. f. North Sea ports, which are much below those booked last year.

Concerning the exports of high-grade Florida rock in the quarter ending March 31, Messrs. Auchincloss Brothers furnish us with the following statistics:

Destination.	1901.	1902.	Changes.	
Austria, tons	.....	2,750	I.	2,750
Belgium	11,256	10,168	D.	1,088
England	4,400	7,254	I.	2,854
Germany	57,583	48,214	D.	9,369
Holland	16,337	2,168	D.	14,169
Italy	.....	2,012	I.	2,012
Norway and Sweden	2,910	.....	D.	2,910
Scotland	2,300	6,810	I.	4,510
Total tons	94,786	79,376	D.	15,410

These exports comprise over 60 per cent. of the total of all phosphates reported for the quarter. The total quantity of Florida, Tennessee and South Carolina phosphates exported during these 3 months was 128,500 tons, which compares with 168,075 tons in the corresponding period last year; showing a decrease of 39,575 tons, or 23.5 per cent, due chiefly to the curtailed demand in Germany.

Tennessee miners are asking a 25c. advance in export price, but in the foreign market sellers are quoting as low as 5½d. per unit (about $8.58 per ton).

Comparatively little is doing in South Carolina rock.

We quote phosphate prices below:

Phosphates.	Per ton F. o. b.	C. i. f. Un. Kingdom or European Ports. Unit.	Long ton.
*Fla. hard rock (17@80%)	$6.50@7.00	6¼@6¾d.	$9.75@10.53
*Fla. land peb. (68@73%)	3.00@3.25	4¾@5d	6.65@ 7.00
*Fla. Peace Riv. (58@63%)	2.25@2.50	4¾@5d	5.70@ 6.00
†Tenn., (78@80%) export	3.75	5½@6d.	8.58@ 9.36
†Tenn., 78% domestic	3.00@3.25	.....	.....
†Tenn., 75% domestic	2.75@3.00	.....	.....
†Tenn., 73@74% domestic	2.40	.....	.....
†Tenn., 70@72% domestic	2.10@2.25	.....	.....
‡So. Car. land rock	3.25	4½@5d	5.67@ 6.30
‡So. Car. river rock	2.75@3.00	.....	.....
Algerian (63@68%)	.....	5⅞@6½d.	7.48@ 8.45
Algerian (58@63%)	.....	5¼@6d.	6.30@ 7.20
Algerian (53@58%)	.....	5 @5¼d.	5.50@ 5.78

*Fernandina, Brunswick or Savannah.
†Mt. Pleasant. ‡On vessels, Ashley River.

Liverpool. **April 16.**

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

There is no special activity to note.

Soda Ash.—We quote nearest spot range for tierces about as follows: Leblanc ash, 48 per cent, £5 15s. @£6; 58 per cent, £6 2s. 6d.@£6 7s. 6d per ton, net cash. Ammonia ash, 48 per cent, £4 5s.@£4 10s.; 58 per cent, £4 10s.@£4 15s. per ton, net cash. Bags, 5s. per ton under price for tierces. Soda crystals are generally £3 7s. 6d. per ton, less 5 per cent for barrels, or 7s. less for bags, with special terms for certain export quarters. Caustic soda spot prices are: 60 per cent, £8 15s.; 70 per cent, £9 15s.; 74 per cent, £10 5s.; 76 per cent, £10 10s. per ton, net cash. Bleaching powder is nominally quoted at £6 15s.@ £6 17s. 6d. per ton, net cash for hardwood packages, but there is not much fresh export business reported; special terms for Continental and other export quarters. Chlorate of potash is still quoted at 3d. per lb., net cash, but orders are scarce. Bicarb soda is unchanged at £6 15s. per ton, less 2½ per cent for the finest quality in 1 cwt. kegs, with usual allowances for larger packages, also special terms for a few favored markets. Sulphate of ammonia is in limited supply and nearest spot quotations are about £12 5s.@£12 7s. 6d. per ton, less 2½ per cent for good gray 24@25 per cent in double bags f. o. b. here. Nitrate of soda is in moderate request on spot at £10 17s. 6d.@£11 per ton, less 2½ per cent for double bags f. o. b. here, as to quality.

METAL MARKET.

New York. May 1.

GOLD AND SILVER.

Gold and Silver Exports and Imports.

At all United States Ports in March and Year.

Metal	March. 1901.	March. 1902.	Year. 1901.	Year. 1902.
Gold.				
Exports	$490,269	$4,732,181	$9,128,240	$15,323,143
Imports	2,520,455	2,609,060	8,645,355	5,698,740
Excess.	I. $2,030,186	E. $2,123,121	E. $482,885	E. $9,624,403
Silver.				
Exports	$5,150,186	$3,329,255	$14,519,674	$11,762,653
Imports	2,706,366	2,296,203	8,085,093	6,409,479
Excess.	E. $2,443.820	E. $1,033,052	E. $6,434,581	E. $5,353,17

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.

Gold and Silver Exports and Imports, New York.

For the week ending May 1, 1902, and for years from January 1, 1902, 1901 and 1900.

Period.	Gold. Exports.	Gold. Imports.	Silver. Exports.	Silver. Imports.	Total Excess Exports or Imports.
Week	$4,600	$4,460	$184,510	$18,049	E. $166,601
1902	16,442,351	1,036,340	10,640,922	458,009	E. 25,588,924
1901	16,397,994	1,008,302	12,511,205	1,417,297	E. 26,483,600
1900	6,786,400	1,316,548	13,054,354	1,548,842	E. 16,939,394

Gold exports this week were to South America and silver to London. Imports were chiefly from Central America and the West Indies.

Financial Notes of the Week.

Business continues good, and prospects are better than they were a week or two ago, the timely rains having improved crop prospects. The speculative markets are somewhat quieter. Money in New York is in a little better supply. No further shipments of gold are reported. There are rumors of London buying of some blocks of American securities; if these are true, there will be no immediate demand for gold for export. In this connection it is well to note that gold imports at San Francisco have been very light this year, no gold having been received from Australia.

The statement of the New York banks, including the 63 banks represented in the Clearing House, for the week ending April 26 gives the following totals, comparison being made with the corresponding weeks of 1901 and 1900:

	1900.	1901.	1902.
Loans and discounts	$774,548,600	$884,444,900	$893,394,100
Deposits	852,062,500	970,790,500	954,546,600
Circulation	21,128,300	31,314,900	30,970,300
Specie	163,468,900	187,157,800	173,094,000
Legal tenders	66,621,000	72,299,600	75,003,700
Total reserve	$230,089,900	$259,457,400	$248,097,700
Legal requirements	213,015,625	242,697,625	238,636,650
Balance surplus	$17,074,275	$16,759,775	$9,461,050

Changes for the week this year were increases of $1,772,400 in deposits, $761,600 in specie, $2,563,900 in legal tenders, and $2,882,400 in surplus reserve; decreases of $1,097,300 in loans and discounts and $6,600 in circulation.

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.

	—1901— Gold.	—1901— Silver.	—1902— Gold.	—1902— Silver.
N. Y. Ass'd	$187,157,800	.....	$173,094,400	.....
England	179,366,070	.....	181,776,140	.....
France	487,473,200	219,782,470	515,137,745	221,665,705
Germany	158,205,000	72,755,000	186,670,000	69,050,000
Spain	70,010,000	83,080,000	70,455,000	91,545,000
Nethld's	25,284,500	28,578,000	23,913,500	32,579,000
Belgium	14,935,000	7,465,000	15,980,000	7,990,000
Italy	76,235,000	9,654,500	80,640,000	10,631,500
Russia	364,840,000	33,970,000	368,360,000	42,495,000

The returns of the Associated Banks of New York

are of date April 26 and the others April 24, 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 Bank of England reports only gold.

The silver market the past week has been dull with a weakening tendency. London quotes few buyers, with sellers not pressing. If India or Russia should come in for coinage orders, the price should improve, but the Chinese indemnity continues a depressing factor.

The United States Assay Office in New York reports receipts of 17,000 oz. silver for the week.

Shipments of silver from London to the East for the year up to April 17 are reported by Messrs. Pixley & Abell's circular as follows:

	1901.	1902.		Changes.
India	£2,685,710	£2,392,585	D.	£293,125
China	246,125	16,500	D.	229,625
The Straits	48,976	250	D.	48,726
Totals	£2,980,811	£2,409,335	D.	£571,476

Arrivals for the week, this year, were £146,000 in bar silver from New York, £6,000 from Chile, £3,000 from the West Indies, and £20,000 from Australia; total, £175,000. Shipments were £171,000 in bar silver to Bombay, and £65,000 to Calcutta; total, £236,000.

Indian exchange has been steady, and the Council bills offered in London were all taken at an average of 15.91d. per rupee. The demand for silver for Indian account has been light.

Prices of Foreign Coins.

	Bid.	Asked
Mexican dollars	$0.41	$0.44
Peruvian soles and Chilean pesos	.37	.41½
Victoria sovereigns	4.86	4.88
Twenty francs	3.86	3.88
Twenty marks	4.74	4.86
Spanish 25 pesetas	4.78	4.82

OTHER METALS.

Daily Prices of Metals in New York.

Apr. May	Sterling Exchange	Silver N. Y. Cts.	Silver London Pence.	Copper Lake Cts. per lb.	Copper Electrolytic per lb.	Copper London £ per ton.	Tin, cts. per lb.	Lead cts. per lb.	Spelter N.Y. cts. per lb.	Spelter St. L. cts. per lb.
25	4.87⅞	51¾	23⅞	11⅞ @12	11⅛ @11⅜	52⅜	28	4.05 @4.10	4.35	4.15
26	4.87¾	51½	23⅞	11⅞ @12	11⅛ @11⅜	....	28	4.05 @4.10	4.35	4.15
28	4.87¾	51⅜	23¾	11¾ @12	11⅛	52½	28¼	4.05 @4.10	4.35	4.15
29	4.87¾	51	23½	11¾ @12	11⅜ @11⅛	52¼	28 28¼	4.05 @4.10	4.35	4.15
30	4.87¾	51	23½	11¾ @12	11⅜ @11⅛	52¼	28¼ @ 28⅛	4.05 @4.10	4.35	4.15
1	4.87¾	50⅞	23 7/16	11¾ @12	11⅜ @11⅛	52⅜	28¾	4.05 @4.10	4.35	4.15

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.

By an unfortunate error in proofreading, the price of silver in London on April 21 was given in the table of daily prices in our last issue as 24 5-16d.; it should have been 23 5-16d. On April 22 no quotation could be given for silver in London, as absolutely no sales were reported on that day, an almost unprecedented occurrence. The New York price on April 22 was 51 cents.

Copper.—The market remains quiet. But few transactions are reported, and these not of large volume. Buyers, generally have assumed a waiting attitude. Consumption continues unabated, and it is believed that larger orders for raw material may soon be placed. Slightly lower prices have been made, and we quote Lake Copper at 11¾@12c.; electrolytic, in cakes, wirebars and ingots at 11⅜11½c., in cathodes at 11⅛@11¼c.; casting copper at 11¼@11⅜c.

The foreign market has fluctuated but little. It closed last Thursday at £52 2s. 6d., and on Friday it was 5s. higher. On Monday it improved further 2s. 6d., on Tuesday and Wednesday it ruled at about £52 5s., and on Thursday closed at £52 12s. 6d. for spot, and the same for three months.

Statistics for the second half of April show no change in the visible supplies.

Refined and manufactured sorts we quote: English tough, £55 10s.@£56; best selected, £56 10s.; strong sheets, £68; India sheets, £65 10s.; yellow metal, 6@6⅛d.

Exports of copper from New York, Baltimore and Philadelphia for the week ending April 30 are reported by our special correspondents as follows: To Great Britain, 653 tons; Germany, 648; Holland, 555; France, 600; Italy, 143; Belgium, 55; Russia, 200; Turkey, 25; total, 2,879 tons. Imports were 312 tons copper from Mexico, and 25 tons from London; total, 337 tons.

Imports of copper into the United States for the three months ending March 31 are reported by the Bureau of Statistics of the Treasury Department as below, in long tons:

	1900.	1901.	Changes.
Copper ore and matte	13,140	12,113	D. 1,027
Fine copper	6,885	6,581	D. 304

As the report does not distinguish ore and matte, it is impossible to estimate the total fine copper represented in these imports.

Tin.—The upward movement which we noted in our last report has made further progress. A fair business has been done, especially for early deliveries for which the supply is not plentiful. The production in the Straits appears to be decreasing, and as consumption remains very good, a higher level of prices may be reached. At the close, we quote spot tin at 28¾c.; May, 28½c.; June, 28¼c.

The foreign market, which closed last Thursday at £126 2s. 6d. for spot, £123 for three months', rose on Friday to £129 for spot, £125 10s. for three months'. On Monday spot was £1 highger, but this advance was lost again on Tuesday. On Wednesday spot was quoted at £129 10s., three months at £126, and on Thursday the market closed at £130 12s. 6d. for spot, £127 for three months.

Statistics for the month of April show a decrease in the visible supplies of 2,500 tons.

Imports of tin into the United States for the three months ending March 31 are reported as below, in long tons of 2,240 lbs.:

	1901.	1902.	Changes.
Straits	4,665	5,540	I. 875
Australia	192	135	D. 57
London	3,528	3,012	D. 516
Holland	254	305	I. 51
Other countries	22	85	I. 63
Totals	8,661	9,077	I. 416

The total increase this year was 416 tons, or 4.8 per cent. The gain was in shipments direct from East, the imports by way of Great Britain having fallen off.

Lead.—The metal is dull and unchanged. We quote 3.97½@4.05c. St. Louis, 4.05@4.10c. New York.

In London the market is slightly higher, Spanish lead being quoted at £11 13s. 9d.@£11 15s. English lead £11 16s. 3d.@£11 17s. 6d.

Imports of lead in all forms into the United States for the three months ending March 31, and re-exports of imported lead, are given by the Bureau of Statistics of the Treasury Department as below, in short tons:

	1901.	1902.	Changes.
Lead, metallic	103	1,516	I. 1,413
Lead in ores and base bullion	36,756	26,545	D. 10,211
Total imports	36,859	28,061	D. 8,798
Re-exports	27,945	21,509	D. 6,436
Balance	9,914	6,552	D. 2,362

Of the imports this year 24,407 tons, or 87.1 per cent of the total, were from Mexico, and 2,690 tons, or 9.6 per cent, from Canada. In addition to the re-exports given above, there were 456 tons of domestic lead exported this year, against 2,317 tons last year.

St. Louis Lead Market.—The John Wahl Commission Company telegraphs us as follows: Lead is dull, by steady. Missouri brands sell at 3.97½@4c. Argentiferous lead brings 4.05c.

Spelter.—The market is quiet. Consumers, generally, have covered their wants for this and next month, and there is little buying. On the other hand, not much pressure to sell has developed, and we quote prices unchanged at 4.15c. St. Louis, 4.35c. New York.

The foreign market is somewhat higher, good ordinaries being quoted at £18 2s. 6d., specials 5s. higher.

Exports of spelter, or metallic zinc, from the United States for the three months ending March 31 were 1,341 short tons, against 1,473 tons for the corresponding period in 1901; a decrease of 132 tons, or 9 per cent. Exports of zinc ore were 12,268 tons, against 8,479 tons last year; an increase of 3,789 tons, or 44.6 per cent, this year.

St. Louis Spelter Market.—The John Wahl Commission Company telegraphs us as follows: Spelter is steady at the basis of 4.15c., East St. Louis.

Antimony is unchanged. We quote Cookson's at 9¾@10c.; Halletts, 8@8½c.; Hungarian, Japanese, Italian and U. S. Star at 7¾c.

Imports of antimony into the United States for the three months ending March 31 are reported as follows, in pounds:

	1901.	1902.	Changes.
Metal and regulus	893,573	1,001,022	I. 107,449
Antimony ore	265,280	138,263	D. 127,017

A considerable increase in metal was accompanied by a large falling off in ore imports.

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

Exports of nickel, nickel oxide and nickel matte from the United States for the three months ending March 31 were 966,743 lbs., against 1,208,871 lbs. for the corresponding period in 1901; showing a decrease of 242,128 lbs., or 20 per cent, this year.

Platinum.—Consumption continues good. Ingot platinum in large lots brings $19.50 per oz. in New York.

Chemical ware (crucibles and dishes), best hammered metal from store in large quantities, is worth 82c. per gram.

Imports of platinum into the United States for the three months ending March 31 were 1,427 lbs., against 1,645 lbs. in the first quarter of 1901; a decrease of 218 lbs., or 13.3 per cent, this year.

Quicksilver.—The New York price is $48 per flask for large lots, with a slightly higher figure for small orders. In San Francisco quotations are somewhat easier, $46.50@$47 being named for domestic orders, though $44 is still quoted for export. The London price is £8 15s. per flask, with the same figure quoted from second hands.

Exports of quicksilver from all United States ports for the three months ending March 31 were 169,573 lbs., against 236,607 lbs. in the corresponding period of 1901; a decrease of 67,037 lbs., or 39.4 per cent.

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

Aluminum.	Per lb.
No. 1, 98% ingots	33@37c.
No. 2, 90% ingots	31@34c.
Rolled sheets	4c. up
Alum-bronze	20@23c.
Nickel-alum	33@39c.
Bismuth	$1.60
Chromium (over 90%)	1.00
Copper, red oxide	50c.
Ferro-Molyb'um (50%)	$1.25
Ferro-Titanium (10%)	90c.
Ferro-Titanium (20%)	$1.10

Aluminum.	Per lb.
Ferro-Tungsten (37%)	28c.
Magnesium	$2.75
Manganese (over 90%)	1.00
Mangan'e Cop. (20% Mn)	22c.
Mangan'e Cop. (30% Mn)	23c.
Molybdenum (Best)	$1.85
Phosphorus	50c.
American	70c.
Sodium metal	50c.
Tungsten (Best)	62c.

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

Average Prices of Metals per lb., New York.

	Tin. 1902.	Tin. 1901.	Lead. 1902.	Lead. 1901.	Spelter. 1902.	Spelter. 1901.
January	23.54	26.51	4.000	4.350	4.27	4.12
February	24.07	26.68	4.075	4.350	4.15	4.01
March	26.32	26.03	4.075	4.350	4.28	3.91
April	27.77	25.93	4.075	4.350	4.37	3.98
May	....	27.12	....	4.350	....	4.04
June	....	28.60	....	4.350	....	3.99
July	....	27.85	....	4.350	....	3.96
August	....	26.78	....	4.350	....	3.99
September	....	25.31	....	4.350	....	4.08
October	....	26.62	....	4.350	....	4.23
November	....	26.67	....	4.350	....	4.20
December	....	24.36	....	4.153	....	4.31
Year	....	26.54	....	4.334	....	4.09

Average Prices of Copper.

Month.	New York—Electrolytic. 1902.	New York—Electrolytic. 1901.	New York—Lake. 1902.	New York—Lake. 1901.	London—Standard. 1902.	London—Standard. 1901.
January	11.053	16.25	11.322	16.77	48.43	71.78
February	12.173	16.38	12.378	16.90	55.16	71.17
May	....	16.41	....	16.94	....	69.66
March	11.882	16.42	12.188	16.94	53.39	69.54
April	11,618	16.43	11,986	52.79	69.61	16.94
June	....	16.38	....	16.90	....	68.83
July	....	16.31	....	16.61	....	67.66
August	....	16.25	....	16.50	....	66.34
September	....	16.25	....	16.54	....	65.97
October	....	16.25	....	16.60	....	64.11
November	....	16.224	....	16.33	....	64.51
December	....	13.845	....	14.36	....	62.34
Year	....	16.117	....	16.53	....	66.79

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.

Month.	1902. London. Pence.	1902. N. Y. Cents.	1901. London. Pence.	1901. N. Y. Cents.	1900. London. Pence.	1900. N. Y. Cents.
January	25.62	55.56	28.97	62.82	27.30	59.39
February	25.41	55.09	28.13	61.06	27.40	59.76
March	25.00	54.23	27.04	60.63	27.59	59.81
April	24.34	52.72	27.30	59.29	27.41	59.59
May	....	....	27.43	59.64	27.56	59.96
June	....	....	27.42	59.57	27.81	60.42
July	....	....	26.96	58.46	28.23	61.25
August	....	....	26.94	58.37	28.13	61.14
September	....	....	26.95	58.26	28.85	62.63
October	....	....	26.62	57.59	29.58	63.83
November	....	....	26.12	56.64	29.66	64.04
December	....	....	25.46	55.10	29.68	64.14
Year	....	....	27.11	58.95	28.27	61.33

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

STOCK QUOTATIONS.

NEW YORK.

Company and Location.	par val	April 24. H.	April 24. L.	April 25. H.	April 25. L.	April 26. H.	April 26. L.	April 28. H.	April 28. L.	Apr. 29. H.	Apr. 29. L.	Apr. 30. H.	Apr. 30. L.	Sales
Acacia, Colo.	$1							.11						500
Alamo, Colo.	1									.04½				2,000
Alice, Mont.	25							55						500
Amalgamated c., Mont	100	67.63	66.13	68.50	67.00	67.88	66.75	66.88	65.88	66.63	65.25	66.25	65.13	140640
*Anaconda c., Mont.	25	114.		116.	113.	116.	113.	114.				112.	111.	2,550
Anaconda Gold, Colo.	5							.20						500
Argentum-Jun., Colo.	2													
Belcher, Nev.	3													
Best & Belcher, Nev.	3							.25						1,000
Brunswick, Cal.	1	.17				.17				.15				700
Chrysolite, Colo.	50			.04										500
Comstock T., Nev.	100							.05½						400
Comstock Bonds, Nev.	100			05½										6,000
Con. Cal. & Va., Nev.	2½	1.25						1.63				1.70	1.60	600
Cripple Cr. Con., Colo.	1													
Elkton, Colo.	1	.80		.80		.80		.78	.77	.77	.75	.74		3,900
Golden Fleece, Colo.	1	.35				.34						.30		700
Greene Con., Mex.	10	22.88	22.38	23.00	22.75	23.00		23.50		23.38	23.00	23.50	23.13	7,200
Hale & Norcross, Nev.	3			22										100
Horn Silver, Utah.	25													
Isabella, Colo.	1	.26				.26		.25				.25		1,900
Jack Pot, Colo.	1													
Little Chief, Colo.	1			.13								.13		500
Mexican, Nev.	3							.55		.60				1,000
Mine Securities, U. S	100	7.88	7.50	7.75				7.75	7.50	7.88	7.75	8.00	7.00	5,100
Mollie Gibson, Colo.	5							.10						150
Ontario, Utah.	100	9.25		9.25	8.50									250
Ophir, Nev.	3	1.20						1.60	1.35					300
Pharmacist, Colo.	1													
Phoenix, Ariz.	1									.06				
Portland, Colo.	1	1.90		1.95		1.85				1.85		1.88		1,100
Potosi, Nev.	3	.23												200
Quicksilver, Cal.	100													
Quicksilver pf., Cal.	100													
Small Hopes, Colo.	20			.50	.45									300
Standard Con., Cal.	10					3.60						3.60		400
Tenn. C., Tenn.	25	10.38	10.15	11.00		11.50	10.75	11.00		11.38	11.00	13.63	12.00	5,400
Union Copper, N. C.	10	3.75	3.63					3.88	3.75	4.00	3.80	4.00		2,500
White Knob, Ida.	100	24.75	24.00	26.00	24.75	25.38	24.75	27.25	25.25	27.00	26.50	26.75	26.00	7,400
Work, Colo.	1									.07½				2,000

*Per cent. †Ex-dividend.

Coal and Industrial Stocks.

Am. Agr. Chem., U.S.	100	24		27½	24¼	28½	28	30¼	29	30½	29¼	30½	29¼	6,475
Am. Agr. Chem. pf, U.S.	100	83½		84½		86½	85	87½		87½	87	87		1,426
Am. Car & Fdy., U.S.	100	30	29¼	30¾	30½	30½	30	30¾	30⅜	31¼	30½	31¼	30⅛	23,775
Am. Car & Fdy. pf, U.S.	100	91	89¾	91¾	91	86½	85	91¼	91	91¼	91	91¼		4,300
Am. Sm. & Ref., U.S.	100	43⅜	44⅛	45¼	44¼	45⅝	44⅛	44⅞	43½	44	43¼	43⅝	43½	7,272
Am. Sm. & Ref. pf, U.S.	100	96¼	95⅜	96⅜	96¼			96½	96¼	95⅜	95¼	95⅛	95	3,513
Col. Fuel & I., Colo.	100	110½	107	109⅞	108	109¾	108	110⅜	107½	110⅞	108¾	109¼	106¾	334980
Col. & H. C. & I., Colo.	100	21¾	21	22	21¼	21½	21½	21		21	20½	20⅞	20¼	3,300
Int'l S. Pump, U.S.	100	55	54	54½	54	55¼	55	55⅝		55¼	55	55	54⅛	1,510
Int'l S. Pump pf, U.S.	100	93								94		94	90	300
Mong. R. Coal, Pa.	100	13¼	13⅛	13⅛		13		13¼				13¼	13	1,097
Mong. R. Coal pf, Pa.	100	43¼		43¼		43⅛		43½	43	43	42⅝	43		2,837
National Lead, U.S.	100	18		18½				19	18½	20⅛	19	20⅛	19⅛	14,330
National Lead pf, U.S.	100	89						86¾		89		89⅞	89	335
National Salt, U.S.	100	20		20						20		20		
National Salt pf, U.S.	100	69¾		69¾						69¾		69¾		
Pittsburg Coal, Pa.	100	25		25				24⅞		24⅜				1,234
Pittsburg Coal pf, Pa.	100	90½	90	90⅝		90⅛		90¼	90	90¼	90	90⅝	90	1,802
*Pressed Steel Car, Pa.	100	42⅛	41⅛	44⅜	42⅛	43⅞	43⅛	46½	44	46½	45½	46¼	45¼	39,420
Republic I & S., U.S.	100	20	19¼	19⅞	19½	19½	19	19⅜	19	19⅜	19¼	19¼	19	36,750
Republic I. & S., pf, U.S.	100	75⅞	74¼	76	75½	75¾	75½	75⅛	75	75⅝	75	75¼	74½	20,250
Sloss-Shef S. & I., Ala.	100	33	32	33	32					34	31	33	31	200
Sloss-Shef S. & I. pf, Ala.	100	83	82	82½	82					82½		82		200
Standard Oil, U.S.	100	627	625	630	625	630		630		647		650		137
Tenn. C. I. & R. R., Ala.	100	74⅜	73⅜	74¼	73	73½	72½	73¾	72½	73¼	72	72⅜	70¼	76,425
U. S. Red. & Ref., Colo.	100	42¼				42¼		43	42¼			44	43½	1,500
U.S. Red. & Ref. pf, Colo	100	65				65¼				64½				400
U.S. Steel Corp., U.S.	100	43⅜	42	43¾	43¼	43½	43	43	42½	42⅜	42⅜	42½	42	201310
U.S. Steel Corp. pf, U.S.	100	94	92½	94⅜	74	94½	94¼	94⅜	93¾	93⅜	93⅛	93⅜	92½	166741
Va.-Car Chem., U.S.	100	75¼	73	75½	74¾	75⅞	74⅞	76⅜	75¼	76	75¼	75¾	74¾	31,820
Va.-Car Chem. pf, U.S.	100	131¾	130¼	131⅞				132⅝	132	132½		132⅛		2,000

Total sales, 1,172,299 shares. * Ex-dividend.

PHILADELPHIA, PA. §

Name and Location of Company.	par val	Apr. 24. H.	Apr. 24. L.	Apr. 25. H.	Apr. 25. L.	Apr. 26. H.	Apr. 26. L.	Apr. 28. H.	Apr. 28. L.	Apr. 29. H.	Apr. 29. L.	Apr. 30. H.	Apr. 30. L.	Sales
Am. Alkali	$50					.63	.38	1.00	.68	1.25	.75	.75	.68	14,590
Am. Cement	10	7.00	6.88			7.00	6.88	7.38	7.00	7.25		7.00		4,060
Beth. Iron, Pa.	50													
Beth. Steel, Pa.	50													
Cambria Iron, Pa.	50			48.00	47.50					47.50		47.50		130
Cambria Steel, Pa.	50	24.75	24.38	24.88	24.63	25.00	24.75	24.75	24.63	24.75	24.63	24.63	24.50	12,224
Susq. I. & S., Pa.	10			2.25				2.18				2.25		500
United Gas I., Pa.	50	122		122	121½	122¼	122	122¼	121¾	121¾		121¾	121½	2,399

§Reported by Townsend, Whelen & Co., 309 Walnut St., Philadelphia, Pa. Total sales 33,903 shares.

MEXICO. Apr. 19.

Name of Company	Shares.	Last div'd	Prices. Bid.	Prices. Ask.
Durango:				
Ca. Min. de Penoles	2,500	$50.00	$4,150	$4,250
Augustias, Pozos	2,400	5.00	50	65
Guananjuato:				
Cinco Senores y An., aviada	2,000	15.00	245	255
Cinco Senores y An., aviada	400	10.00	215	225
Providencia, San Juan de la Luz	6,000	2.00	250	260
Guerrero:				
Garduno y Anexas.	7,200		30	50
Hidalgo:				
Amistad y Concordia.	9,600	3.71	54	54½
Carmen, aviada.	1,100		250	300
Ca. Real del Monte	2,554		450	550
El Encino, aviador	1,120		40	50
Guadalupe Fresnillo y Anexas.	1,000		220	300
La Blanca, aviada.	1,536		490	500
La Blanco, aviada.	768		260	280
Maravillas y An., aviador	1,680		200	250
Maravillas el Lobo	1,000		200	250
Palma y An., aviador	1,800		15	25
Sta. Gertrudis y An., aviador	9,600		10	11
Sta. Gertrudis y An., aviador	28,800	0.50	65	65½
Santo Tomas Apostol aviador	5,130		6	7
San Rafael y An., aviada.	1,200	12.00	660	670
San Rafael y An., aviada.	1,200	8.00	290	300
Solodad aviada.	960	5.00	270	280
Sorpressa, aviada.	930	5.00	180	185
Mexico:				
Alacran	2,400		$50	$65
La Esperanza (El Oro)	3,000	$10.00	795	805
Socovon de S. Fern.	2,500		20	30
Michoacan:				
Luz de Borda, aviador	3,000		20	32
Luz de Borda, aviada	1,000		10	12
San Luis Potosi:				
Concepcion y An.	3,000		100	115
El Barreno, aviador.	2,000	2.00	20	22
Sta. Maria de la Pa.	2,400	10.00	570	580
Santa Fe.	2,400		20	30
San Diego y Annexas.	2,400	4.00	70	80
Zacatecas:				
Candelaria y Pinos	2,500		320	340
San Carlos y Annexas	2,500	10.00	310	320
Sta. Maria de Gaud.	2,500	10.00	345	355
Miscellaneous:				
Bartolome de Medina	2,000	1.50	50	55
Guadalupe Hacienda	10,000	4.00	220	230
La Luz Hac. (Pachuca)	3,750		65	77
La Reina (Chihuahua)	192		2,500	3,500
Naica (Chihuahua)	100		4,500	5,000
Natividad (Oaxaca) aviador	1,800	4.00	480	520
National (Oaxaca) aviador	1,800	4.00	400	500
San Francisco Hac.	6,000	2.00	190	195
Santa Ana Huantla Morelos	4,000		50	70
Union Hacienda	3,000	5.00	190	195

BOSTON, MASS.

Name of Company.	par val	Shares listed.	Apr. 24. H.	Apr. 24. L.	Apr. 25. H.	Apr. 25. L.	Apr. 26. H.	Apr. 26. L.	Apr. 28. H.	Apr. 28. L.	Apr. 29. H.	Apr. 29. L.	Apr. 30. H.	Apr. 30. L.	Sales.
Adventure Con., c	$25	100,000	23.13		24.38	24.00	24.50	24.00	24.25	24.00	24.00	23.25	24.00	22.00	4,029
Aetna Cons.	5	100,000													
Allouez, c	25	80,000											3.50		50
Amalgamated, c	100	1,500,000	†67.63	67.00	68.38	68.13	67.88	66.63	66.75	65.75	66.50	65.38	66.50	65.13	12,265
Am. Gold Dreg.	5	90,000													
Am. Z. L. & Sm.	25	60,000			13.00				12.00						150
Anaconda, c	25	1,200,000													
Arcadian, c	25	150,000	8.50	7.75	8.50	8.00			8.50	8.00	7.50		7.75	7.00	2,415
Arnold, c	25	60,000							.50				.65		70
Atlantic, c	25	40,000	39.00				30.00		30.00				36.00	29.00	300
Baltic	25	100,000													
Bingham, Cons.	50	150,000	37.00	35.13	37.00	36.50	35.63	35.50	36.50	35.50	36.50	35.88	36.38	35.00	9,786
Bonanza Dev.	10	300,000											.80		600
Boston, q.	10	100,000													
British Columbia	5	250,000													
Cal. & Hecla, c	25	100,000	565.		565.				570.	539.	540.	534.	540.	†533	245
Centennial, c	25	90,000	20.75	20.00	20.75	20.25	20.00		20.00	19.50	19.75		19.50		915
Central Oil	25	60,050									7.75	7.50	8.38	8.00	1,080
Cochiti, g.	10	182,250	.30	.25			.40	.25	.45						927
Cons. Mercur, g.	5	1,000,000	1.75		1.88				1.88	1.81	1.88	1.75	1.88	1.75	1,965
Con. Zinc & L. M. S.	10	110,000											3.00		100
Copper Range, Con.	100	285,000	61.00	59.50	61.63	60.25	60.75	59.50	60.63	59.25	59.50	59.00	59.00	56.75	16,677
Daly-West.	20	150,000	44.00		44.75	44.50	45.00		44.00		45.25	45.00			945
Dominion Coal	100	150,000	138½		140.	136	142½		143	142.	142.	141½	1.40		656
Dominion Coal, pf.	100	30,000	177.												10
Dominion I & S.	100	100,000	68.00	67.25	69.50	67.25	71.50	70.00	72.25	70.25	70.88	68.25	70.50	68.50	11,115
Elm River, c.	12	100,000									3.25		3.50		225
Franklin, c.	25	100,000	12.50		12.00	11.00			11.00		11.00				244
Guanajuato Cons.	5	385,000			3.75	3.50	3.75	3.50			3.75	3.50	3.50		960
Humboldt, c.	25	40,000													
I. Royale Con., c.	25	150,000	13.00	12.50	13.00	12.75	13.00		13.00		14.00	13.50	14.00		985
Mass. Con., c	25	100,000	19.00	18.75	19.38	18.50	19.00	18.50	19.00	18.25	18.25	18.00	17.75	17.50	2,942
Mayflower, c.	25	100,000	3.00		3.00				2.88	2.50	2.63				450
Merced	15	100,000													
Michigan, c.	25	100,000	11.25	11.00	11.50	11.25			11.50	10.88			11.00	10.25	624
Mohawk, c.	25	100,000	38.00	37.25	38.00	37.00	38.00	37.00	37.50	35.00	37.00	35.50	36.00	35.50	2,921
Mont. C. & C.	25	200,000									4.00				100
Mont'l & Boston	5	570,000	3.13	3.06	3.13	3.00					3.50	3.13	3.38	3.25	13,295
National	25	100,000	1.63	1.25											680
N. E. Gas & Coke.	25	100,000	3.50		4.00	3.75	4.00				4.00	3.50	4.06		1,207
New Idria	5	100,000			7.50										50
Old Colony, c	25	100,000			3.88				3.75				3.50		220
Old Dominion, c.	25	150,000	19.88	19.00	19.50		19.50	19.00	19.50	17.50	18.00	17.50			2,880
Osceola, c.	25	96,150	63.00		63.00		63.00		63.50		62.88		63.00	62.00	221
Parrot, s. c.	10	229,850			26.50		26.25		26.00		26.50	25.50	25.50	24.75	619
Phoenix Con., c.	25	100,000	3.50		4.00	3.75	3.88	3.75			3.75		3.75		710
Quincy, c.	25	100,000					130.				130	125.			32
Rhode Island, c.	25	100,000			3.60				2.50				2.25		175
Santa Fe, g. c.	10	250,000	3.00		3.00				3.00				3.00		1,410
Santa Ysabel	5	130,000	.50												60
Tamarack, c.	25	60,000	175.		180.	179.			177.		176.	175.	175.		211
Tecumseh, c.	25	80,000													
Tennessee	25	175,000													
Trimountain, c.	25	100,000							1.00				1.00		730
Trinity, c.	25	160,000	13.38	13.50	14.00	13.50	13.75	13.50	13.75	13.25	13.38	13.00	13.25	12.63	5,770
United States, g.	25	250,000	22.13	21.75	23.00	21.63	21.75	21.25	22.00	21.25	21.63	21.25	21.50	21.00	7,698
U. S. Oil	25	100,000	14.88	14.75	15.50	15.00	15.63	15.25	15.88	15.50	16.00	15.50	15.50	14.75	3,952
Utah Con., g.	5	300,000	23.00	22.50	23.00	22.50	23.00		23.50	23.00	23.00		22.50		1,190
Victoria, g.	25	100,000	5.50	5.00	5.50	5.13	5.25	5.00	5.00		5.50	5.00	4.88	4.75	3,792
Washington, c.	25	60,000													
Winona, c.	25	100,000	2.50	2.13	2.25	1.75	2.00		2.40	2.00	2.00		2.00		3,904
Wolverine, c.	25	60,000	54.00	53.00	54.00	53.00			54.50	54.00	54.00		53.50		508
Wyandot, c.	25	100 000	1.00						1.00		1.25				37

Official Quotations Boston Stock Exchange. Total sales, 124,384 shares. †Ex-dividend

ST. LOUIS, MO.* Apr. 28.

Name.	Shares.	Par	Bid.	Ask.	Name.	Shares.	Par	Bid.	Ask.
Adams.	1,500,000	$10	$0.25	$0.50	Con. Coal, Ill.	50,000	$100	$19.50	$20.00
Am.-Nettie, Colo.	300,000	10	1.00	1.10	Doe Run Lead Co.	10,000	100	128.00	135.00
Catherine Lead, Mo.	50,000	10	3.00	4.00	Granite Bimet, Mt.	1,000,000	10	2.55	2.65
Central Lead, Mo.	10,000	100	130.00	132.00	K. & Tex. Coal, Mo.	25,000	100	50.00	52.00
Columbia Lead, Mo.	50,000	10	11.00	14.00	St. Joe Lead, Mo.	300,000	10	16.50	17.00

*From our Special Correspondent.

SPOKANE, WASH.* Apr. 26.

Name of Company.	Par Val.	H.	L.	Sales.	Name of Company.	Par Val.	H.	L.	Sales.
American Boy	$1	.07½	.06	36,000	Princess Maud	$1	.03½	.03	41,000
Black Tail	1	.11⅞	.12½	26,000	Quilp	1	.37	.34	2,000
Ben Hur	1	.14	.13½	2,000	Rambler Cariboo	1	.89	.86	
Fisher Maiden	1	.08	.07	2,000	Republic	1	.10¼	.09¾	1,000
Gold Ledge	0.05	.01¾	.01¾	72,500	San Poil	1	.29½	.27½	3,000
Lone Pine-Surp. Con.	1	.07½	.06⅞	54,000	Sullivan	1	.09½	.09	12,500
Morning Glory	1	.03⅜	.03	24,000	Tom Thumb	1	.22¼	.22	16,000
Mountain Lion	0.10	.28	.27	1,000	Trade Dollar	1	.12½	.12	1,000

Total sales 288,000 shares. *Reported by Hunner & Harris.

SALT LAKE CITY.* April 26.

Name of Company.	Location.	Shares.	Par Val.	Quotations. High.	Quotations. Low.	Sales.
Ajax	Tintic	300,000	$10	$0.50	$0.43¾	39,000
Anchor	Park City	150,000	10	3.50	3.25	350
Bullion Beck	Tintic	100,000	10			
Carisa	Tintic	500,000	1	.46	.34	67,300
Con. Mercur	Mercur	1,000,000	5	1.87	1.80	4,550
Creole	Park City	150,000	1			
Daly	Park City	150,000	20	2.00	2.00	200
Daly-West	Park City	150,000	20	46.00	42.75	1,993
Dexter	Tuscarora	200,000	5			
Eagle & B. Bell	Tintic	250,000	1	.80	.80	100
Grand Central	Tintic	250,000	1	3.10	3.00	500
Horn Silver	Frisco	400,000	25	1.25	1.20	500
L. Mammoth	Tintic	150,000	1	1.65	1.50	5,000
Mammoth	Tintic	400,000	25	1.27	1.22	2,700
May Day	Tintic	400,000	.25	.35½	.25½	123,000
Ontario	Park City	150,000	100	9 04	9.00	406
Sacramento	Mercur	1,000,000	5	.22¼	.21¼	4,500
Silver King	Park City	150,000	20			
Star Con.	Tintic	500,000	1	.16½	.16	14,900
Swansea	Tintic	100,000	5			
So. Swansea	Tintic	300,000	1	.79	.68	54,788
Showers Con.	Tintic	430,000	5			
Sunshine	Mercur	250,000	10	.28½	.27½	6,600
Tetro	Tintic	500,000	5	.25	.20	16,300
Tesora	Tintic	400,000	1	.06	.06	500
U. Sunbeam	Tintic	150,000	1	.44½	.36	2,300
Uncle Sam	Tintic	500,000	1	.34½	.25¾	57,000
West Mng. Glory	Tintic	500,000	.10	.02¾	.02⅜	12,500
Victor	Tintic	500,000	1	.35½	.25	7,800
Yankee Con.	Tintic	500,000	1	2.23	2.09	6,600
Ben Butler	Bingham	500,000	1	.13¾	.12⅝	13,200
Boss Tweed	Tintic	250,000	1	.56	.41	1,010
California	Park City	300,000	1	.24	.15	103,400
Century	Park Valley	150,000	1	.57	.50	10,700

*By our Special Correspondent. Total number of shares sold, 556,088.

STOCK QUOTATIONS.

COLORADO SPRINGS, COLO.

Name of Company.	par val	Apr. 21. H.	Apr. 21. L.	Apr. 22. H.	Apr. 22. L.	Apr. 23. H.	Apr. 23. L.	Apr. 24. H.	Apr. 24. L.	Apr. 25. H.	Apr. 25. L.	Apr. 26. H.	Apr. 26. L.	Sales
Acacia	$1	.09⅞	.09¼	.10	.08¾	.09½	.09	.09½	.09	.09¼	....	.09¼	....	3,000
Alamo	1	.03⅝	.03	.03⅝	.03¼	.03¾	.03¼	.03⅝	.03¼	.03⅝	.03¼	.03⅝	.03¼	....
Am. Con	1	.02¼	.02	.02¼	.02	.02¼	.02	.02⅛	....	.02	....	.02¼	....	3,500
Anaconda	1	.18	.17	.18½	.17	.19	.17	.18	.16	.18½	.16	.18¼	.16	1,100
Aola	1	.01¼	.01⅛	.01¼	.01⅛	.01¼	.01	.01⅜	.01⅛	.01	....	.01½	.01⅛	5,000
Argentum Jr	1	.04	.02½	.04	....	.04	....	.04	.03	.03⅞	....	.03¼	....	....
Battle Mt. C	1	.17	.15	.17	.14	.17	.14	.17	.15	.16	.14	.16	.14¾	5,100
Ben Hur	1	.04⅛	.04¼	.04½	.04¼	.04¼	.04¼	.04½	.04	.04½	....	.04¼	.04	2,000
Black Bell	1	....	....	....	....	....	....	....	....	....	....	....	....	....
Blue Bell	1	.07	....	.07½	....	.07	....	.07	.06½	.07½	.06⅝	.07	.06½	....
Buckhorn	1	.02⅛	.02	.02½	.01¾	.02⅛	.01¾	.02½	.01¾	.02⅛	.01½	.02¼	.01½	....
But'fly Ter	1	.20	.17	.20	.18	.21	.19	.21	.19	.21	.19½	.21	.20	10,200
Cent'l Con	1	.04⅛	.02¼	.04¼	.03	.02	....	....	....	....	....	....	....	....
Champion	1	.02⅝	.02⅛	.02½	.02	.02½	.02	.02½	.02	.02½	.02	.02½	.02	1,000
C. K. & N	1	.06	.05¾	.06¼	.06	.06¼	.06⅛	.06⅛	.06	.06⅛	.06	.06⅜	.06¼	29,000
Columbine-Victor	1	.08	.07½	.07⅝	.07	.07¼	.07	.07½	.07⅜	.07⅛	.07¼	.07½	.07	49,100
C. C. G. Ext	1	.05	.04½	.04¾	....	.05	.04¾	.05	.04¾	.05	.04¾	.05	....	1,000
C. C. & Mn	1	.02⅞	.02⅝	.03	.02¾	.02⅞	.02¾	.02⅞	.02⅝	.02¾	.02⅝	.02⅞	.02⅝	2,000
Cr'de & C. C	1	.04	.03¾	.04¼	.03⅜	.04	.03½	.04	.03½	.03⅛	....	.03½	....	....
C. C. Con	1	.06¼	.06	.06½	.06¼	.97	.06½	.06½	.06¼	.06¾	.06	.06⅜	.06	4,000
Dante	1	.04⅛	.03⅞	.04⅛	.03⅞	.04⅛	.03⅞	.04	.03⅞	.04	.02⅞	.04	.03⅞	1,300
Dr. Jack Pot	1	.38⅞	.38	.40	.37½	.38¼	.35	.37½	.35	.36¾	.36⅝	.36	....	30,700
Echo	1	.02	....	.02	....	.01⅞	....	.01½	....	.01½	.01	.01½	....	....
Elkton, Con	1	.74½	.73⅞	.73½	.72¾	.72½	.71⅞	.73	.70	.70	..	.72	.70⅛	10,273
El Paso, G	1	.47	.46½	.46	.45	.45⅞	.45	.46⅝	.46	.47	.46	.46½	.46	5,000
Fanny Rawlings	1	.07	.05	.07	.05	.06½	.05	.05⅞	.05½	.06	.05	.05½	.04	5,000
Findley	1	.10	.09⅝	.10	.09⅛	.10¼	.09¾	.10½	.09½	.10½	.09⅛	.09¾	.09½	4,000
Gold Dollar	1	.05	....	.04⅞	.04	.04	.03	.03¾	.03¾	.04	.03¼	.03¾	.03¼	4,000
Gold Dollar Con	1	.14	....	.13	....	.12	.11½	.12	....	.12	....	.12	....	1,000
Gold Cycle	1	.62	.60½	.62½	.62	.62	.61	.63	.61	.61	.60	.61	.60	7,000
Gold Fleece	1	.45	.20	.30	.25	.30	.20	.30	.26	.30	.20	.27	.20	1,350
Gold Knob	1	.02	....	.02¼	....	.02	.01½	.02	.01½	.02	.01½	.03	.01½	1,000
Gold Sov'n	1	.02¾	....	.02¾	.02⅜	.02⅞	.02⅝	.02¾	.02⅝	.02¾	.02⅝	.02¾	.02½	....
Hart	1	.04	....	.04	....	.04	....	.04	....	.04	....	.04	....	....
Ida May	½	.08	....	.08	....	....	....	.08	....	.08	....	.08	....	....
Ironclad	1	....	....	.02½	....	.02⅞	....	.02½	....	.02½	....	.02⅛	....	....
Isabella	1	.25	.24½	.24⅞	.24½	.24¾	.24	.24¼	.23½	.24⅛	.23½	.25	.23	5,800
Jack Pot	1	.24¾	....	.24½	.25	.25½	.24	.25½	.24	.25	.24½	.25½	.24½	8,700
Last Dollar	1	.55	.47½	.54	.45	.55	.47½	.55	.47½	.51	.45	.51	.45	5,000
Lexington	1	.06⅞	.06½	.06¾	.06⅜	.06⅜	.06⅛	.06¼	.06	.06¼	.06	.06⅛	.06	2,000
Little Nell	1	.03	.02¾	.03	....	.03	....	.03	....	.02¾	....	.02¾	....	1,000
Little Puck	1	.05¾	.05⅜	.05¾	.05⅜	.06	.05	.05⅛	....	.05¾	.05⅛	.06	.05⅛	2,000
Matoa	1	.07	....	.07	....	.07	....	.07	....	.07	....	.07	....	....
Midway	1	.03½	.03¼	.03½	.03¼	.03½	.03⅛	.03½	.03¼	.03½	.03¼	.03½	.03¼	1,000
Mint	1	.04⅞	.04⅛	.04⅞	.04	.05	.04½	.05	.04¼	.05	.04¼	.05	.04	1,000
Missouri	1	.03	.02	.02½	.02	.02½	.02	.02½	.02	.02½	.02	.02¾	.02	1,000
Mobile	1	.01¾	.01¼	.01⅛	.01	.01⅛	....	.02	....	.01⅜	.01	.02	.01¼	1,000
Moll Dwyer	1	....	....	....	....	....	....	....	....	....	....	....	....	....
Mol. Gibson	1	.11⅛	.11	.12½	.11	.11¼	.11	.11⅝	.11	.11⅞	.11⅜	.11⅞	.11¼	12,000
Monarch	1	.02	.01½	.01¼	....	.01½	....	.01¼	....	....	....	....	....	....
Montreal	1	.01¼	....	.01¼	....	....	....	....	....	....	....	....	....	....
Moon A'c'r	1	.15	....	.15	....	.15	....	.15	....	.15	....	.15	....	....
Morn'g Star	1	.01¾	.01⅝	.02	.01½	.01⅝	.01½	.01¾	.01½	.01½	.01⅜	.02	.01¼	16,900
National	1	.01⅝	.01¼	.01⅝	.01⅜	.01⅝	.01¼	.01⅜	.01¼	.01⅝	.01½	.01½	.01¼	4,000
Nellie, V	1	.01	....	.02½	.01	.02	.01¾	.02	.01½	.02	.01½	.02	.01½	....
New Haven	1	.03⅛	....	.03⅛	.02½	.03	.02	.03	.02	.02⅝	.02⅜	.02⅝	.02⅜	2,090
Olive Branch	1	.02	....	.01¼	....	.01¼	.01	.01¼	....	.04¼	....	....	....	1,000
Oriole	1	.01½	....	.01½	....	.01½	....	.01½	....	.01½	....	.01½	....	....
Pappoose	1	.02	....	.02	.01½	.02¼	....	.02	.01½	.02	....	.02	....	2,000
Pharmacist	1	.04¼	.04	.04⅛	.04	.04¼	.04	.04⅛	.04	.04¼	....	.04	.03½	5,000
Pilgrim	1	.04⅛	.04	.04⅛	.04	.04⅛	.04	.04⅛	.04	.04⅛	.04	.04⅛	.04	1,000
Pinnacle	1	.04¼	.04	.06½	.06	.06½	....	.04¼	.04	.06⅛	.06	.05¼	....	....
Pointer	1	.02¾	....	.02⅝	.02½	.02⅝	....	.02½	.02	.02½	.02¼	.02½	.02¼	5,600
Portland	1	1.92	1.91	1.90	1.89	1.85	1.83	1.90	1.83	1.83½	1.81	1.84	1.82	18,400
Prince Alb	1	.03⅜	.02⅞	.02⅞	.02½	.02½	.02	.02½	.02	.02½	.02	.02½	.02	2,100
Princess	1	....	....	....	....	....	....	.02	....	.02	....	....	....	....
Progress	1	.04	.03	.03	....	....	....	.02¼	....	.04¼	.04	.04¼	.04⅛	4,000
Pythias	1	.01¼	....	.01¼	....	.01½	....	.01½	....	.02	....	....	....	....
Republic	1	.02¼	.01½	.02½	.01½	.02½	.01½	.02½	.01½	.02⅛	.01½	.02½	.01½	....
Rob. Burns	1	.01½	....	.02	.01	.02	....	.02	.01	.02	....	.02	.01½	....
Rose Maud	1	.03¼	.03⅛	.03⅛	.03	.03	.02½	.02⅛	....	.03½	.02⅞	.03¼	.02¾	1,000
Rose Nicol	1	.04	.03½	.05	.03	.04	.03⅝	.04	.03½	.05	.04	.04	.03½	3,000
Sunset Eclipse	1	.07¼	.07⅛	.07¾	.07½	.07⅝	.07⅛	.07½	.07⅛	.06¾	.06⅜	.06⅛	.05¾	20,300
Uncle Sam	1	.02	.01	.02	....	.01⅝	.01	....	....	.01⅞	.01	.01⅞	....	1,000
Union	1	.03	.01	.03	.01	.03	.01	.03	.01	.03	.01	.03	....	....
Vindicator	1	.99½	.95	.99	.95	.99½	.95	.96	.95	.98	.93	.99	....	2,700
Va. M	1	....	....	....	....	....	....	....	....	....	....	....	....	....
Work	1	.07½	.06⅞	.07	.06½	.06½	.06¼	.06½	.06¼	.06½	.06	.06½	.06	7,000

Total sales 322,923 shares.

Colorado Springs (*By Telegraph.*)

Name of Company.	par val	Apr. 24. H.	Apr. 24. L.	Apr. 25. H.	Apr. 25. L.	Apr. 26. H.	Apr. 26. L.	Apr. 28. H.	Apr. 28. L.	Apr. 29. H.	Apr. 29. L.	Apr. 30. H.	Apr. 30. L.
Acacia	$1	.09½	.09	.09¼	.09	.09¼	.09	.09	.08½	.09	.07	.09	.08½
Alamo	1	.03⅝	.03¼	.03⅝	.03¼	.03⅝	.03¼	.03⅝	.03¼	.03⅝	.03½	.03¾	.03¼
Anaconda	1	.18	.16	.18½	.16	.18¼	.16	.17	.14	.18	.16	.17½	.16
Argentum	1	.04	.03	.03⅞	.03	.03¾	.03	.04	.03	.03	.02½	.03½	.03
Battle Mt	1	.17	.15	.16	.14	.16	.14¾	....	....	.16	.14½	.14¾	.14
Butterfly Ter	1	.21	.19	.21	.19½	.21	.20	.21	.19	.21	.20	.21	.19
Cripple Creek Con	1	.06½	.06¼	.06⅜	.06	.06⅜	.06	.06½	.06⅛	.06¼	.06⅛	.06¼	.06
Dr. Jack Pot	1	.37½	.35	.36¾	.36⅝	.36½	.36	.36	.35¾	.35	.34¼	.34½	.34
El Paso	1	.46⅝	.46	.47	.46	.46½	.46	.46	.45⅞	.45	.44¾	.45	.43¾
Elkton, Con	1	.73	.70	.70½	.70	.72½	.70⅛	.68½	.68	.65⅛	.65	.63	.62⅞
Fanny Rawlings	1	.05⅞	.05⅛	.06	.05	.05½	.04	.05	.04	.05	.04	.05	.04
Findlay	1	.10½	.09½	.10½	.09⅛	.09¾	.09½	.09½	.09⅛	.09⅞	.09⅜	.09¾	.09⅜
Gold Dollar Cons	1	.12	.11	.12	.11	.12	.11	.12	.10	.12	.10	.07⅞	.06
Gold Sov'n	1	.02¾	.02⅝	.02¾	.02⅝	.02¾	.02½	.02¾	.02½	.02⅝	.02½	.02⅝	.02¼
Golden Cycle	1	.63	.61	.61	.60	.61	.60	.60⅛	.60	.60¼	.59	.60	.59
Golden Fleece	1	.30	.20	.30	.20	.28	.20	.28	.22	.27	.20	.27	.22
Hart	1	.05	.04	.05	.04	.05	.04	.04	.03⅞	.04	.03	.04	.03
Isabella	1	.24¼	.23⅛	.24⅛	.23½	.25	.23	.24	.22¾	.23¾	.23½	.24	.23½
Jack Pot	1	.25	.24	.25	.24½	.25½	.24	.25	.23½	.25	.23	.25	.23
Keystone	1	.04	.03	.04	.03	.04	.03	.04	.03½	.04	.03	.04	.03
Last Dollar	1	.55	.47½	.51	.45	.51	.45	.48½	.47	.50	.45	.52	.45
Lexington	1	.06¼	.06	.06¼	.06	.06⅛	.06	.06¼	.06	.06⅛	.06	.06⅛	.06
Mollie Gibson	1	.11⅝	.11	.11⅞	.11⅜	.11⅞	.11¼	.12	.11⅛	.11½	.11	.11⅜	.10¾
Moon Anchor	1	.15	.13	.15	.13	.15	.13	.15	.13	.15	.13	.15	.13
National	1	.01⅝	.01¼	.01⅝	.01½	.02	.01½	.01⅝	.01¼	.02	.01⅛	.01⅝	.01¼
New Haven	1	.03	.02	.02⅞	.02⅜	.02⅝	.02⅜	.02⅝	.02⅜	.02⅝	.02⅜	.02⅝	.02⅜
Pharmacist	1	.04¼	.04	.04¼	.04	.04	.03¼	.04	.03¾	.04	.03	.03⅝	.03
Pinnacle	1	.06½	.06	.06⅜	.06	.06	.05¼	.06	.05½	.06	.05	.06½	.06
Portland	1	1.85	1.79	1.83⅛	1.81	1.84	1.82	1.83	1.81½	1.85	1.80	1.83	1.80⅛
Sunset Eclipse	1	.07½	.07⅛	.06¾	.06⅞	.05⅛	.05¾	.06	.05¾	.04½	.03⅞	.04½	.04⅛
Vindicator, Con	1	.96	.95	.98	.93	.99	.93	1.00	.95	.95	.90	.95	.92
Work	1	.06½	.06⅛	.06½	.06	.06½	.06	.06¼	.06	.06¼	.05¾	.06	.05½

MONTREAL, CANADA. Apr. 28.

Name of Company.	par val	H.	L.	Sales	Nome of Company.	par val	H.	L.	Sales
Big Three	$1	.01¼	....	....	Montreal-London	$0.24	.02⅛	....	....
California	1	.04⅛	.04	....	Noble Five	1	....	....	....
Can. Gold Fields	0.10	....	....	....	Novelty	1	....	....	....
Deer Trail Con	1	.03⅛	.02¼	....	North Star	....	.23	....	1,000
Evening Star	1	.04	.02	....	Payne	1	.28	.20½	1,000
Golden Star	1	.04¼	.03	....	Rambler-Cariboo	1	....	....	....
Gold Hills Dev	1	.01½	....	....	Republic Con	1	.10	....	....
Knob Hill	1	....	....	....	Slocan-Sovereign	1	.02¼	....	....
Monte Christo	1	.02	....	....	Virtue	1	.19	....	1,000
Montreal, G. F.	1	.02⅛	....	....	War Eagle	1	.28	.27	3,000

LONDON. Apr. 16.

Name and Country of Company	Authorized Capital.	Par value.	Last dividend. Amt.	Last dividend. Date	Quotations. Buyers.	Quotations. Sellers.
	£	£. s. d.	s. d.		£. s. d.	£. s. d.
Alasks-Treadwell, g., Alaska	1,000,000	5 0 0	1 6	Jan., 1902	4 0 0	4 5 0
Anaconda, c. s., Montana	6,000,000	5 0 0	2 0	May, 1902	5 16 3	5 18 9
Copiapo, c., Chile	200,000	2 0 0	2 6	Dec., 1901	2 5 0	2 10 0
De Lamar, g. s., Idaho	400,000	1 0 0	2 0	Dec., 1901	17 6	1 2 6
El Oro, g., Mexico	1,000,000	1 0 0	1 3	July, 1901	1 10 0	1 12 6
Enterprise, g., British Col	200,000	1 0 0			7 6	12 6
Frontino & Bolivia, g., Columbia	140,000	1 0 0	3 0	July, 1901	1 2 6	1 5 0
Hall Mg. & Sm., c. s., British Col	325,000	1 0 0			1 6	2 6
Le Roi, g., British Col	1,000,000	5 0 0	5 0	Nov., 1899	4 0 0	4 2 6
Le Roi No. 2, g., British Col	120,000	5 0 0	5 0	July, 1901	5 10 0	5 12 6
Mesquital, g., Mexico	25,000	2	4	July, 1901	4 0	5 0
Montana, g. s., Montana	660,000	1 0 0	6	April, 1899	3 9	4 3
Mountain Copper, California	1,250,000	5 0 0	4	Oct., 1901	4 5 0	4 10 0
Parral, g. s., Mexico	30,000	2	5 0		9 0	10 0
Stratton's Independence, Colorado	1,100,000	1 0 0	1 0	Jan., 1902	5 6	8 2
St. John del Rey., g., Brazil	600,000	1 0 0	1 0	June, 1901	17 6	18 6
Utah Con., g., (High. Boy), Utah	300,000	1 0 0	5 0	May, 1901	4 5 0	4 15 0
Ymir, g., British Col	200,000	1 0 0	1 0	Mar., 1902	1 12 6	1 15 0
European:						
Linares, l., Spain	45,000	3 0 0	7 0	March, 1901	3 0 0	4 0 0
Mason & Barry, c., sul., Port'g'l	420,000	1 0 0	12 6	May, 1901	4 0 0	4 5 0
Rio Tinto, c., Spain	1,625,000	5 0 0	37s 6d	April, 1902	44 0 0	44 5 0
Rio Tinto, pref., Spain	1,625,000	5 0 0	2s 6d	April, 1902	6 0 0	6 5 0
Tharsis, c., Spain	1,250,000	2 0 0	12 0	April, 1902	5 12 6	5 17 6
Australia and New Zealand:						
Assoc. Gold Mines, W. Australia	500,000	1 0 0	1 6	Jan., 1900	1 6 3	1 8 9
Br'ken Hill Pr'p., s., N. S. Wales	384,000	8 0	1 0	Nov., 1901	1 11 6	1 12 6
Great Bo'd'r Pr'p., W. Australia	175,000	2 0	6	Jan., 1902	19 0	19 3
Hannan's Brownhill, g., W. Australia	140,000	1 0 0	7 6	Oct., 1900	2 17 6	3 0 0
Ivanhoe Gold C'p., W. Australia	1,000,000	5 0 0	3 0	Feb., 1902	7 5 6	7 7 6
Kalgurlie, g., W. Australia	120,000	1 0 0	rts.	Oct., 1899	3 13 9	3 16 3
Lake View Cons., g., W. Australia	250,000	1 0 0	5 0	Oct., 1901	3 6 3	3 8 9
Mt. Lyell M. E. R. I., c., Tasmania	900,000	3 0 0	4 0	Jan., 1902	3 13 9	3 16 3
Mt. Morgan, g., Queensland	1,000,000	1 0 0	3	Mar., 1902	3 17 6	4 2 6
Waihi, g., New Zealand	330,000	1 0 0	2 6	Mar., 1902	5 11 3	5 13 9
Indian:						
Champion Reef, g., Colar Fields	234,169	10 0	7 8	Jan., 1902	5 16 3	5 18 9
Mysore Gold, Colar Fields	265,000	10 0	5 0	Mar., 1902	6 12 6	6 15 0
Nundydroog, g., Colar Fields	242,000	10 0	1 6	Nov., 1901	1 15 0	1 17 6
Ooregum, g., Colar Fields	290,000	10 0	1 6	Dec., 1901	2 3 9	2 3 3
Ooregum, pref., g., Colar Fields	240,000	10 0	1 6	Dec., 1901	2 13 9	2 16 3
African:						
British S. Africa, chartered S. Africa	5,000,000	1 0 0	rts.	May, 1899	3 16 3	3 18 9
Cape Copper, S. Africa	600,000	2 0 0	8 0	Jan., 1902	4 10 0	4 15 0
Cape Copper, pref., S. Africa	150,000	2 0 0	8 0	Jan., 1902	4 2 6	4 7 6
City and Sub'n (New), g., Transvaal	1,360,000	4 0 0	3 0	Aug., 1899	7 7 6	7 10 0
Crown Reef, g., Transvaal	120,000	1 0 0	18 0	Nov., 1899	17 15 0	18 5 0
De Beers Con., d., pref., Cape Colony	....	....	....	....	18 16 3	8 18 9
De Beers Con., def.	....	....	....	....	24 15 0	24 17 6
Ferreria g., Transvaal	90,000	1 0 0	10 0	Jan., 1902	25 10 0	26 10 0
Geldenhuis Est., g. Transvaal	200,000	1 0 0	10 0	Aug., 1899	7 3 9	7 6 3
Henry Nourse, g., Transvaal	125,000	1 0 0	10 0	Aug., 1899	9 17 6	10 0 0
Jagersfontein, d., Orange F. S.	1,000,000	5 0 0	6 0	Dec., 1900	27 0 0	27 10 0
Joh'n'b'g Con. Invet., S. Africa	2,750,000	1 0 0	2 0	Nov., 1899	3 17 6	3 18 9
Jubilee, g., Transvaal	50,000	1 0 0	5 0	Aug., 1899	7 0 0	7 5 0
Langlaagte Est., g., Transvaal	470,000	1 0 0	3 0	Sept., 1899	4 8 9	4 11 3
May Con., g., Transvaal	290,000	1 0 0	0 6	Aug., 1899	4 18 9	5 1 3
Meyer & Charlton, g., Transvaal	100,000	1 0 0	3 0	Feb., 1902	6 0 0	6 5 0
Namaqua, c., Cape Colony	200,000	2 0 0	3 0	Feb., 1902	3 15 0	4 0 0
Primrose (New), g., Transvaal	300,000	1 0 0	6 0	Aug., 1899	4 18 9	5 1 3
Rand Mines, g., S. Africa	1,795,956	5 0	15 0	Aug., 1899	12 7 6	12 10 0
Robinson, g., Transvaal	2,750,000	5 0 0	8 0	Aug., 1899	11 3 9	11 6 3
Sheba, g., Taansvaal	1,100,000	1 0 0	5 0	Feb., 1902	1 7 6	1 8 9
Sim. & Jack (new) g., Transvaal	....	1 0 0	....	....	2 2 6	2 5 0
Wolhuter, g., Transvaal	860,000	4 0 0	2 0	Feb., 1899	5 16 3	5 18 9

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

PARIS. Apr. 10.

Name of Company.	Country.	Product.	Capital Stock.	Par value.	Latest divs.	Prices. Opening.	Prices. Closing.
			Francs.	Fr.	Fr.	Fr.	Fr.
Acieries de Creusot	France	Steel mfrs	27,000,000	2,000	85.00	1,708.00	1,715.00
" " Firminy	"	" "	3,000,000	500	200.00	2,715.00	2,720.00
" " Huta-Bank	Russia	Iron and Steel	....	500	....	3,295.00	3,290.00
" " la Marine	France	Steel mfrs	20,000,000	500	65.00	1,370.00	1,335.00
Anzin	"	Coal	....	....	320.00	5,155.00	5,405.00
Boleo	Lower Cal.	Copper	....	500	176.00	1,820.00	1,705.00
Briansk	Russia	Coal and Iron	....	500	....	404.00	404.00
Champ d'Or	S. Africa	Gold	3,375,000	25	3.75	36.00	33.50
Courrieres	France	Coal	600,000	300	90.00	2,281.00	2,305.00
Dombrowa	Russia	"	....	500	75.00	981.00	981.00
Dourges	France	"	12,000,000	500	1,000	24,790.00	24,700.00
Dynamite Centrale	"	Explosives	....	500	19.00	697.00	717.00
Escombrera-Bleyberg	Spain	Lead	....	500	50.00	830.00	834.00
Fraser River	Brit. Col'mb.	Gold	250,000	25	....	7.00	7.00
Huanchaca	Bolivia	Silver	40,000,000	125	5.00	140.00	135.50
Laurium	Greece	Zinc and Lead	16,300,000	500	25.00	375.00	380.00
Malfidano	Italy	Zinc	12,500,000	500	12.50	384.00	375.00
Metaux, Cle. Fran. de	France	Metal dealers	25,000,000	500	22.50	479.00	460.00
Mokta-el-Hadid	Algeria	Iron	18,312,500	500	35.00	870.00	866.00
Napthe Baku	Russia	Petroleum	....	....	....	464.00	474.00
Napthe Nobel	"	"	....	....	....	540.00	540.00
" " parts	"	"	....	....	....	10,900.00	10,875.00
Nickel	N. Caled'nia	Nickel	10,000,000	250	20.00	544.00	536.00
Penarroya	Spain	Coal, etc	....	500	55.00	1,095.00	1,010.00
Rebecca	Colo'do, U. S.	Gold	5,000,000	25	....	2.00	2.00
Salines de l'Est	France	Salt	....	500	6.00	290.00	275.00
Salines du Midi	"	"	....	500	40.00	911.00	915.00
Vielle Montagne	Belgium	Zinc	9,000,000	30	30.00	565.00	555.00

TORONTO, ONT.

Name of Company.	par val	Apr. 22. H.	Apr. 22. L.	Apr. 23. H.	Apr. 23. L.	Apr. 24. H.	Apr. 24. L.	Apr. 25. H.	Apr. 25. L.	Apr. 26. H.	Apr. 26. L.	Apr. 28. H.	Apr. 28. L.	Sales
Ontario:														
Olive	1	.06	.04	.06	.04	.06	.04½	.06	.04½	.06	.04	.06	.04½	....
British Columbia:														
Cariboo McK	1	.30	.26	.28	.25	.28½	.26½	.28	.26	.28	.25	.28	.26	....
Center Star	1	.42	.40	.40½	.39	.42	.40	.42	.41	.42½	.40½	.43	.41	15,000
Deer Trail	1	.03	.02½	.03	.02½	.03	.02½	.02¾	.02	.03	.02¼	.02¾	.02	500
Fairview	1	.04½	.04⅛	.04½	.04⅛	.04½	.04¼	.05	.04¼	.05	.04¼	.05	.04	500
Lone Pine	1	.08	.07	.08	.07	.08	.07	.08	.07¼	.08	.07	.08	.07¼	....
Morrison	1	.05	.02½	.06	....	.06	....	.06	....	.06	....	.06	....	....
Mt. Lion	1	.35	.27	.34	.28	.33	.27	.33	.28	.35	.28	.32	.28	....
North Star	1	.24	.22	.24	.22½	.24	.23	.23½	.22½	.24	.22⅛	.23½	.22½	....
Payne	1	.30	.27	.32	.28	.32	.28	.32	.28	.33	.29	.31	.28½	5,000
Rambler	1	.98	.86	.90	.86	.95	.87½	.95	.86	.90	.85	.93	.85	....
Republic	1	.10½	.10	.10½	.09½	.10½	.09½	.10½	.10	.10½	.10¼	.10¾	.10½	12,000
Virtue	1	.25	.20	.25	.20	.25	.20	.25	.20	.25	.20	.22	.15	....
War Eagle Cons	1	.30	.22	.26	.21	.21	.18	.18	.15	.18	.14½	.18	.15	....
Winnipeg	1	.05	.04	.05	.04	.04¼	.03⅞	.05	.04¾	.05	.03⅞	.05	.02½	1,000
Wonderful	1	.04	....	.04	....	.04	....	.04	....	.04	.02½	.05	....	....
Develop. Co														
Can. G. F. S	1	.04½	.04	.04½	.04	.04½	.04⅛	.04⅛	.04⅛	.04¾	.04	.04½	.04⅛	....

Total sales, 34,000 shares. †Ex-dividend.

DIVIDENDS.

GOLD, SILVER, COPPER, LEAD, QUICKSILVER AND ZINC COMPANIES.

Name and Location of Company.		Authorized Capital Stock.	Shares. Issued.	Par Val	Dividends. Paid 1902	Total to Date.	Latest. Date.		Amt.
Aberdeen, c.	N. M.	$1,000,000	32,175	$25		$32,175	Nov.	1901	$1.00
Adams, s. l. c	Colo.	1,500,000	150,000	10	$7,500	723,500	Feb.	1902	.05
Aetna Con., q.	Cal	500,000	100,000	5		225,000	Apr.	1900	.15
Alaska Goldfields	Alaska.	1,500,000	250,000	5		260,000	Jan.	1901	.54
Alaska-Mexican, g.	Alaska.	1,000,000	180,000	5		465,381	Oct.	1900	.10
Alaska-Treadwell, g.	Alaska.	5,000,000	200,000	25	150,000	4,970,000	Apr.	1902	.37½
Amalgamated, c.	Mont.	155,000,000	1,538,879	100	2,308,318	18,117,809	May	1902	.50
Am. Sm. & Ref., pf.	U. S.	50,000,000	500,000	100	1,750,000	7,141,553	Apr.	1902	1.75
Am. Zinc, L. & Sm.	Mo	2,500,000	60,000	25		180,000	Jan.	1900	1.00
Anaconda, c.	Mont.	30,000,000	1,200,000	25	600,000	21,450,000	May	1902	.50
Arizona, c.	Ariz.	3,775,000			694,190	3,024,859	Apr.	1902	...
Atlantic, c.	Mich	1,000,000	40,000	25		940,000	Feb.	1901	2.00
Bald Butte, g. s.	Mont.	250,000	250,000	1	75,000	1,192,148	May	1902	.06
Boston, q	Cal	1,000,000	100,000	10		20,000	Jan.	1900	.10
Boston & Colo Sm.	Colo.	750,000	15,000	50	22,500	382,600	Apr.	1902	.75
Boston Gold Copper. Sm	Colo.	1,000,000	1,000,000	1		150,000	Nov.	1901	.02½
Boston-Little Circle, z. l.	Mo	100,000	100,000	1		112,500	Oct.	1901	.25
Boston & Mont. Con., c. s. g.	Mont.	3,750,000	150,000	25	300,000	26,525,000	Apr.	1902	2.00
Breece, l. s.	Colo.	5,900,000	200,000	25		170,000	Dec.	1901	.20
Buffalo Hump, g.	Idaho	1,000,000	100,000	10		300,000	Jan.	1901	.10
Bullion-Beck & Champion	Utah	1,000,000	100,000	10		2,498,400	June.	1900	.10
Bunker Hill & Sullivan	Idaho	3,000,000	300,000	10	105,000	1,390,000	May	1902	.07
Butte & Boston, c.	Mont.	2,000,000	200,000	10		1,600,000	Nov.	1901	3.00
Butterfly & Terrible, g.	Colo.	1,500,000	1,250,000	1		31,250	Oct.	1901	.00½
Calumet & Hecla, c.	Mich	2,500,000	100,000	25	1,500,000	78,850,000	May	1902	5.00
Carisa g. s. c.	Utah	500,000	500,000	1		30,000	Nov.	1901	.03
Centennial Eureka, g. s. l. c.	Utah	5,000,000	100,000	25	50,000	2,667,700	Jan.	1902	.50
Center Creek, l. z.	Mo	1,000,000	100,000	10	10,000	80,000	Mar.	1902	.10
Central Eureka, g.	Cal	4,000,000	398,425	10		15,750	Sept.	1901	.02½
Central Lead, l.	Mo	1,000,000	10,000	100	25,000	290,000	May	1902	.50
Cherry Hill, g.	Cal	1,000,000	1,000,000	1	12,500	45,000	Apr.	1902	.00¼
Con. Cal. & Va., s. g.	Nev	540,000	216,000	2½		3,963,600	July.	1901	.10
Con. Mercur (New), g.	Utah	5,000,000	1,000,000	5	185,000	270,000	May	1902	.03
Consolidated (New), g.	Colo.	2,500,000	1,900,000	1	76,000	399,030	Apr.	1902	.01
Creede & Crip. Ck., g.	Colo.	800,000	800,000	1		16,000	May	1901	.02
Croesus, g.	Cal	1,000,000	200,000	5		227,300	Aug.	1901	.05
Crowned King, g. s.	Ariz.	6,000,000	600,000	10		242,760	May	1901	.02
Dalton & Lark, g. s. l.	Utah	2,500,000	2,500,000	1		350,000	July.	1901	.10½
Daly-West, (New)	Utah	3,600,000	180,000	20	132,000	132,500	Apr.	1902	.40
De Lamar, g. s.	Idaho	2,000,000	400,000	5	288,000	2,874,000	May	1902	.72
Dewey Con., g.	Utah	10,000	10,000	1		5,850	June.	1901	.10
Doctor Jack Pot Con., g.	Colo.	3,000,000	2,900,000	1		232,000	Aug.	1901	.01
Doe Run, l.	Mo	1,500,000	10,000	100	30,000	507,072	Apr.	1902	1.50
Ducktown c. i. sul. (Ord)	Tenn	375,000	6,000	50		133,750	Nov	1900	2.50
Ducktown (Fndr)	Tenn	1,000	200	5		41,250	May	1900	162.50
Elkton Con., g.	Colo.	3,000,000	2,500,000	1	100,000	1,404,461	Mar.	1902	.04
Empire State-Idaho, l. s.	Idaho	6,000,000	505,542	10	101,108	1,359,446	Apr.	1902	.05
Empire Con. q.	Cal	5,000,000	50,000	100	15,000	15,000	Jan.	1902	.30
Ferris-Haggarty, c.	Wyo.	1,000,000	1,000,000	1		15,000	Sept.	1901	.01
Florence, s.	Mont.	2,500,000	400,000	5		223,780	Mar.	1900	.05
Gemini	Utah	500,000	5,000	100		700,000	Aug.	1900	10.00
Gold Coin of Victor, g.	Colo.	1,000,000	1,000,000	1	120,000	1,080,000	Apr.	1902	.03
Gold King, g.	Colo.	1,000,000	936,850	1		412,214	July.	1901	.03
Golden Cycle, g.	Colo.	1,500,000	1,500,000	1		198,000	Oct.	1900	.01
Golden Eagle, g.	Colo.	500,000	489,015	1		98,916	Sept.	1901	.01
Grand Central, g.	Utah	250,000	250,000	1		691,250	Nov	1900	.10
Gwin, g.	Cal	1,000,000	100,000	10	60,000	331,000	Apr.	1902	.25
Hecla, l. s.	Idaho	250,000	1,000,000	¼		100,000	Dec.	1900	.02
Hecla Con., s. l.	Mont.	1,500,000	30,000	50		2,250,000	July	1901	.50
Helena Con., g.	Ore	1,500,000	1,300,000	1	26,000	144,000	Apr.	1902	.00½
Hidden Treasure, g.	Cal	360,000	36,000	10		457,452	Sept.	1900	.10
Holy Terror, g.	S. D.	500,000	500,000	1		172,000	Jan.	1900	.01
Homestake, g.	S. D.	21,000,000	210,000	100	420,000	11,073,750	Apr.	1902	.50
Horn Silver, g. s. c. z. l.	Utah	10,000,000	400,000	25		5,342,000	Dec.	1901	.10
Independence Con., g.	Colo.	2,500,000	2,500,000	1		281,375	Apr.	1901	.04
Ingham Con., g.	Colo.	750,000	1,359,600	½		33,981	Aug	1901	.00¼
Iowa, g. s. l.	Colo.	1,666,667	1,666,667	1	33,334	236,835	Apr.	1902	.01
Iron Silver	Colo.	10,000,000	500,000	20		2,550,000	Dec	1900	.10
Isabella, g.	Colo.	2,250,000	2,250,000	1		742,500	Mar.	1901	.01
Jamison g.	Cal	3,900,000	390,000	10		62,400	Sept.	1901	.03
Katinka, g.	Colo.	1,000,000	1,000,000	1		10,000	Nov	1901	.01
Kendrick & Gelder Sm.	Colo.	1,000,000	1,000,000	1		20,000	Dec.	1901	.01
Kennedy, g.	Cal	10,000,000	100,000	100		1,801,000	June.	1901	.05
La Fortuna, g.	Ariz.	250,000	250,000	1	75,000	1,151,000	May	1902	.05
Last Dollar, g.	Colo.	1,500,000	1,500,000	1		180,000	Dec.	1901	.02
Lightner, g.	Cal	125,000	102,255	1		28,117	May	1901	.10
Linie, g.	Colo.	1,250,000	250,000	5		349,183	Apr.	1900	.05
Mammoth, g. s. c	Utah	10,000,000	400,000	25		1,840,000	July.	1901	.05
Mary McKinney, g.	Colo.	1,000,000	1,000,000	1	60,000	420,000	Apr.	1902	.03
May Day, g.	Utah	100,000	400,000	¼	12,000	30,000	Mar	1902	.01
Midget, g.	Colo.	1,000,000	1,000,000	1	15,000	180,000	Jan	1902	.15
Modoc, g. s.	Colo.	500,000	500,000	1	10,000	240,000	Mar	1902	.01
Mont. Ore Purchasing	Mont.	2,500,000	81,000	25		2,322,000	Nov	1901	2.00
Monument, g.	Colo.	300,000	300,000	1		21,124	Feb.	1901	.01
Morning Star Drift, g	Cal	240,000	2,400	100		854,400	Sept.	1900	3.00
Mountain, c.	Cal	6,250,000	250,000	25	300,000	3,393,750	Apr.	1902	1.20
Mt. Diable, s.	Nev.	5,000,000	50,000	100		260,271	Jan.	1900	.10
Napa Con., q.	Cal	700,000	100,000	7	20,000	1,170,000	Apr.	1902	.10
National Lead, com.	U. S.	15,000,000	149,054	100		1,341,486	Mar.	1900	1.00
National Lead, pfd	U. S.	15,000,000	149,040	100	260,844	12,144,404	Mar.	1902	1.75
New Idria, q.	Cal	5,000,000	100,000	5	30,000	350,000	Apr.	1902	.20
New Jersey Zinc	U. S.	10,000,000	100,000	100	700,000	3,900,000	Feb.	1902	7.00
New Leadville Home, g.	Colo.	2,000,000	2,000,000	1	25,000	265,500	Feb.	1902	.00⅝
New Zealand Con., g.	Colo.	1,000,000	900,000	1	31,950	138,600	Apr.	1902	.01
Nugget, g.	Colo.	1,000,000	991,000	1		84,730	July.	1901	.01
Old Colony Zinc & Sm	Mo	1,000,000	69,909	10		138,184	Nov	1901	.25
Omega, g.	Cal	1,500,000	1,200,000	1		18,188	June.	1900	.01½
Ontario, s. l.	Utah	15,000,000	150,000	100	90,000	14,827,000	June.	1902	.30
Osceola, c.	Mich	2,500,000	96,150	25		4,247,300	Dec.	1901	3.00
Parrot, c.	Mont.	2,300,000	229,850	10	114,925	5,772,925	Jan.	1902	.50
Penn. Con., g.	Cal	5,150,000	51,500	100		161,325	May	1900	.10
Plumas Eureka, g.	Cal	1,406,250	150,625	10		2,831,294	Apr.	1901	.24
Pointer, g	Colo.	1,250,000	1,250,000	1		25,000	June.	1901	.01
Portland, g.	Colo.	3,000,000	3,000,000	1	180,000	4,207,080	Jan.	1902	.06
Quicksilver, pfd.	Cal	4,300,000	43,000	100	21,500	1,909,911	May	1902	.50
Quincy, c.	Mich	2,500,000	100,000	25	400,000	13,270,000	Feb.	1902	4.00
Richmond, g. s. l.	Nev.	1,350,000	54,000	25		4,453,797	Dec.	1900	.24
Rocco-Homestake, g. s.	Nev.	300,000	300,000	1	22,500	76,500	May	1902	.01½
Sacramento, g.	Utah	5,000,000	1,000,000	5		133,000	Aug.	1901	.00½
St. Joseph, l.	Mo	3,000,000	250,000	10	37,500	3,497,000	Mar.	1902	.15
Santa Rita, g.	Colo.	1,000,000	1,000,000	1		4,000	July.	1900	.02
Silver King, g. s. l.	Utah	3,000,000	150,000	20	500,000	5,250,000	May	1902	.66⅔
Silver Shield, g	Utah	300,000	300,000	1		4,500	Feb.	1901	.00½
Smuggler, s. l. z.	Colo.	1,000,000	1,000,000	1	20,000	2,175,000	Feb.	1902	.01
Southern Boy, g.	Colo.	1,250,000	875,000	1		17,500	May	1900	.02
S. Swansea, s. l.	Utah	300,000	275,000	1		167,500	Mar.	1901	.05
S. Winnie, g. s.	Colo.	250,000	250,000	1		15,000	Sept	1901	.01
Standard Con., g. s.	Cal	2,000,000	478,394	10	17,839	4,053,297	Feb.	1902	.10
Standard, s. l.	Idaho	500,000	500,000	1	100,000	2,565,000	Apr.	1902	.05
Stratton's Independence, g.	Colo.	5,500,000	1,000,007	5	480,002	4,032,858	Apr.	1902	.24
Strong, g.	Colo.	1,000,000	1,000,000	1		1,900,000	Dec.	1091	.02½
Swansea, s. l.	Utah	500,000	100,000	5		330,500	June	1901	.05
Tamarack, c.	Mich	1,500,000	60,000	25		8,490,000	Dec.	1901	10.00
Tomboy (New), g. s.	Colo.	1,500,000	300,000	5		332,000	Dec.	1901	.48
Town Topics, g. c.	Colo.	1,000,000	1,000,000	1	5,000	20,000	Jan.	1902	.00½
Uncle Sam Con.	Utah	500,000	500,000	1		45,000	Nov.	1901	.03
Union, g.	Colo.	1,250,000	1,250,000	1	25,000	445,244	Jan.	1902	.02
Union, z. l.	Kas.	500,000	300,000	1		16,000	July.	1901	.01
United, z. l., pfd.	Mo	1,000,000	14,998	25	14,998	75,057	Apr.	1902	.50
United, com.	Mo	5,000,000	74,990	5	7,498	7,498	Apr.	1902	.05
United Verde, c	Ariz	3,000,000	300,000	10		10,785,322	Dec.	1901	.75
U. S. Red. & Ref., com	Colo	6,000,000	58,850	100	58,850	58,850	Apr.	1902	1.00
U. S. Red. & Ref., pf.	Colo.	4,000,000	39,233	100	117,700	117,700	Apr.	1902	1.50
Utah, g.	Utah	1,000,000	100,000	10		193,000	Aug.	1901	.02
Utah Con., c.	Utah	1,500,000	300,000	5		732,000	Dec.	1902	1.22
Vindicator Con., g.	Colo.	1,500,000	1,100,000	1	143,000	807,000	Apr.	1902	.05
Wolverine, c.	Mich	1,500,000	60,000	25	120,000	870,000	Apr.	1902	2.00
Yankee Con., g. s. l.	Utah	500,000	500,000	1	75,000	75,000	Apr.	1902	.05
Yellow Aster, g.	Cal	1,000,000	100,000	10		459,410	Dec.	1900	.10

COAL, IRON AND INDUSTRIALS.

Name and Location of Company.		Authorized Capital Stock.	Shares. Issued.	Par Val	Dividends. Paid 1902.	Total to Date.	Latest. Date.		Amt.
Ala. Coal & Iron, pfd	Ala.	$2,500,000	$25,000	$100	$43,750	$437,500	Mar.	1902	$1.75
Allis-Chamlers, pfd.	U. S.	25,000,000	162,500	100	568,750	1,137,500	May	1902	1.75
Altoona Coal & Coke	Pa.	2,500,000	250,000	10		75,000	Jan.	1901	.30
Americen Agr. Chem., pfd.	U. S.	20,000,000	171,350	100	514,050	3,068,640	Apr.	1902	3.00
American Cement	Pa.	2,100,000	200,000	10	80,000	380,000	Jan.	1902	.40
American Coal	Md.	1,500,000	60,000	25	75,000	1,207,500	Mar.	1902	1.25
American Iron & Steel, com.	Pa	17,000,000	34,000	50	5,100	260,000	Jan.	1902	.15
American Iron & Steel, pfd.	Pa	3,000,000	60,000	50	75,000	375,000	Apr.	1902	.62½
Bethlehem Steel	Pa.	15,000,000	300,000	50		1,325,000	Sept.	1901	.25
California Oil & Gas	Cal.	2,000,000	200,000	10		540,000	Sept.	1901	.70
Cambria Steel	Pa.	50,000,000	1,000,000	50	750,000	4,500,000	Feb.	1902	.75
Central Coal & Coke, com	Mo	1,500,000	15,000	100	30,000	90,000	Apr.	1902	1.00
Central Coal & Coke, pfd	Mo	1,500,000	15,000	100	37,500	656,250	Apr.	1902	1.25
Central Oil	W. Va.	1,500,000	60,000	25	30,000	97,500	May	1902	.25
Central Oil	Cal.	1,000,000	800,000	1	24,000	160,247	Jan.	1902	.03
Central Pt. Con. Oil	Cal.	200,000	190,000	1		45,600	Dec.	1901	.02
Colorado Fuel & Iron	Colo.	38,000,000	239,310	100	805,000	1,642,500	Apr.	1902	1.75
Colorado Fuel & Iron, pfd.	Colo.	2,000,000	20,000	100	80,000	1,400,000	Feb.	1902	4.00
Consolidation Coal	Md.	10,250,000	102,500	100	205,000	5,523,000	Feb.	1902	2.00
Consolidated Coal	Ill.	5,000,000	50,000	100	50,000	160,000	Jan.	1902	1.00
Continental Oil	Cal.	300,000	260,000	1		10,400	July.	1901	.01
Dabney Oil	Cal.	1,000,000	1,000,000	1		10,000	May.	1901	.01
Empire Steel & Iron, pfd	N. J.	5,000,000	23,700	100	35,550	284,400	Jan.	1902	1.50
Federal Chem., pf.	Ky.	1,500,000	15,000	100	45,000	45,000	Apr.	1902	1.50
Four Oil	Cal.	300,000	300,000	1	9,000	24,000	Mar.	1902	.01
Fullerton Oil	Cal.	25,000	25,000	1		750	June.	1901	.03
General Chem., com.	U. S.	12,500,000	74,055	100	74,055	775,037	Mar.	1902	1.00
General Chem., pfd.	U. S.	12,500,000	94,160	100	282,480	1,556,343	Apr.	1902	1.50
Globe Oil	Cal.	600,000	600,000	1		3,000	Apr.	1901	.00½
Gray Eagle Oil	Cal.	250,000	100,000	2½		217,000	May.	1901	.47
Green Mountain Oil	Cal.	500,000	500,000	1		5,000	Oct.	1901	.01
Hanford Oil	Cal.	20,000	2,000	10	2,000	8,000	Jan.	1902	1.00
Heywood Oil	Tex.	800,000	800,000	1		32,000	Nov.	1901	.04
Home Oil	Cal.	100,000	100,000	1	30,000	290,000	Apr.	1902	.07½
Homestake Oil	Cal.	100,000	10,000	10		31,500	Aug.	1901	.15
Houston Oil, pfd	Tex.	7,500,000	75,000	100	225,000	225,000	Mar.	1902	3.00
Imperial Oil	Cal.	1,000,000	100,000	100	80,000	80,000	Apr.	1902	.20
Jeff & Clearf., Coal & Iron, com.	Pa	1,500,000	15,000	100		30,000	Aug.	1900	2.00
Jeff & Clearf., Coal & Iron, pfd.	Pa	1,500,000	15,000	100	37,500	487,500	Feb.	1902	2.50
Kern River Oil	Cal.	100,000	20,000	5	10,000	40,000	Feb.	1902	.50
Lehigh Coal & Nav	Pa.	14,346,650	286,933	50		19,377,788	Nov.	1901	1.50
Los Angeles Oil & Trans.	Cal.	250,000	10,000	1		2,500	Feb.	1901	.25
Maryland Coal, pfd.	Md.	2,000,000	18,850	100		744,544	Dec.	1901	3.00
Monongahela R. Coal, pfd.	Pa.	10,000,000	198,300	50	694,330	1,735,825	Apr.	1902	1.75
Montana Coal & Coke	Mont	5,000,000	200,000	25		120,000	Oct.	1900	.03
National Salt, com.	U. S.	7,000,000	70,000	100		615,000	Nov.	1901	1.50
National Salt, pfd.	U. S.	5,000,000	50,000	100		875,000	Nov.	1901	1.75
New Central Coal	Md.	1,000,000	50,000	20		510,000	Apr.	1900	.40
Oceanic Oil	Cal.	100,000	100,000	1		2,000	Dec.	1900	.01
Ohio & Indiana Natural Gas	U. S.	10,000,000	90,000	100	90,000	810,000	Mar.	1902	1.00
Oil City Petroleum	Cal.	500,000	500,000	1		15,000	Nov.	1901	.02½
Pacific Coast Borax	Cal.	2,000,000	19,000	100	76,000	1,065,500	Apr.	1902	1.00
Park Crude Oil	Cal.	100,000	82,146	1		4,897	Sept.	1900	.01
Peerless Oil	Cal.	1,000,000	100,000	10	5,000	5,000	May	1902	.05
Pennsylvania Salt Mfg.	Pa.	5,000,000	100,000	50	150,000	13,000,000	Apr.	1902	3.00
Penna. Steel, pf.	Pa.	25,000,000	165,000	100	247,500	825,000	May	1902	3.50
Petroleum Dev.	Cal.	125,000	125,000	1	25,000	25,000	Mar	1902	.20
Philadelphia Gas, com.	Pa.	14,752,131	295,042	50	442,564	2,028,393	Apr.	1902	.75
Philadelphia Gas, pfd.	Pa.	3,998,350	79,967	50	99,959	499,795	Mar.	1902	1.25
Pittsburg Coal, pfd.	Pa.	32,000,000	297,012	100	1,120,000	5,278,168	Apr.	1902	1.75
Producers' & Con. Oil	Cal.	1,000,000	10,000	100		56,500	Mar	1901	.10
Rep. Iron & Steel, pfd.	U. S.	25,000,000	203,069	100	710,742	3,909,080	Apr.	1902	1.75
Retsof Salt	N. Y.	5,000,000	36,030	100	72,000	504,000	Apr.	1902	1.00
San Joaquin Oil	Cal.	100,000	100,000	1	15,000	40,000	Feb.	1902	.05
Shawmut Oil	W. Va.	1,250,000	50,000	25		100,000	Nov	1901	.50
Sloss-Sheffield Steel & Iron, pfd.	Ala.	20,000,000	67,000	100	234,500	1,042,250	Apr	1902	1.75
So. Cal. Oil & Fuel	Cal.	300,000	200,000	1		39,000	Nov.	1901	.01½
Standard Oil (of N. J.),	U. S.	100,000,000	970,000	100	19,400,000	39,785,000	Mar.	1902	20.00
Sunday Lake Iron	Mich	1,000,000	40,000	25		40,000	Feb.	1901	1.00
Susquehanna I. & S., pf.	Pa.	1,500,000	300,000	5	45,000	627,500	Jan.	1902	.15
Temple Iron	Pa.	240,000	2,400	100	7,200	7,200	Jan.	1902	3.00
Tenn. C. I. & R. R., com,	Tenn	23,000,000	225,536	100		1,102,144	Nov.	1900	2.00
Tenn. C. I. & R. R., pf.	Tenn	248,000	2,480	100	9,920	272,800	May	1902	2.00
Tex. & Pacific Coal	Tex.	2,000,000	20,000	100	60,000	1,980,000	Apr.	1902	1.50
Thirty-three Oil	Cal.	500,000	100,000	5	40,000	40,000	Apr.	1902	.10
Union Oil	Cal.	10,000,000	52,672	100	142,214	260,725	Apr.	1902	1.35
U. S. Crude Oil	Cal.	100,000	100,000	1		27,220	Dec.	1901	.02
U. S. Marble	Wash.	2,000,000	2,000,000	1	15,000	53,750	Jan.	1902	.00¾
U. S. Oil	W. Va.	2,500,000	100,000	25		775,000	Oct.	1900	.50
U. S. Steel Corp., com	U. S.	550,000,000	5,084,952	100	10,169,302	24,358,309	June	1902	1.00
U. S. Steel Corp., pf.	U. S.	550,000,000	5,103,147	100	18,058,430	35,883,391	May.	1902	1.75
Va.-Caro Chem., com.	U. S.	38,000,000	279,844	100	279,844	1,929,844	Mar.	1902	1.00
Va.-Caro Chem., pf.	U. S.	12,000,000	120,000	100	480,000	5,580,000	Apr.	1902	2.00
Ventura Con. Oil	Cal.	1,000,000	1,000,000	1	5,000	5,000	Feb.	1902	.00½
Warner Oil	Cal.	200,000	200,000	1		10,000	June	1901	.01
Westmoreland Coal	Pa.	5,000,000	250,000	50	375,000	7,125,000	Apr.	1902	1.50
West Shore Oil	Cal.	100,000	100,000	1	5,000	25,000	Mar.	1902	.05
Whittier Con. Oil	Cal.	1,000,000	1,000,000	1		5,600	Dec.	1900	.01

CANADA, CENTRAL AND SOUTH AMERICA, MEXICO.

Name and Location of Company.		Authorized Capital Stock	Shares Issued	Par Val	Dividends Paid 1902	Total to Date.	Latest. Date.		Amt.
Amistad y Concordia	Mex.	$480,000	9,000	$50	$20,064	$36,064	Jan.	1902	$2.09
Athabasca, g.	B. C.	550,000	110,000	5		25,000	Oct.	1900	.23
Bartolome de Medina Mill	Mex.	50,000	2,000	25	5,160	48,710	Apr.	1902	.65
Bosun, s. l.	B. C.	250,000	50,000	5		12,500	Apr	1901	.25
Cariboo McKinney, g.	B. C.	1,250,000	1,250,000	1	18,750	496,837	Mar.	1902	.01½
Center Star, g.	B. C.	3,500,000	3,500,000	1		210,000	May.	1901	.01
Copiapo, c.	Chile	1,125,000	112,500	10		2,826,000	Dec.	1901	.60
Dominion Coal	N. S.	3,000,000	30,000	100	120,000	2,040,000	Jan.	1902	4.00
Dominion I. & St., pf	N. S.	5,000,000	50,000	100	175,000	350,000	Apr.	1902	3.50
El Oro, g. s.	Mex.	5,000,000	1,000,000	5		1,140,000	Dec.	1901	.36
Esperanza, s. g.	Mex.	150,000	3,000	50	52,290	972,870	Apr.	1902	4.30
Frontino & Bolivia c	Colom.	643,310	128,662	5		1,211,703	July.	1901	.72
Goodenough, s. l.	B. C.	800,000	659,400	1	6,594	13,188	Jan.	1902	.01
Grand Central, g. s.	Mex.	1,500,000	250,000	5		840,000	Jan.	1900	.48
Guadalupe Mill	Mex.	1,000,000	10,000	100	43,900	3,425,850	Apr.	1902	1.32
Greene Con., c.	Mex.	6,000,000	600,000	10		220,000	Sept.	1901	.20
Le Roi No. 2, g.	B. C.	3,000,000	120,000	25		144,000	June	1901	1.20
Mesquital	Mex.	125,000	250,000	½		35,000	July.	1901	.08
Natividad, s. g.	Mex.	36,000	2,400	15	16,848	127,404	Apr.	1902	1.73
N. Y. & Hond. Rosario, s. g.	C. A.	1,500,000	150,000	10	60,000	1,730,000	Apr.	1902	.10
North Star, s. l.	B. C.	1,500,000	1,300,000	1		253,500	Dec.	1901	.01½
Nova Scotia St. & Coal, com.	N. S.	5,000,000	30,900	100	123,600	123,600	Apr.	1902	4.00
Nova Scot a St. & Coal, pfd.	N. S.	2,000,000	10,300	100	20,600	61,800	Apr.	1902	2.00
Payne Con., s. l.	B. C.	3,000,000	2,600,000	1		1,438,000	Jan.	1901	.03
Penoles (Map.), s. l.	Mex.	125,000	2,500	50	218,188	1,568,738	Apr.	1902	21.50
Providencia (S. J.)	Mex.	90,000	6,000	15	20,880	121,020	Apr.	1902	.86
Rambler-Cariboo, s. l.	B. C.	1,250,000	1,250,000	1	50,000	138,000	Apr.	1902	.01
Reco, s. l.	B. C.	1,000,000	1,000,000	1		278,500	Aug.	1900	.10
St. John del Rey, g.	Brazil	3,000,000	425,000	5		13,736,107	June	1901	.24
San Carlos Minillas	Mex.	12,500	2,500	5	43,713	255,892	Apr.	1902	4.30
Sorpressa	Mex.	19,200	960	20		185,653	Dec.	1901	2.18
Sta. Maria de Guadalupe	Mex.	2,500	2,500	1	43,525	336,125	May	1902	4.30
San Francisco Mill	Mex.	50,000	6,000	25	29,250	254,990	Apr.	1902	.86
San Diego de Char	Mex.	96,000	2,400	40		61,100	Nov.	1901	.83
St. Gertrudis	Mex.	1,920,000	38,400	50	21,224	2,571,484	Apr.	1902	.21
San Rafael	Mex.	60,000	2,400	25		1,719,908	Dec.	1901	3.48
St. Eugene Con., s. l.	B. C.	3,500,000	3,500,000	1		210,000	Apr	1901	.03
Union Mill	Mex.	150,000	3,000	50	6,750	359,370	Feb.	1902	2.25
War Eagle Con., g. s. c.	B. C.	2,000,000	1,750,000	1		545,250	Feb.	1900	.01½
Ymir, g.	B. C.	1,000,000	200,000	5	48,000	288,000	Mar	1902	.24

CHEMICALS, MINERALS, RARE EARTHS, ETC. CURRENT WHOLESALE PRICES.

Abrasives—	Cust. Meas.	Price.
Carborundum, f.o.b. Niagara Falls, Powd., F. FF. FFF..	lb.	$0.08
Grains	"	.10
Corundum, N. C	"	.07@.10
Chester, Mass	"	.04½@.05
Barry's Bay, Ont		.07½@.09½
Crushed Steel, f. o. b. Pittsburg	"	.05½
Emery, Turkish flour, in kegs	"	.03½
Grains, in kegs	"	.05@.05½
Naxos flour, in kegs	"	.03½
Grains, in kegs	"	.05@.05½
Chester flour, in kegs	"	.03½
Grains, in kegs	"	.05@.05½
Peekskill, f.o.b. Easton, Pa., flour, in kegs	"	.01½
Grains, in kegs	"	.02½
Crude, ex-ship N. Y.: Abbott (Turkey)	lg. ton	26.50@30.00
Kuluk (Turkey)	"	22.00@24.00
Naxos (Greek) h. gr	"	.26.00
Garnet, as per quality	sh. ton	25.00@35.00
Pumice Stone, Am. powd	lb.	.01½@.02
Italian, powdered	"	.01½
Lump, per quality	"	.04@.40
Rottenstone, ground	"	02½@.04½
Lump, per quality	"	.06@.20
Rouge, per quality	"	.10@.30
Steel Emery, f.o.b. Pittsburg	"	.07
Acids—		
Boracic, crystals	"	.10¾@.11
Powdered	"	.11¼@.11½
Carbonic, liquid gas		.12½
Chromic, crude		.20
Hydrofluoric, 36%	"	.06
48%	"	.05
Best		.25
Sulphurous, liquid anhy	"	.06
Alcohol—Grain	gal.	2.45
Refined wood, 95@97%	"	.60@.65
Purified	"	1.20@1.50
Alum—Lump	100 lbs.	1.75
Ground	"	1.80
Powdered	"	3.00
Chrome, com'l	"	2.75@3.00
Aluminum—		
Nitrate	lb.	1.50
Oxide, com'l, common	"	.06½
Best	"	.20
Pure	"	.80
Hydrated	100 lbs.	2.60
Sulphate, pure	"	1.50@2.00
Com'l	"	1.15@1.25
Ammonia—		
Aqua, 16°	lb.	.03
18°	"	.03¼
20°	"	.03¾
26°	"	.05½
Ammonium—		
Carbonate, lump	"	.08¼@.08⅜
Powdered	"	.09¼@.09½
Muriate, grain	"	.05⅝
Lump	"	.08⅝
Nitrate, white, pure (99%)	"	.12
Phosphate, com'l	"	.09
Chem., pure	"	.60
Antimony—Glass	"	.30@.40
Needle, lump	"	.05½@.06
Powdered, ordinary	"	.05¾@.07¼
Oxide, com'l white, 95%	"	.09½
Com'l white, 99%	"	.12
Com'l gray	"	.07
Sulphuret com'l	"	.16
Arsenic—White	"	.03⅛@.03⅜
Red	"	.06¼@.07
Asphaltum—		
Ventura, Cal	sh. ton	32.00
Cuban	lb.	.01½@.03½
Egyptian, crude	"	.05½@.06
Trinidad, refined	sh. ton	35.00
San Valentino (Italian)	lg. ton	16.00
Seyssel (French), mastic	sh. ton	21.00
Gilsonite, Utah, ordinary	lb.	.03
Select	"	.03¾
Barium—		
Carb. Lump, 80@90%	sh. ton	25.00@27.50
92@98%	"	26.00@29.00
Powdered, 80@90%	lb.	.01¾@.02
Chloride, com'l	100 lbs.	1.67½@1.76
Chem. pure cryst	lb.	05
Nitrate, powdered	"	.05½

Barium—	Cust. Meas.	Price
Oxide, Am. hyd. cryst	lb.	$0.02¾
Sulphate (Blanc Fixe)	"	.02
Barytes—		
Am. Crude, No. 1	sh. ton	9.00
Crude, No. 2	"	8.00
Crude, No. 3	"	7.75
German, gray	"	14.50
Snow white	"	17.00
Bauxite—Ga. or Ala. mines:		
First grade	lg. ton	5.50
Second grade	"	4.75
Bismuth—Subnitrate	lb.	1.40
Subcarbonate	"	1.65
Bitumen—"B"	"	.03½
"A"	"	.05
Bone Ash	"	.02½@.02½
Borax	"	.07¼@.07½
Bromine	"	.40
Cadmium—Metallic	"	1.40
Sulphate	100 lbs.	2.00@2.50
Calcium—Acetate, gray	"	1.30
" brown	"	.90
Carbide, ton lots f.o.b. Niagara Falls, N. Y., or Jersey City, N. J.	sh. ton	75.00
Carbonate, ppt	lb.	.05
Chloride,	sh. ton,	9.00@10.00
Cement—		
Portland, Am., 400 lbs	bbl.	1.70@1.90
Foreign	"	1.65@2.25
"Rosendale," 300 lbs	"	.75
Slag cement, imported	"	1.65
Ceresine—		
Orange and Yellow	lb.	.12
White	"	.13½
Chalk—Lump, bulk	sh. ton	2.75
Ppt. per quality	lb.	.03¾@.06
Chlorine—Liquid	"	.30
Water	"	.10
Chrome Ore—		
(50% ch.) ex-ship N. Y	lg. ton	24.75
Sand, f.o.b. Baltimore	"	33.00
Bricks, f.o.b. Pittsburg	M	175.00
Clay, China—Am. com., ex-dock, N. Y	lg. ton	8.00
Am. best, ex-dock, N. Y	"	9.00
English, common	"	12.00
Best grade	"	17.00
Fire Clay, ordinary	sh. ton	4.25
Best	"	6.00
Slip Clay	"	5.00
Coal Tar Pitch	gal.	.08
Cobalt—Carbonate	lb.	1.75
Nitrate	"	1.50
Oxide—Black	"	2.26@2.30
Gray	"	2.28@2.40
Smalt, blue ordinary	"	.06
Best	"	.20
Copperas	100 lbs.	.30@.35
Copper—Carbonate	lb.	.18@.19
Chloride	"	.35
Nitrate, crystals	"	.35
Oxide, com'l	"	.19
Cryolite	"	.06½
Explosives—		
Blasting powder, A	25 lb. keg	2.65
Blasting powder, B	"	1.40
"Rackarock," A	lb.	.25
"Rackarock," B	"	.18
Judson R.R. powder	"	.10
Dynamite (20% nitro-glycerine)	"	.13
(30% nitro-glycerine)	"	.14
(40% nitro-glycerine	"	.15
(50% nitro-glycerine)	"	.16½
(60% nitro-glycerine)	"	.18
(75% nitro-glycerine)	"	.21
Glycerine for nitro (32 2-10° Be.)		.12⅞@.13
Feldspar—Ground	sh. ton	8.00@9.00
Flint Pebbles—Danish, Best	lg. ton	14.75
French, Best		11.75
Fluorspar—		
Am. lump, 1st grade	sh. ton	$14.40
2d grade	"	13.90
Gravel and crushed, 1st gr	"	13.40
2d grade	"	12.40
Ground, 1st grade	"	17.90
2d grade	"	16.50
Foreign, lump	"	8.00@12.00
Ground	"	11.50@14.00
Fuller's Earth—Lump	100 lbs.	.75
Powdered	"	.85

Graphite—Am. f.o.b. Providence, R. I., lump	Cust. Meas. sh. ton	Price $8.00
Pulverized	"	30.00
German, som. pulv	lb.	.01¼@.01½
Best pulverized	"	.01½@.02
Ceylon, common pulv	"	.02¾@.03½
Best pulverized	"	.04@.08
Italian, pulv	"	.01¼
Gypsum—Ground	sh. ton	8.00@8.50
Fertilizer	"	7.00
Rock	lg. ton	4.00
English and French	"	14.00@16.00
Infusorial Earth—Ground.		
American, best	"	20.00
French	"	37.50
German	"	40.00
Iodine—Crude	100 lbs	2.45
Iron—Muriate	lb.	.05
Nitrate, com'l	"	.01¼
True	"	.04
Oxide, pure copperas col	"	.05@.10
Purple-brown	"	.02
Venetian red	"	.01@.01½
Scale	"	.01@03
Kaolin—(See Clay, China.)		
Kryolith—(See Cryolite.)		
Lead—Acetate, white	"	.07¾@.08
Brown	"	.06
Nitrate, com'l	"	.06½
" gran	"	.08¼
Lime—Com., abt. 250 lbs	bbl.	.80
Finishing	"	.90
Magnesite—Greece.		
Crude (95%)	lg. ton	6.50@7.00
Calcined	sh. ton	14.00@15.00
Bricks	M	170.00
Am. Bricks, f.o.b. Pittsburg	"	175.00
Magnesium—		
Carbonate, light, fine pd	lb.	.05
Blocks	"	.07@.09
Chloride, com'l	"	.01¾
Fused	"	.20
Nitrate	"	.60
Sulphate	100 lbs.	.75@.95
Manganese—Powdered, 70@75% binoxide	lb.	.01¼@.01½
Crude, pow'd. 75@85% binoxide	"	.01½@.02¼
85@90% binoxide	"	.02¼@.03¼
90@95% binoxide	"	.03¼@.05½
Carbonate	"	.16@.20
Chloride	"	.04
Ore, 50%, Foreign	unit	.20@.21
Domestic	"	.30
Marble—Flour	sh. ton	6.00@7.00
Mercury—Bichloride	lb.	.77
Mica—N. Y. gr'nd, coarse	"	.03@.04
Fine	"	.04@.05
Sheets, N. C., 2x4 in	"	.30
3x3 in	"	.80
3x4 in	"	1.50
4x4 in	"	2.00
6x6 in	"	3.00
Mineral Wool—		
Slag, ordinary	sh. ton	19.00
Selected	"	25.00
Rock, ordinary	"	32.00
Selected	"	40.00
Nickel—Oxide, No. 1	lb.	1.00
No. 2	"	.60
Sulphate	"	.20@.21
Oils—Black, reduced 29 gr.:		
25@30, cold test	gal.	.09¾@.10¼
15, cold test	"	.10¾@.11¼
Zero	"	.11¾@.12¾
Summer	"	.09¼@.09¾
Cylinder, dark steam ref	"	.08¾@.10¾
Dark, filtered	"	.11¼@.15¾
Light filtered	"	.14¾@.17¾
Extra cold test	"	.21¾@.26¾
Gasoline, 86°@90°	"	.14@.19
Naphtha, crude, 68°@72°	bbl.	9.05
"Stove"	gal.	.12
Linseed, domestic raw	"	.64@.65
Boiled	"	.67
Calcutta, raw	"	.85
Ozokerite	lb.	.11½
Paints and Colors—		
Chrome green, common	"	.05
Pure	"	.16
Yellow, common	"	.10¼
Best	"	25
Lampblack, com'l	"	.04½
Refined	"	.07
Litharge, Am. powd	"	.04¾@.05¼
English flake	"	.08¼@.08½
Glassmakers'	"	.07¼@.08

Paints and Colors—	Cust. Meas.	Price
Metallic, brown	sh. ton	$ 19.00
Red	"	16.00
Ocher, Am. common	"	9.25@10.00
Best	"	21.25@25.00
Dutch, washed	lb.	.04¾
French, washed	"	.01½@.01⅝
Orange mineral, Am	"	.07¼@.07½
Foreign, as to make	"	.07¾@.11⅝
Paris green, pure, bulk	"	.12@.12¼
Red lead, American	"	.05¼@.05¾
Foreign	"	.06⅝@.08
Turpentine, spirits	gal.	.45 @.46½
White lead, Am., dry	lb.	.04¼@.04½
American, in oil	"	.05¼@.05¾
Foreign, in oil	"	.07⅛@.09⅛
Zinc, white, Am., ex dry	"	.04⅜@.04⅝
American, red seal	"	.06½
Green seal	"	.07
Foreign, red seal, dry	"	.05¾@.08½
Green seal, dry	"	.06½@.09½
Potash—		
Caustic, ordinary	"	.04⅞@.06
Elect. (90%)	"	.06½
Potassium—		
Bicarbonate cryst	"	.08¼
Powdered or gran	"	.14
Bichromate, Am	"	.08¼@.08¼
Scotch	"	.08½@.09
Carbonate, hydrated	"	.04@.04¼
Calcined	"	.03½@.03¾
Chromate	"	.35
Cyanide (98@99%)	"	.23
Kainit	lg. ton	9.05
Manure salt, 20%	100 lbs.	.66
Double Manure salt, 48@53%	"	1.12
Muriate, 80@85%	"	1.83
95%	"	1.86
Permanganate	lb.	.09½@.10½
Prussiate, yellow	"	.13⅝@.14
Red	"	.36
Sulphate, 90%	100 lbs.	2.11
96%	"	2.14
Sylvinit	unit	.35½
Quartz—(See Silica).		
Salt—N. Y. com. fine	sh. ton	2.00
N. Y. agricultural	"	1.50
Saltpetre—Crude	100 lbs.	3.50@3.55
Refined	"	4.25@4.62½
Silica—Best foreign	lg. ton	10.00@11.00
Ground quartz, ord	sh. ton	6.00@8.00
Best	"	12.00@13.00
Lump quartz	"	2.50@4.00
Glass sand	"	2.75
Silver—Chloride	oz.	65
Nitrate	"	35
Oxide	"	85.@1.10
Sodium—		
Bichromate	lb.	.06¾
Chlorate, com'l	"	.07¾@.08¼
Hyposulphite, Am	100 lbs.	1.60@1.65
German	"	1.70@1.90
Peroxide	lb.	.45
Phosphate	"	.02¼@.03
Prussiate	"	.10½@.11
Silicate, conc	"	.05
Com'l	"	.01
Sulphate, com'l	100 lb.	.77½
Sulphide	lb.	.01¼
Sulphite crystals	"	.02½
Sulphur—Roll	100 lbs.	1.85
Flour	"	1.90
Flowers, sublimed	"	2.15
Talc—N. C., 1st grade	sh. ton	13.75
N. Y., Fibrous, best	"	10.20
French, best	100 lbs.	1.25
Italian, best	"	1.62½
Tar—Regular	bbl.	1.85
Oil barrels	"	3.75
Tin—Crystals	lb.	.20@21½
Oxide	"	.42
Uranium—Oxide	"	2.25@3.00
Zinc—Metallic, ch. pure	"	.07@.09⅝
Carbonate	"	.15
Chloride	"	.05
Dust	"	.05¼@.05¾
Sulphate	"	.02½@.03¾

THE RARE EARTHS.

	Cust. Meas.	Price
Boron—Nitrate	lb.	$1.50
Calcium—Tungstate (Scheelite)	"	.60
Cerium—Nitrate	"	11.00
Didymium—Nitrate	"	35.00
Erbium—Nitrate	"	40.00
Glucinum—Nitrate	"	20.00
Lanthanum—Nitrate	"	30.00
Lithium—Nitrate	oz.	.60
Strontium—Nitrate	lb.	06⅜@.07
Thorium—Nitrate 49@50%	"	5.00
Uranium—Nitrate	oz.	.25
Yttrium—Nitrate	lb.	40.00
Zirconium—Nitrate	"	8.00

NOTE.—These quotations are for wholesale lots in New York unless otherwise specified, and are generally subject to the usual trade discounts. Readers of the ENGINEERING AND MINING JOURNAL are requested to report any corrections needed, or to suggest additions which they may consider advisable. See also Market Reviews.