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**Illustrated.*

DEPARTMENTS.

EDITORIAL.

IN ANOTHER COLUMN, under the head of 'Department Law,' Dr. R. W. Raymond discusses the practice of the General Land Office, with regard to patents on mineral lands, and also a recent request of the Colorado Mine Operators' Association with reference to this practice. Dr. Raymond has covered the subject so fully with his accustomed clearness and completeness that we can add nothing to his article, and simply desire to call attention here to the presentation of this important subject.

THE RECENT REDUCTION in the price of steel billets, which are now selling at $23 to $24 per ton, at mill, removes an anomalous condition which has existed for over two years. During that time billets have sold at a price several dollars above the quotation for steel rails. It used to be considered that, allowing for cost of rolling, rails should sell at from $3 to $5 a ton above the price of billets, but, during the boom, conditions were exactly the reverse. One reason for this has been that the large companies have been using in their own mills the billets which they made, and have had only a very small quantity to sell to the outside mills which used purchased billets. On the surplus sold they have put whatever prices the exigencies of the purchasers seemed to warrant.

THE REPORT OF the Homestake Mining Company for the year ending with June last shows a total of 1,279,075 tons of ore milled. The proceeds, including miscellaneous receipts, were $4,629,721, or $3.62 per ton; the total costs were $4,026,099, or $3.15 per ton, leaving net earnings amounting to $603,622, or $0.47 per ton. It is to be regretted that the report of such an important company should be stated in a rather vague and confusing way. It is difficult to work out even this general statement, while details are altogether wanting. The operations of the great mines and of the mills present many features which would be highly interesting to the mining world. The presentation of these in the annual report would give stockholders the information which is their due, and would also be of benefit to many engineers and mill-men.

IT IS ANNOUNCED, in a semi-official way, that the United States Steel Corporation is now studying methods of reducing its current expenses, and that one of the first steps adopted will be to cut down wages and salaries. Just how, or in what quarters, this reduction will be made is not yet settled, but the decision of the company is awaited with some anxiety. There is an apprehension that any attempt at a general reduction will meet with opposition in the form of strikes and labor troubles. This is possible, but we think, upon the whole, it is not very probable. Many of the employees recognize the sit-

uation, and are more apprehensive of a reduction in forces than in wages. The standard of the past two years has been pretty high, and, though there will be a natural opposition to the cutting down, it looks as though more reasonable counsels may prevail.

A LITTLE STRUGGLE, quite interesting to observers of the iron trade, is going on between the railroads and the rail-makers. The prices of standard sections of steel rails have been kept at $28 a ton, at mill, for two years past, and the railroads are asking for a reduction, in view of the general fall in prices of other kinds of steel. The so-called rail-pool has refused to make this, up to date, pointing out the fact that prices of rails have been relatively lower all through the boom than those of other products. On the other hand, the large steel companies have been asking the railroads for a reduction in freight rates, both on raw materials and finished steel, claiming that rates were put up when prices went up, and that the rule should work both ways, and rates should decrease with the prices. Up to date, neither party seems disposed to give way, and people are wondering which will be the first to make concessions.

A BELIEF IN THE permanence of production from the California oil-fields is becoming apparent, especially on the part of the railroads. We recently noted the purchases, by the Southern Pacific Company, of a large interest in the stock of the Associated Oil Companies, and of other properties. The company evidently intends to keep control of a considerable extent of oil property for its own needs. The Santa Fe Company is also preparing to take the oil business in hand by the construction of a branch into the West Side fields in Kern county. This line will take the road into the center of the Sunset district, and will place that district and others in the West Side region in a much better position than they have been for transportation facilities. Both the Southern Pacific and the Santa Fe roads use oil in their locomotives to a large extent, already consuming several million barrels a year, and it is expected that they will, before long, take nearly half the oil produced in California, to supply their fuel necessities.

THE RESTRICTION in the output of pig iron, which was proposed, seems hardly to have taken full effect until very near the close of October. The production of pig iron for the month fell off about 125,000 tons, as compared with that of September, making the output the lightest reported so far this year. The change, however, which was mainly effected in the last week of the month, shows in a very marked way in the reports made of the capacity of the furnaces in blast. This was about 282,500 tons weekly on November 1, against 361,500 tons on October 1 and 398,500 tons on June 1 of this year, when the maximum capacity was reached. The reduction has been greatest in the Pittsburg district and the Mahoning and Shenango valleys in Pennsylvania and Ohio, where the ownership and control of the United States Steel Corporation is strongest. There was also a very considerable falling off among the Eastern furnaces, in the Schuylkill and Lehigh valleys. In the last-named district, most of the furnaces which have gone out of blast have in all probability shut down for good, or, at least, until another boom is on; for it is these Eastern furnaces where costs are higher than in western Pennsylvania, and there are quite a number which cannot be run at a profit unless pig iron brings an unusually high price. In the South there has been very little reduction in output, notwithstanding the fall in prices, and the comparative difficulty in selling iron.

SIR CLEMENT LE NEVE FOSTER.

We note with pleasure the bestowal of a knighthood on Professor C. L. Neve Foster; not because such a title can add to his dignity, but because it is a public recognition of his many and valued services. Sir Clement, as he must now be called, received his education at the Royal School of Mines and at Freiberg, in Saxony. After serving from 1860 to 1865 under Sir Roderick Murchison on the English Geological Survey, he undertook important mining commissions in Egypt, Venezuela and Italy successively. In 1873 he was appointed inspector of mines in Cornwall and Devon, and in 1880 inspector in North Wales. He succeeded Sir Warington Smyth as professor of mining at the Royal College of Science and Royal School of Mines in 1891. He is the translator, with Professor Galloway, of Callon's great book on mining and the author of 'Ore and Stone Mining' and of 'Elementary Mining,' a book shortly to make its appearance. The preparation of the mineral statistics of Great Britain is in his hands, and he is technical editor of the *Proceedings* of the Institution of Mining and Metallurgy.

AN INTERESTING DEVELOPMENT.

From Denver comes the intelligence that the coal miners all over Colorado have struck, in order to give force to a demand for an eight-hour working day. The people in the larger cities and the industries of the State generally are in distress for want of coal, so that a wide-spread feeling of depression prevails. Now come the labor-union leaders and request the governor to call a special session of the legislature in order to pass an eight-hour law, and if this is done they promise to send the men back to work. This development of popular government has many interesting features.

In Montana, a few days ago, a consolidation or blind pool of copper mining companies suffered by what is believed to be an unfair judicial decision, and forthwith it closed its mines and smelters, threw 12,000 men out of employment, and paralyzed the industrial activity of an entire State. Then the copper mining corporation announced that it would resume operations and put all the men to work if only the governor of the State would call a special session to pass a law which would give it relief from unfair treatment by the local courts. The people of the community, seeing extreme industrial depression ahead if this was not done, promptly besought the governor to acquiesce in the corporation's demand, a special session was called, and the work at the mines and smelters was thereupon resumed.

Montana appears to have been compelled to carry out the behest of a corporation, while Colorado now lies at the mercy of a labor-union. In one case the miners' strike for an eight-hour law, in the other case a consolidation of corporations went on strike because of their grievance against the judiciary. There is little to choose between them save that capitalists are usually more intelligent than labor-leaders—but not always, as was shown in the great coal strike in Pennsylvania, where the tactical blunders were mostly on the money side. In any event, this development of the labor situation is a serious one. When any large number of people in a community combine to refuse to perform their usual business or professional functions, there is a disturbance to the body politic; that is what anarchy means, and this is just what it is.

RE-GRINDING MACHINES.

The subject of re-grinding millstuff for further treatment is one which we find frequently mentioned in letters from our engineering friends. One engineer, writing from Johannesburg, says that he is looking for the best form of grinder to reduce concentrates to a fine powder, say 100-mesh, with a view to extracting the gold from the pyritous portion of the ore. About 7 per cent of all the ore crushed will require re-grinding, and, as the plant consists of 900 stamps, it will be seen that the problem is an important one. It would serve a useful purpose if any of our readers with experience in this matter would contribute their views.

At the present time of writing it would appear as if tube-mills are giving the best results, that is, for fine grinding previous to chemical treatment; the re-crushing of middlings and tailings, previous to further concentration, being another, much more difficult, matter. These tube-mills are in vogue both at Kalgoorlie and at Johannesburg. They consist of a revolving tube running on hollow trunnions and half-filled with flints—hence they are often called 'flint mills'—which swash up and down the lower half of the circumference of the tube, in a manner similar to that of the pebbles on the seashore, which are moved to and fro by the surf, and thereby grind the detritus of the land into the sands which fringe our coasts. When crushing dry, the fineness of pulverization is regulated by the feed of ore; when crushing wet, the amount of water admitted will regulate the discharge and consequently the degree of comminution. Of course, tube-mills form an excess of slime, that is their function; consequently the pulp is well prepared for leaching or other chemical treatment, but it is badly adapted for filtering or for mechanical treatment on concentrators, such as vanners and jigs. For preparing millstuff for this purpose, other machinery is required. For crushing dry, high-speed rolls hold their own as efficient granulators, although they have a practical limit as to fineness of product, which can be put at 30-mesh, beyond which their employment ceases to be economical. Ball-mills come next to rolls for dry-crushing, but recent data appear to show that, while the consumption of power per capacity is larger, their initial cost is much greater than that of rolls, and their product is of more uneven size. In cement manufacture, it is now the practice to employ ball-mills for intermediate grinding, and tube-mills for final pulverization. For re-grinding wet material, there is no machine which has proved altogether satisfactory.

Here we encounter a very old problem in milling. Huntington mills are doing good work at Anaconda and Great Falls; while the use of them entails heavy expense in wear and tear, the repairs are easily and quickly made; and the portability of these machines is advantageous, especially in a mountainous region. Chilean mills are economical in point of power consumed and present a good feature in simplicity of parts, but they are ponderous and heavy to repair. Recent improvements in details of construction, consequent upon experience obtained at Anaconda, have resulted in a Chilean mill which is said to do good work and is recommended by authoritative millmen, especially for certain ores requiring extremely fine grinding. In the Lake Superior district, steam-stamps have been tried for the re-crushing of jig-refuse, but without satisfaction; indeed, the whole problem of re-grinding is still in its infancy in the Lake region. As to stamps in general, it can be said that while they are cheap pulverizers, they yield a product of most uneven size, and their use entails the formation of a pulp ill-suited to further concentration. For the crushing of crude ore they are simple and effective machines, but for treating fines, with the idea of avoiding further classification, they

are ill-adapted. Rolls are employed for copper sulphide ores, both at Anaconda and Great Falls, in the first crushing of coarser middlings; but they do not commend themselves, as a rule, for wet-crushing of middlings and tailings to sizes below 1.5 millimeters, which is equivalent to about 12-mesh with No. 22 wire. In theory, rolls afford free crushing, the ore being removed as soon as broken to the size of the opening, but in practice it is found that, by wear, the faces acquire an irregular surface, creating channels between the rolls, through which part of the pulp passes without being crushed; and an uneven product is the result. This finally causes an overcrowding of rolls and screens. When crushing fine this defect is accentuated, so that rolls, when reducing below a certain size, lose the advantage which they possess for crushing to sizes above this practical minimum, of about 1.5 millimeters. In Chilean mills there is pressure followed by a drag, and in Huntington mills there is more drag, tending to slime the product, after it has been crushed to the required fineness. Stamps do not discharge freely and, as a consequence, they pulverize the pulp after it has been crushed to the dimension aimed at by the screen openings.

The whole subject is one of great interest to those engaged in the treatment, by mechanical concentration, of ores containing not only gold, but silver, copper, lead, zinc and, in fact, all the heavy useful metals. We have offered the foregoing observations as a text for discussion, and hope that many of our readers will give expression to their experience and opinion on so important a matter.

DEEP MINING.

While the Tamarack still remains the deepest metal mine in existence, it is pleasant to note that Bendigo continues to boast the deepest gold mines. On the Rand, shafts of great profundity are being sunk, but they have not as yet reached the reef at such a horizon as to bear the palm from the Australian district rendered remarkable by its 'saddle' formations. The New Chum Railway shaft at Bendigo is 3,900 ft. in vertical depth; a cross-cut is being driven at 3,856 ft. to reach 'center country,' where a gold-bearing 'saddle' is expected to be intercepted. The temperature has not been measured in these particular workings, but in a winze sunk 572 ft. below the 3,200-ft. level the temperature of the rock was found to be 108° F., which, allowing for the mean annual temperature of 60° F., indicates an increment of 1° per 78 ft. of descent; therefore, while the hardness of the rock and other working conditions, such as water seepage, have proved no obstacle to exploratory work, the difficulty of maintaining an atmosphere suitable for efficient manual labor has intruded itself. While two men can work a rock-drill in the upper levels, three are required at 3,856 ft., on account of the greater strain on their endurance.

In order to mitigate the heat, water is brought down from a dam at 3,200 ft. and men at the face are sprayed continually. A shower bath is also provided at the flat.

We trust the cross-cut at 3,856 ft. will strike it rich; the last profitable 'saddle' was worked at 3,000 ft. and the company has shown commendable courage in the subsequent vigorous prospecting of the deeper horizon.

MARKET CONDITIONS.

Nov. 18.

The metal markets have been generally quiet and even dull; business has been only on a moderate scale.

Copper is extremely quiet, with buying temporarily at a standstill, both for home and export trade. Consumers seem to be out of the market for the present, although they will doubtless soon have to replenish their stocks. Foreign orders have also fallen off for the time being, demand having been apparently satisfied by the recent movement.

Tin is an exception to the general rule, being somewhat firmer. Recent arrivals are in strong hands.

The immediate demand for lead appears to be satisfied, and consumption is evidently falling off. In view of the present condition, both here and abroad, the principal producers have reduced prices $6 per ton.

Spelter is weaker, demand being small, while supplies are abundant. Prices are again lower. In the Joplin market zinc ore declined, sales having been made this week at $30 per ton, basis of 60 per cent zinc, a decline of $4; while it is stated that one sale was made as low as $28 per ton.

Silver has been quiet, showing little change through the week. The Eastern demand has fallen off, and current shipments to India are light.

The iron market still continues uncertain. In spite of recent reductions in prices, buying has not been stimulated to any great extent. The only activity manifested has been in Southern pig iron, which has sold rather freely at the reduced prices. The attempt to maintain prices in structural material and plates has prevented any business being done, as buyers are convinced that the makers will have to give way. The railroads and the rail pool are still arguing over the price of steel rails, and the larger railroad companies still hold out, although some of the minor companies have given way and placed orders. There is a good deal of talk about export trade, and some orders from abroad for material have been taken, though it is impossible to say at what prices.

The Western coal trade is quiet. The weather has not been of a character to stimulate domestic demand, and factory orders are light. The Lake trade is nearly over for the season. There is some talk in Ohio, Illinois and Indiana of restricting production, with a view to the maintenance of prices, and it is quite possible that something will be done in this line.

The seaboard bituminous coal trade continues quiet. There have been no new developments in the way of competition or reduction of prices. A few more orders are coming in for ports along Long Island Sound and for southern New England points, but no large business is developing.

The anthracite trade continues quiet, with a market depending upon weather conditions. A cold snap has set in which will probably improve local demand. In the West dealers are reported to be generally well stocked up. Shipments by lake have been so large this season that all-rail trade for the winter will probably be light.

METALLICS.

Culled from all sources. Our readers are invited to assist this department by sending similar material.

At the Boleo mines, in Lower California, the product is two-thirds matte and one-third black copper. Both of these are sent to Germany to be refined. The coke used at Boleo is imported from Germany.

The copper ores of Boleo, Lower California, occur in beds of sandstone and conglomerate, in the form of finely disseminated black sulphides in an aluminous and silicious gangue. The main ore-seam lies in clay-standstone, just above a conglomerate layer. Numerous faults traverse the country; they contain no ore and not much quartz, and belong evidently to a post-mineralization period.

Before directing the operations of a coal mine in England, it is necessary to pass an examination, but this is not required for superintending metalliferous mining.

During recent years several Cornish mines have been exploited by means of foreign capital. Thus the Prince of Wales mine, near Callington, was taken over two years ago by a French company, while Germans interested themselves in five setts near Gunnislake. The Seton Burrows and the United mines, in Gwennap, were prospected by foreign owners.

The Mining School at Camborne, Cornwall, owns a mine, known as the King Edward, which is under the management of the teaching staff. From 100 to 125 students get an opportunity to work underground two days in the week, the remainder of their time being occupied by studies at the school itself. The mine is partially furnished with machinery, including compressors and a drill equipment; there is also a stamp-mill and concentrator. It is claimed that this is the only mining school which owns and works a mine.

The records of the California State Mining Bureau show that the State has been a producer of quicksilver ever since it was ceded by Mexico to the United States. In 1850, the output was 7,723 flasks, of 76.5 lb. The maximum production was 79,596 flasks in 1877. From that point it fell to 22,904 flasks in 1891. Last year, the output was 29,202 flasks. The highest average price of the metal in San Francisco in any one year was $105.18 per flask, in 1874; the lowest, $28.23, in 1882. For five years past, the price has ranged between $40 and $48 per flask.

What is believed to be the first iron casting made in the territory, now included in the United States, is preserved in Lynn, Mass. Its history is well authenticated. It is a cooking-pot, weighing a little over 2 lb. It was made about 1642, near Lynn, where a small blast furnace was built in that year. This furnace used charcoal for fuel, with bog ore found in the meadows along the Saugus river, and oyster-shells as flux. This furnace was operated until 1688, with some intermissions.

The mineral borocalcite furnishes the base of the greater part of the borax consumed in Europe. Fifteen parts of finely crushed ore with 60 parts water, 8 parts sodium bicarbonate and 2 of caustic soda are boiled in a steam-heated boiler about three hours. It is then filtered and crystallized, yielding crystals of borax. It is estimated that 100 lb. of borocalcite will yield from 100 to 105 lb. of crystallized borax.

A yield of 5 cu. ft. of acetylene gas from every pound of calcium carbide is guaranteed by manufacturers in the United States. In Germany acetylene gas is mixed with a gas of lower candle-power, containing about 25 per cent acetylene, and used in railroad cars.

Graphite crucibles are serviceable in metallurgical work, where the sudden changes in temperature and the corrosive action of molten metals usually injure immediately pots made from other mineral substances. Graphite crucibles of good quality contain approximately 50 per cent plumbago, 33 per cent air-dried refractory clay, and 17 per cent sand.

In 1845 the total production of copper in the United States was estimated at only 100 long tons; in 1902 it grew to 272,685 tons. Thus in little more than half a century the United States has eclipsed all other countries in the development of its copper deposits.

DISCUSSION.

Readers are invited to use this department for the discussion of questions arising in technical practice or suggested by articles appearing in the ENGINEERING AND MINING JOURNAL.

DEPARTMENT LAW.

The Editor:

Sir.—The resolution passed by tht Colorado Mine Operators' Association on April 13, 1903, and sent in August to the editor of ENGINEERING AND MINING JOURNAL, was referred to me for comment, which I have hitherto found no time to prepare. Perhaps the present remarks upon it will be too late for effect in the particular matter specified; but I trust they may find application hereafter.

The resolution referred to seeks to change a rule of the United States Department of the Interior, declaring that, in mineral patents, "the calls in the patent constitute the survey, and not the acts upon the ground"—that is to say, that courses and distances, stated in a United States patent, shall take precedence of monuments on the ground, as determining the acts of the General Land Office in limiting its grants of later patents.

It is declared that the courts have followed the latter principle; and indeed, I do not see how they could do otherwise, since it is a well-known part of the common law, governing deeds of real estate, and, moreover, founded in reason and equity. Any ruling of the Department of the Interior contravening the decisions of the courts is merely "department law," and must yield at once to the higher authority of judicial decisions. On the case as stated by the Colorado Mine Operators' Association, I do not see how there could be either doubt or difficulty connected with the forcing of the General Land Office to conform its practice with the decisions of the courts, by which its grantees will, of course, be ultimately bound.

There is, however, another view of the case, concerning which I do not feel so sure. The General Land Office has to conduct its business, under our curiously absurd mining law, with much difficulty. There are no maps in existence (and, according to the United States statutes, there can be none) showing what portions of the public mineral domain have been appropriated by private claimants. For mere 'location,' *not* recorded in the United States Land Office, confers at once a possessing title, of which the United States receives no notice whatever, until the possessory owner desires to buy the land outright and receive a patent therefor. When such an application for patent is made, the United States has no means of deciding whether it can properly sell the land applied for, except by having the application advertised for a certain period, and declaring to be forfeited any counter-claims not filed before a given date.

Now if, even after the granting of a patent, the terms thereof are still to be contested on the ground of errors of survey, the confusion becomes still worse. The Land Office knows neither what it can sell nor what is has sold. Nevertheless, the principle of the common law, that in the description of a grant, monuments take precedence of courses and distances, must hold good. Yet it may be a question whether the Land Office should adjudicate such a question, on a subsequent application for patent, or should adhere to its own records, and leave the question to judicial decision. On the whole, I am inclined to think that the Colorado Mine Operators' Association is right in its demand, especially since the former practice of the Land Office was what the Association now seeks to have restored. I have no doubt of the justice of its contention, so far as it has been already settled by the courts; but even when a wrong has been confessed, the proper remedy is still to be determined.

In any case, all lawyers know that "department law" is no law at all. The courts do not recognize it as authority; and it ought to give way at once, and always, to their decisions.

R. W. RAYMOND.

New York, Nov. 16, 1903.

THE GEOLOGIST IN MINING.

The Editor:

Sir.—As I take it, the chief point which Mr. Palmer wishes to make, in his intertsting letter of November 7, is contained in the following quotation: "The geologist is thus placed in a position he little deserves.[1] In point of fact, he is seldom a prospector. Being mostly employed by others to perform certain definite work, he has little time to search for the outcrops of mineral veins, which, I take it, is the purpose of the prospector."

As this point is made in taking exception to my contribution on the subject, I will quote from my article: "In the first place, a geologist has no time to prospect, just as you, mining engineer or mine-owner, have no time—no more than you have to do your own cooking. You leave the almost hopeless searching and seek higher walks of life and more assured results. So does the geologist."

It thus appears to me that Mr. Palmer and myself are in perfect agreement on this point, as well as in the more important conclusion as to the high place of the geologist in twentieth century mining.

J. E. SPURR.

Washington, D. C., Nov. 7, 1903.

MINING COSTS AT CRIPPLE CREEK.

The Editor:

Sir.—The geology and vein structure of Cripple Creek have been described almost *ad nauseam* by many writers, but, so far as I have observed, little has been said to the engineering public about the very vital problem of how to make money out of these much-discussed deposits. The impression seems to prevail among mining men outside of the district that Cripple Creek methods are crude and operating costs high. Now, while glaring examples may be produced, in the district, of almost every fault that could be mentioned in the management of mines, I think that the conditions under which the Cripple Creek mine superintendent labors are not thoroughly understood, and that the methods employed, while they may be behind the times in some respects, are yet fully up to the average of others, and even ahead of the average in regard to certain features of mining practice.

A man brought up in the Lake Superior region, where iron and copper ores are mined from underground at a cost of 75c. to $1 per ton, is apt to smile at mining costs of $10 to $15 per ton, even after making every allowance for differences in the prices of labor and supplies. The conditions, however, are so radically different that any comparison on the basis of tonnage is quite worthless. Before the Lake Superior man can arrive at any understanding of mining costs in Cripple Creek he must realize the following two facts:

1. All ores shipped from Cripple Creek are concentrates produced by *hand sorting*.

2. The amount of development work necessary to find the ores is probably 50 or 100 times greater than in the Lake Superior mines.

At the larger properties of Cripple Creek the cost of mining the total product of ore and waste is only from $2.50 to $3.50 per ton, this cost covering all the expenses of the companies for all purposes, including taxes, insurance and general expenses. This cost does not compare unfavorably with that of mining in such places as Butte, the Cœur d'Alene, or even Lake Superior, when it is considered that labor at Cripple Creek costs 42.5c. an hour, as against probably 22.5c. in Michigan. It must be remembered that the above cost, of $2.50 to $3.50 for crude rock, includes the cost of sorting the ore, which is equivalent to that of milling in other camps, and is fully as expensive.

It may be said, therefore, that on the basis of crude rock hoisted, the Cripple Creek mines have no reason to be ashamed of their costs, as compared with those of other places. This is emphatically the case, in view of the fact that the specific gravity of the Cripple Creek rock is much less than that of lead, copper or iron ore; that most of the rock is broken from shafts, drifts, raises, or from stopes cut out as narrow as possible; that these working places, from their very nature, preclude the use of appliances designed to handle material on a large scale, and that the surface plants are hampered by the fact that, when the mines were started, no attention was paid to any future necessities, and consequently the equipment has been built up piecemeal, and is very far from being economical.

I hasten to state, however, that a low cost per ton, either of crude rock hoisted or of sorted ore shipped, does not necessarily indicate either good mining or good management, and is nearly as apt to indicate the contrary. Two mines may be working in exactly the same kind of ore, and one may ship ore at more than twice the cost for mining that the other does, and yet be doing better work and making larger profits.

To clear up this paradox, it is necessary to call attention hastily both to the character of the ore-bodies, and to the conditions of sale and treatment.

Cripple Creek has always been described as a high-grade camp. This is partly true. The ore occurs in a multitude of small veins, either single or in aggregates. In the small seams which constitute either the vein itself, or a component part of it, the ore is rich, but the rock on the walls, or between the seams, is either wholly or partly waste. The rich seams may vary in thickness from a mere crack to a foot or two, and for these widths may carry from one to several hundred ounces per ton.

There are no large ore-bodies in Cripple Creek. It is doubtful if any single ore-body, or even any single vein, has produced 100,000 tons of shipping ore. The largest and best veins have been found in the granite, where the rock-walls themselves are sometimes uniformly impregnated with values for a width of 30 or 40 ft. In such places large amounts of clean ore have been mined and shipped without sorting, but only in the swells; when the vein narrows down, it is always necessary to break some waste, in order to make room to work.

The ore, therefore, is mined from veins of such a character that it is impossible to get it out without mixing some worthless rock with it. The problem of handling this ore economically depends on the cost of treatment. This cost is at present—and is likely to be always—so high that it becomes very essential to throw out as much waste, or low-grade ore, as possible before shipping. Could the ore be treated for a dollar or two a ton, the proposition would be entirely different. The rich seams in the veins are always so friable that a large part of the value goes into fines, and can be saved by catching the latter on a grizzly, generally with about ¾-in. space between the bars. Sometimes the proportion of value that can be saved by this method will be as high as 90 per cent, or even more, of the total gold in the vein. Sometimes it may be only 25 per cent. It has also been proved possible to save considerable ore, simply by washing the dust off the waste rejected from the ore-house, and collecting this dust in the form of slimes.

It will be evident to anyone who considers these facts, that the problem of mining Cripple Creek ore is not so much one of breaking tons, but of saving values. It must be obvious, for instance, that in a vein where the values go into the fines, it may be very easy to break too much into fines. It may be far preferable to take less out of a stope at a greater cost. It is equally obvious that, after the ore is brought to the surface, it will pay to reject by sorting, even at considerable expense, all rock remaining in the ore that will not pay for freight and treatment. In other words, the problem is not simple, but complex; it is a question of maxima and minima, in which the maximum required is the largest amount of net profit from a given amount of gold in the deposit, while the variables are the cost of freight and treatment, of mining, of sorting, and the value of the rejected waste.

Let us take as a practical example a body of 10,000

[1] By my letter of July 4.

tons of ore, running 1 oz. of gold per ton. This ore can be mixed and shipped without sorting at a handsome profit, as follows:

Gross value of ore	$200,000
Cost of mining 10,000 tons, at $3 per ton	30,000
Freight and treatment, $8.25	82,500
Total cost	$112,500
Profit	87,500

But suppose we reject half of this ore by sorting? By so doing we throw away 5,000 tons that will average $2.50 per ton, or $12,500. The cost of sorting, at 50c. per ton, will be $2,500 more. Then our shipment will be as follows:

5,000 tons, at $37.50 per ton	$187,500
Cost of mining and sorting, $6.50 per ton	32,500
Freight and treatment, $11.25	56,250
Total cost	$88,750
Profit	98,750

In other words, the gross receipts in this case have fallen $12,500. The cost for mining per ton is more than twice as great; the cost for freight and treatment per ton is $3 greater; the apparent showing by the superintendent very bad; but nevertheless he has made for the company $11,250 clear profit on the transaction.

In the first case our total cost for mining, freight and treatment is only $11.25 per ton; in the second case it is $17.75 per ton, but there is more money in the higher cost. This is an example that has been worked out in practice.

It should be very plain, then, that nothing could be more absurd than to judge the merits of a superintendent in Cripple Creek merely by the shipping cost per ton of his ore. Any opinion must be formed on a good many other considerations.

Here, by the way, I wish to avoid giving the impression—which would be a satisfaction to many—that it is not worth while to keep a close record of the costs of mining. On the contrary, this is one point that is too often overlooked. Costs can be kept in the fullest detail at a merely nominal expense. A good system of cost-keeping is so absolutely essential that no property of any size can be run successfully without it. No matter how able a man may be, he can get better results if he knows just what it costs him to do his work. But the costs, once obtained, must be used with discretion, always bearing in mind that the desired result is the greatest *net profit* in dollars and cents, and nothing else.

To give a better idea of the complexity and cost of operating the larger mines of the camp, the following statement of the operations at one of the largest properties during one month may be of interest: 18,910 tons of rock were mined from 40 different and separate stopes at a cost of $2.07 per ton, or $39,068.39. The following development work was done in addition to the stoping: 2,237 ft. of drifts, cross-cuts, winzes, and raises in 46 different headings, at an average of $6.91, $15,455.21; ore-sorting and loading cost, $8,999.98. This made a total of $63,523.58. The total amount of rock hoisted, both from stopes and development work, was 24,931 tons, at $2.55, which was reduced by sorting to 7,093 tons of shipping ore, at $8.96.

Table Showing the Cost of Mining in Detail.

	18,910 tons. Stoping, per ton.	896 ft. Drifts, per ft.	1,229 ft. Cross-cuts, per ft.	112 ft. Raises and winzes, per ft.
Machine men and helpers and hand miners	$0.34	$1.86	$2.01	$3.16
Trammers, shovelers, pipe and track men, etc	0.41	1.03	1.04	0.98
Timbermen	0.23	....	....	1.19
Total underground labor	$0.98	$2.89	$3.05	$5.33
Cost of machines, compressed air, drill sharpening, repairs, etc.	0.15	0.97	1.05	1.66
General tramming cost, repairs on cars, oil, supplies, etc	0.03	0.07	0.09	0.06
Explosives	0.13	1.43	1.66	1.42
Lumber and timber	0.28	....	....	1.52
Hoisting and tramming on surface	0.23	0.46	0.53	0.40
General expense, bosses, assaying, surveying, office, etc	0.23	0.58	0.67	0.45
Supplies, miscellaneous	0.04	....	....	....
Total cost	$2.07	$6.40	$7.05	$10.84

I think it not unfair to say that these costs are good, considering the conditions. The rock is not excessively hard, but it cannot be called soft. Part of the rock is ordinary, unaltered granite, and part is equally hard porphyry. Wages will average $3.40 for eight hours. Coal costs about $4.60 per ton, and timber averages $20 per 1,000 feet.

J. R. FINLAY.

Colorado Springs, Colo., Nov. 9, 1903.

MESH VERSUS APERTURE.

The Editor:

Sir.—In your issue of November 7, I see Mr. Philip Argall has written one of his usual instructive letters. This time he touches on the very vexed question of mesh. However, in warning us of one pitfall he himself falls into another. He says: "An order for wire screen would now read, say, 100 ft. steel wire-cloth, 30 in. wide, No. 20 wire, 16-mesh Washburn & Moen gauge; while, if the term mesh is dropped, then one need only stipulate the size of the aperture, thus: 100 ft. steel wire-cloth, 30 in. wide, 0.035 in. aperture."

This would lead us to understand that the two parts of the above sentence are synonymous, while in fact they are not so. In another place, in the same letter, Mr. Argall says: "The size of the aperture is the gist of the whole matter." Mr. Argall must have overlooked the fact that the number of apertures per square inch also has very much to do with it. For example, 0.035 in. aperture, which he quotes as a specimen order, might be either 20 or 22 mesh, according to the size of the wire, while Mr. Argall would lead us to infer that if the size of the aperture is stipulated it is unnecessary to quote the size of the wire. Moreover, as wire-cloth is rarely true to its normal mesh, it might be even 18 mesh, which is 0.0352 in. aperture, or even 12 mesh, which is 0.0358. Mr. Argall will admit that there is a great difference between the capacity of these various screens, all of the same aperture. It appears to me that we ought invariably to specify in all orders for screens three factors—the size of the wire, the size of the aperture, and the nominal mesh.

The diagram given I consider to be nothing less than a most useful gift to every person engaged in the mining and metallurgical business.

While on the subject of wire screens, I would like to call attention to the discrepancy between the actual and nominal mesh found in the usual wire-cloth in the market. This refers more particularly to the smaller sizes, say, from 40 and smaller. One who has not taken the trouble to make an actual count of the mesh will be surprised at the large discrepancies often met with, especially if the cloth has been roughly handled. Sometimes the count corresponds pretty fairly in one direction, but not in the other. I have noticed this more particularly in the small sieves used in the assay office, where the cloth is often roughly handled in stretching it on its frame.

HENRY W. EDWARDS.

Grand Junction, Colo., Nov. 11, 1903.

LEAD FOR SULPHURIC ACID CHAMBERS.

The Editor:

Sir.—In your issue of November 7, under 'Questions and Answers,' you refer to the quality, etc., of lead for sulphuric acid chambers, stating that small amounts of copper and antimony give to lead the power of withstanding corrosion better than ordinary soft lead. This is an old idea, but does not bear inquiry. Some twenty-odd years ago, while engaged in the works of Messrs. Cookson & Co., of Newcastle-on-Tyne, Mr. N. C. Cookson and myself investigated the subject in experiments carried over several months. The mixtures were carefully made, using an exceptionally pure lead, specially refined, and with varying amounts of antimony and copper. The samples, including the original lead, were rolled to uniform thickness, and corresponding portions were placed in the hands of Mr. William Glover, the inventor of the Glover tower.

Our experiments were made in acid chambers at Messrs. Cookson's works, and in acid of varying strengths kept at various uniform temperatures in the laboratory. In every case, even with the smallest admixture of either copper or antimony, the loss was greater than with the pure lead.

With higher temperatures, the stronger acid and greater amount of the intermixed metals, the corrosion increased enormously, the effect of antimony being decidedly worse than that of copper. Mr. Glover's experiments gave the same results as our own. I have not the particulars of the experiments by me, but a few of the results were published in the *Transactions* of the Newcastle-on-Tyne Chemical Society.

I may say that, by amalgamating the surface of sheet lead, the corrosion was almost entirely prevented when exposed in the acid chambers.

Dr. G. Lunge subsequently made a very searching investigation of the subject, a report of which I find in the *Journal* of the Society of Chemical Industry, 1893, pp. 146-153, where it is quoted from the ENGINEERING AND MINING JOURNAL, 1893, 8-10, 32, 56-57. In this he confirms our observations.

It used to be a common idea in England, formerly, that lead from certain places was particularly good for chemical use. Probably at one time such leads were better, because they contained less impurities than most other leads. Later, when these brands had become a tradition, their good quality was imputed to the impurities which they did contain.

T. CRISP SANDERSON.

Port Richmond, N. Y., Nov. 11, 1903.

MILLING PLANT AT WALHALLA, VICTORIA.

The Editor:

Sir.—Having had the opportunity for some time past of enjoying the interesting and instructive articles on gold recovery which appear in your JOURNAL, it occurred to me that the description of a crushing plant recently erected in an important mining district of this Australian State, Victoria, might be of some interest to your readers.

Walhalla, the place to which I refer, is picturesquely situated in an extremely hilly portion of the Gippsland district, and is connected by a rough and dangerous road with the nearest railway depot, about four hours' ride from Melbourne. Mining operations have been carried on vigorously, and have resulted in the production of about 80 tons of gold up to date. The Long Tunnel Extended Company has contributed largely to this. It has had a long and prosperous career, and is still one of the principal gold producers of Victoria, and now rejoices in the possession of the most up-to-date stamp-mill in the State. Since its formation, in 1871, this company has treated 260,000 tons of ore for 337,000 oz. of gold, valued at £1,194,000. The new battery has a capacity of 1,600 tons a month, and I will now proceed to a short account of it. More than 3,000 cu. yd. have been excavated near the bottom of the hill, in which the tunnel of the company is driven. From the top of the tramway the trucks are allowed to gravitate to the battery. The quartz is tipped onto a grizzly, made of tapered bars, about 12 ft. long, and leading into the stone-breaker. This is of an improved rotary type, made by Messrs. Jaques Bros., the well-known Melbourne engineers, and extensively used out here. It weighs 7 tons, and has a capacity of from 12 to 20 tons per hour. A wrought-iron chute conducts the stuff to the ore-bins, which run the whole length of the battery, holding about 400 tons. They are massively constructed and entirely separate from the main building over the battery. Belt shifting apparatus is attached to the stone-breaker, so that it may be at once thrown out of gear, if necessary. From the bins the quartz gravitates down wrought-iron door chutes, opened by means of tooth-gearing to regulate the conveyance

of ore to the Challenge feeders, which are placed on rails and may be thrown out of gear at will. The battery consists of 20 stamps, each weighing 1,150 lb., and five heads in each box, the boxes being of the Homestake pattern. The shanks are of the plain pattern and taper at both ends. The disks are of American pattern, with hardened steel faces and three keys at the back. The battery-frame is of cast iron. Each battery is driven separately by a 10-in. belt, and is fitted up with belt-tightening gear to throw out each five heads separately. The stamps are run up to 96 drops per minute, being driven by means of rope-gearing directly off the main engine onto a 7-in. countershaft running underneath the feeding floor. The ripple-tables are of special design, fitted with covers and locking bars; then follow four of the latest Halley tables, and after these three Wilfley tables. In the battery housing an overhead crawl is used for lifting the shanks, etc. Retort and smelting furnaces are also neatly fitted up. Water is pumped from a creek into tanks placed high up the side of the hill, with a capacity of 8,000 gal. each, and from which water may be conducted to any part of the battery. Power is generated in two high-pressure Cornish boilers, constructed to stand a working pressure of 120 lb. per sq. in., and neatly built in brick and stone-work under a separate housing lower down the hill, for convenience in stoking, as otherwise hauling of fire-wood would be necessary. The engine itself is of the horizontal high-duty tandem-compound Corliss type. Attached to the engine is the main rope-driving wheel, which is 12 ft. in diameter, with six grooves, and weighs 5 tons. The engine has 11.5 in. high pressure and 20 in. low pressure cylinder and 36 in. stroke, and runs at a speed of 68 revolutions per minute. Every provision is made for the addition of another 20 stamps, there being plenty of power both in boiler and engine, and with the splendid prospects ahead this extension will no doubt soon be necessary.

D. G. MURRAY.

Richmond, Melbourne, Oct. 7, 1903.

MINE SAMPLING.

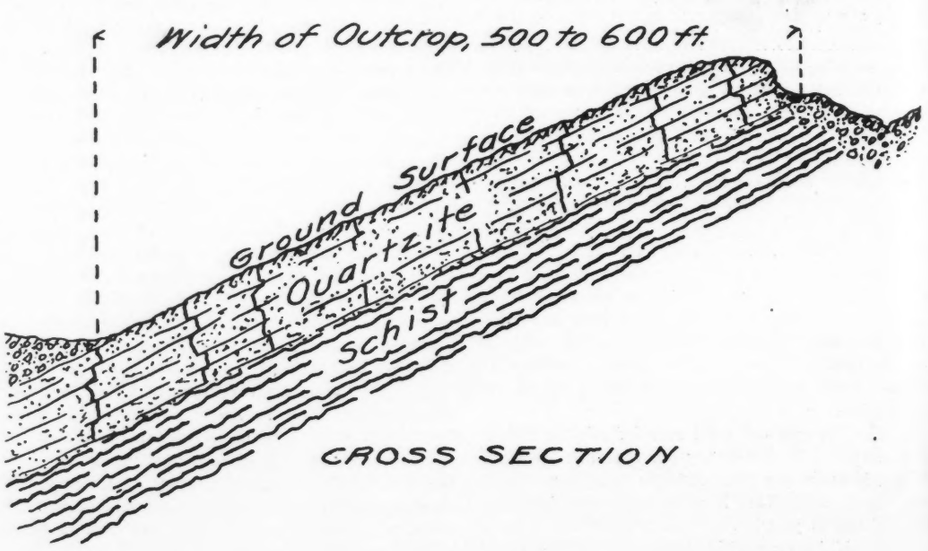
The Editor:

Sir.—In your criticism, appearing in the issue of October 24, you refer to the "data contributed on the subject of sampling by a score of experienced men, who are actually doing the sampling of the big mines in this and other countries." The question as to how accurately hand-samples may be expected to show the actual value of the ore as mined is a very interesting one, and no doubt many would be pleased if you could persuade some of these engineers of wide experience to furnish further data as to the results they have had in their work. Of course, it is realized that, in addition to an accurate determination of ore-values by careful sampling, the mining must be done in such a way as to exclude waste if sampling results are to check with mining results; but comparisons of the results of their examinations with actual mining results, if conditions as to nature of ore-bodies, method of mining, etc., are given, would be of great benefit to other engineers who have not had such extensive experience.

In a previous article the writer has given the conditions and results in two cases. In the hope of creating further interest in the subject and bringing forth valuable data, he now adds two other cases, as follows:

1. The property was represented as being a large body of low-grade, free-milling gold ore, having a width of 500 to 600 ft. The only workings were two open-cuts and two shallow shafts. The deposit had a width of outcrop of 500 to 600 ft., but a careful examination showed that its actual thickness, while great, was only 50 to 60 ft. The attached sketch shows how the mistake in estimating the width occurred.

The ore deposit was in quartzite, containing here and there small, irregular seams of quartz. It was observed that the quartzite itself carried values, although values were higher in the quartz veinlets. The gold was finely divided, and only rarely visible to the naked eye. In 'bucking' the samples, for the purpose of quartering down, once in a while a few pieces of rock would be found showing comparatively coarse gold, and such pieces were rejected as a matter of safety. The ore was sampled in 10-ft. sections across the deposit, 269 samples being taken. These samples were 'bucked' and quartered down by hand in the usual manner, except that, before the last quartering, they were put through a small hand-crusher and reduced to pieces that would all pass ¼-in. mesh. Samples were taken and assayed in duplicate, and the average value was $3 per ton.



The price asked was a very large one, and as the deposit did not give much promise of going down, the proposition was rejected. Later it was bought for about one-fifteenth of the price first asked; a mill was built, and the ore was mined by the open-cut system. The writer was afterward reliably informed by the manager of the mine that the ore as mined averaged about $3.75 per ton.

2. In this case the ore-bodies were irregular ones in limestone, carrying gold, silver and lead. The mother lode of the district is a contact between diorite and Cretaceous limestone. The ore occurs in a system of three veins, situated at a distance of 1,500 to 1,800 ft. away from the main contact. They are parallel fissure-veins in limestone, usually conformable to the strike and dip of the stratification. The pay-ore is easily detected by the eye, and in mining great care is used to keep it clean. There was not much ore 'in sight' in the mine, but in the lower workings it had been mined in such a way that there was an opportunity to check the hand-sampling of the faces against the smelter returns of product for eight months. This check gave the following results: Lead, as determined by hand-samples, practically the same percentage as was shown by the smelter returns; silver values, from hand-samples, 13 per cent greater than from smelter returns; gold values, from hand-samples, 36 per cent less than from smelter returns. Notwithstanding these differences in the silver and gold values, it was decided to rely upon the results of assays of hand-samples, for the following reasons: The sampling, as well as old smelter returns, showed that the ore was increasing in silver and decreasing in gold values, with depth; on the dump were several thousand tons of ore that had been mined during the two years previous to the eight months checked, which had not been shipped on account of lack of cheap transport facilities; this old ore carried about the same value in lead, but was lower in silver and higher in gold than the ore mined during the eight months' period. This latter ore had been piled up against the old ore, and in sacking it for shipment some of the old ore became mixed with it, so that about one-fourth of the ore sold to the smelters during the eight months was old ore.

R. C. GEMMELL.

Bonanza, Zacatecas, Mex., Nov. 2, 1903.

THE GERMAN PETROLEUM MARKET.

The contest for the control of the German oil trade, which has been carried on for some time between the German-American Oil Company, a subsidiary of the Standard Oil Company, and the Deutsche Bank, which has large interests in the oil-fields of Galicia and Roumania, bids fair to be a protracted one. The action of the Austrian refiners, who hold the balance of power, and seemingly prefer a position of independence to an alliance with either of the parties, may serve to prolong the struggle indefinitely. Both concerns have tried unsuccessfully to come to an agreement with the Austrian interests. The German-American Company proposed a plan by which the Austrian refiners would be allowed to sell 80,000 tons of their product yearly in German markets, provided they would not enter other countries, excepting France. The company, in return, would agree to take the surplus of the refiners, up to 100,000 tons, at a price to be determined at time of sale, and to sell the surplus outside of Austria. The Deutsche Bank, on the other hand, offered the refiners a general contract to sell on commission their whole surplus in the German market. It is believed that the Austrian refiners will refuse to unite with either of the parties; at any rate, they are making arrangements to secure a firm footing in the German trade.

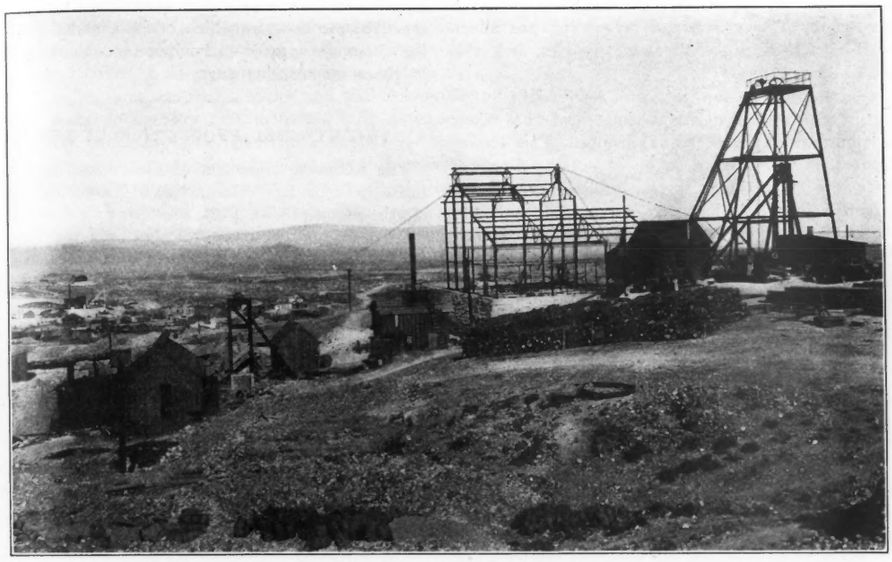
COAL TRADE OF JAPAN.—At the Japanese port of Omuta, on the Bay of Shimabara, Island of Kiusiu, the Mitsui-Bussan-Kaisha is building a new harbor, by means of which coals from the Miike mines will be shipped direct from Omuta. These are the most important coal mines of Japan, and they are situated at no great distance from Omuta.

COAL IN BRAZIL.—It is reported that coal has been discovered in Brazil near the town of Sedro, in the State of Parana. So far as determined, the coal-bearing area extends over 3,000 hectares, the explorations indicating that the coal-field runs through the center of Parana in a general north and south direction, and is probably a continuation of the coal measures found in the State of Rio Grande do Sul.

THE ORE DEPOSITS OF TONOPAH, NEVADA.*

By J. E. SPURR.

The mining district of Tonopah is situated in Nye county, Nevada, south from Belmont. It is reached by stage from Sodaville, on the Carson & Colorado Railroad. The region is arid and, until the discovery of the camp in question, was uninhabited. At the present writing there is an estimated population of 4,000 people in Tonopah. The town has electric lights, water-works, two newspapers, and has attracted much attention all over the country.



NEW STEEL HEAD-FRAME AND POWER-HOUSE, TONOPAH MINING COMPANY.

Discovery and Development.—Tonopah was discovered in 1900 by J. L. Butler, the prospector. The original eight claims which he located are now the property of the Tonopah Mining Company.

Mr. Butler's mine paid for itself from the start. The method of leasing was adopted in December, 1900, and before the end of 1901 the lessees are said to have extracted nearly $4,000,000 worth of ore. Leasing was discontinued in January, 1902, and the Tonopah Mining Company commenced development work, in which it is still engaged.

Up to April 1, 1903, there was shipped from this mine a total weight of 33,385,650 lb. of ore, containing 40,997 oz. gold and 3,431,620 oz. silver. Large quantities of unshipped ore remain on the dumps.

Subsequent to Mr. Butler's locations, ledges were cut by underground development work in a number of different prospects, such as the Montana-Tonopah, Mizpah Extension, California-Tonopah, West End, Tonopah Extension, Ohio-Tonopah, McNamara, Fraction, Wandering Boy, etc. Some of these show low-grade ore, while some show high values of ore in the development stage. The Montana-Tonopah, the only mine actually shipping outside of the Tonopah Mining Company, shipped up to July 15, 1903, a total of about $15,000 worth of ore. Large shipments have been made by both companies since these data were collected.

Sketch of Geologic History.—The earliest rock at Tonopah is an altered hornblende andesite. Subsequent to the eruption of this rock, fractures were formed in it, which became the channels for ascending hot waters. These waters transformed the rocks, altered them largely to quartz and sericite, and in other places to calcite, chlorite and pyrite. The first-named alteration is most closely connected with the veins. Subsequently another eruption of andesite occurred, differing from the early andesite in containing, as dark minerals, pyroxene and biotite rather than hornblende. Then ensued a period of rest, followed by a renewal of volcanic eruption. The lavas were now rhyolites and silicious dacites, closely related to one another. This period of vulcanism extended over a considerable time, and a number of different flows of dacite and rhyolite alternated or mingled.

During a portion of this volcanic epoch a large fresh-water lake formed, in which were deposited white volcanic ash and some beds of Tertiary infusoria. The first lava overlying the lake-beds is a local thin sheet of basalt. Soon after the extrusion of this, great columns of dacite and rhyolite forced their way upward. These volcanic necks now constitute detached low mountains, having been laid bare by erosion.

A considerable number of important faults have been found in the region. All the rocks, up to and including the tuffs and basalt, have been displaced by the faulting, but these faults stop at the contact of the dacite necks, which are not affected. The following is the tabulated sequence of events as worked out for Tonopah:

Early andesite.
Fracturing.
Vein formation. (Primary minerals, quartz, valencianite, stephanite, pyrite, chalcopyrite.) Values good; gold and silver, silver predominant.
Erosion.
Later andesite.
Probable erosion.
Dacite.
Dacite breccia.
Rhyolite breccias, flows, and dikes, intermingled with slightly stratified or interstratified pumiceous or tuffaceous fragmental material.
Vein formation. (Primary minerals, quartz, pyrite.) Values relatively low; gold and silver, gold apt to predominate.
Erosion.
Tuffs, with an occasional thin rhyolite flow.
Elevation of tuffs.
Tilting.
Basalt.
Chief faulting. (Affects everything preceding.)
Rhyolite (white) intrusion.
Vein formation. (Primary minerals, quartz, chalcedony, calcite, siderite, pyrite.) Values low; gold and silver, gold apt to predominate.
Erosion.
Dacite, intrusion.
Mineralization (chalcedony, manganese). Values slight to insignificant.
Erosion.
Glassy rhyolite flow.

Mineralization.—The most important veins in the Tonopah district occur only in the early andesite, and were probably formed by hot waters closely succeeding the early andesite intrusion. These veins carry gold and silver in the proportion of about 1 part of gold to 100 of silver by weight. They are unusually free from base metals; no lead, arsenic, etc., has been detected. In some places there is a very little copper, in others none. The gangue is quartz, with frequently a mineral which is a species of orthoclase feldspar (valencianite). The sulphide ores, so far as developed, show primary stephanite, with probably some polybasite, scant pyrite, and comparatively rare chalcopyrite. Secondary sulphides, coating the cracks in these ores, are ruby silver, argentite, with, probably, pyrite and chalcopyrite. The oxidized ores show abundant silver chloride, with occasional bromides, etc., and sometimes free gold. Along the borders of some of the fine-grained rhyolite intrusions there has been considerable alteration and mineralization, which is attributed to a cause similar to that which produced the veins in the early andesite. This alteration is in the form of silicification and occasional pyrite. Quartz veins, usually small, but sometimes large, have been formed; these contain precious metals, but in small amount and irregularly distributed. The gold frequently preponderates over

HAULING ORE FROM THE DUMP OF THE MIZPAH MINE, TONOPAH.

*Published by permission of the Director of the United States Geological Survey.

the silver. Calcite and siderite or ferriferous calcite, chalcedony, etc., are found in some of these veins. The veins belong to different periods of rhyolite intrusion.

The contacts of the large dacite necks are in many places accompanied by the deposition of chalcedony, manganese, etc., in cracks and crevices. These deposits contain, as a rule, insignificant quantities of the precious metals.

On the whole, no less than four periods of hot-spring action, accompanied by more or less vein formation and mineralization, have been noted at Tonopah. Each of these periods was consequent upon a lava intrusion.

The Vein Groups of the Early Andesite Mineralization.—The productive veins in the early andesite belong to the type of linked veins. Their physical characteristic is that they branch and reunite in both a horizontal and vertical direction. There is generally in each group a master vein, from which smaller veins branch. It is only the veins on Mizpah hill which have been sufficiently developed to give information concerning the vein system. On this hill there may be recognized at present three main groups of veins, the Valley View group, the Mizpah group, and the Montana-Tonopah group. The trunk vein of the Mizpah group is called the Mizpah vein, and crosses Mizpah hill in an east and west direction. Its outcrop is cut off both to the east and west by heavy faults. From it a succession of branches, known as the Burro Nos. 1, 2, 3, etc., depart in a southwestern direction. The Valley View shows a distinct group of veins of the same general type as the Mizpah, but with minor differences. The main vein has, like the Mizpah, a northerly dip, but is very much flatter. As it approaches the surface it passes into a number of smaller, nearly vertical veins. The Montana-Tonopah group shows a strong main vein running east and west and dipping north, with various branches. In all these veins the union of two branches is generally attended by increase of values, and conversely, the place where a small vein leaves the main one is often impoverished to a greater degree than the size of the branch vein would lead one to expect.

Occurrence of Ores in the Veins.—The veins are usually strong and well defined, yet they are not fissure veins. Close examination shows that they have been formed almost entirely by replacement of the andesite in which they occur. They have originated as zones of especially strong fracturing. These zones, which are usually four to six feet wide, became the chief channels for the ascending waters. It has already been stated that the andesite near the veins has been silicified to a very great extent, and the veins themselves seem to be the final stage of alteration, the andesite being entirely altered in places to quartz. All stages of the development of this process can be seen in different portions of the veins. As exceptions, there are streaks of quartz, usually small, within the main veins, which show crustification and comb structure, and thus bear evidence of having been formed in cavities. These cavities, however, were irregular and were not fissures, but spaces of dissolution formed by the mineralizing waters themselves.

At the time of the writer's first investigation of Tonopah, in the autumn of 1902, only the oxidized ores of the upper levels of the Mizpah were available for examination. From a microscopic study he found that the original metallic mineral was still present in minute grains. It was black in color and he supposed it to be a rich silver sulphide. Subsequent to this investigation the primary sulphide ores were found in places in the Montana-Tonopah, and the correctness of the forecast was shown. In the above-named mine the ores are quartz veins carrying, in places, large amounts of stephanite; chalcopyrite is commonly present and is probably, in part at least, primary. Besides the quartz as gangue material there are large amounts of a variety of orthoclase-valencianite.

Throughout the Tonopah district, argentite and ruby silver are common, though not in such quantities as the stephanite or the oxidized products. They are both secondary, being derived from the stephanite. Some of the chalcopyrite and pyrite is probably also secondary.

The oxidized ores are important, practically all the ore shipped from the Mizpah vein being of this character. The limit of oxidization is irregular, penetrating most deeply along the veins and along faults, and thus varying from 100 to 700 ft. below the surface. In the oxidized ores the sulphides are usually entirely altered, or can only be made out with the microscope. The products of alteration are silver chlorides with some bromides and iodides, and iron and manganese oxide.

It seems probable that in places some slight transfer and re-deposition of the precious metals has taken place during the process of oxidization. This action, however, is not believed to be important. For example, the chief shoots in the oxidized ore of the Mizpah vein are believed to correspond with the original sulphide ore-shoots. These oxidized bodies are broad and irregular in detail, but are all parallel and pitch east, having the same pitch in general as the intersection of the branch veins with the main one; this coincides also with the pitch of abundant post-mineral fractures, and even faults.

Future of the District.—It is certain that many more veins than those now known will eventually be discovered, and from them much rich ore will be extracted. The exceptionally complicated geology, however, will make prospecting difficult and expensive, unless carried on in the most cautious and scientific way. When it is repeated that the veins have been covered by numerous volcanic flows and sediments, have been cut through and displaced by volcanic intrusions, and have finally been cut and displaced by complicated faults, it will be seen how difficult are the local problems with which the miner has to deal.

FILLING OLD MINE WORKINGS.*

By CARL CIZEK.

The method of filling exhausted coal-workings with waste material, flushed down by water from the surface, which was introduced at Myslowitz in Silesia in 1901, has been adapted to the working of a seam 4 m. thick at Polnisch-Ostrau, in a mine where the growth of the population has necessitated the locking up of about 6.25 acres, containing more than 1,000,000 tons of coal, in safety pillars for the support of the houses and other buildings that have accumulated about the shafts. The seam, which lies at a low angle of inclination, is opened out in broad pillars, which are subsequently divided through by cross-driving, and the final removal is effected by forming chambers 8 m. long in the direction of the strike, which are enclosed on the free sides by dams formed of a double layer of planks with an intermediate packing of brushwood, the space left by the removal of the coal being immediately filled by sand and other waste material mixed with water, and brought in through an open launder from a lateral drift. The packing material is principally loamy sand from a hill adjoining the shafts, which, together with the ashes and waste of a large coking-plant, is trammed to a conical feeding-hopper, placed in a shallow pit adjoining the upcast shaft, and communicating with it by a lateral drift. A screen, with bars 2.25 in. apart at the bottom of the hopper, keeps back large stones. The flushing water is supplied from underground by a pumping-engine, raising 3 tons per minute from a depth of 220 m. to a storage-reservoir on the hill, whence it passes by 145-mm. gas-pipes to the distributing funnel, and, mixing with the waste, carries it down into the shaft and levels by a steel pipe of the same size, which is 6.5 mm. thick in the shaft, but is thickened to 10 mm. in the bends in the workings, where the scouring action is a cause of increased wear, the final distribution being effected by open launders, which can be shifted to deliver at any required angle. These are so arranged that the material introduced has no greater distance than 3.5 m. to flow from the point of introduction before coming to rest. As soon as the water has drained off the surface of the deposit it is perfectly firm, and can be walked upon. The proportion of water required to packing material is as 1 to 1, when the latter is of a dry or sandy character, but when loamy or containing clay it must be increased to nearly 2 to 1. With the available water supply, from 60 to 70 cu. m. of packing may be introduced per hour, at which rate a chamber containing about 450 tons of coal might be completely filled in about six working days.

*Oesterreichische Zeitschrift für Berg-und Hüttenwesen. Abstracted for the Institution of Civil Engineers.

THE MINERAL PRODUCTION OF INDIA.

The following statement of the mineral output of India in 1902 has been prepared from the official report recently issued by the Director-General of Statistics of that country:

The output of gold, which still continues to be the chief item in the mineral production of India, amounted to 517,639 crude oz., as compared with 532,126 crude oz. in 1901. The product in 1902 was equivalent to 463,242 fine oz., of a value of $9,575,320. As heretofore, nearly all the gold was mined in the Kolar district of Mysore, the mines in Nizam's Territory producing a very small quantity. Some gold is washed each year from the river sands of northern India, but it is difficult to estimate the amount. Arrangements have been made recently to re-open the old mines of the Dharwar district and the Sangli State of the Bombay Presidency.

The output of coal was 7,424,480 long tons, against 6,635,727 tons in 1901. The principal mines are situated in Bengal, and the product is consumed mostly by the railways, river steamers, and the mills and factories. The output is insufficient to meet the requirements of the country, and a considerable quantity is imported each year from England and Japan.

There was an important increase in the production of petroleum, which amounted to 56,607,688 gal., against 50,075,117 gal. in 1901. Although the industry has expanded very rapidly in recent years, it is still unable to supply fully the domestic markets, and in 1902 about 81,000,000 gal. of petroleum were imported from the United States and Russia.

The production of salt in 1902 was 1,099,391 long tons, showing a slight falling off from the total of the previous year. Among the other important mineral products are saltpeter, which is produced in Bihar; iron ore, in the Raniganj district of Bengal; graphite, in the State of Travancore; manganese, in the Central Provinces; and mica, in Bengal. The output of these minerals in 1902 was as follows: Saltpeter, 11,130 long tons; iron ore, 80,869 tons; graphite, 4,575 tons; manganese ore, 177,780 tons; and mica, 1,021 tons.

A NEW USE FOR CEMENT.—Marbled slabs of colored cement, for use as table-tops, are made by pouring the tinted cement in proper proportions on plates of highly polished mirror-glass, then stirring the paste. When hardened, it is removed from the glass. The pieces thus obtained have a polished surface that can be improved upon by brushing with a diluted solution of potassium silicate.

BLASTING WITH LIQUID AIR.—The London *Iron and Coal Trades Review* says: "Experiments are at present being carried out at South Hetton Colliery, Durham, under the direction of Mr. W. O. Wood, chief agent to the South Hetton Coal Company, president of the North of England Institute of Mining Engineers, and joint patentee of the process, with the object of obtaining a safe and practical substitute for blasting in coal and other mines in which gas is found. The means employed is liquid air, and the experiments are, so far, satisfactory."

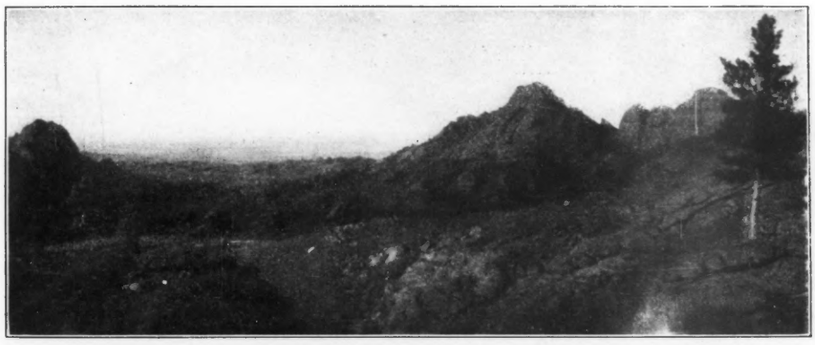
MINING IN THE KIRGHIZ STEPPES.

BY E. NELSON FELL.

(*Continued from page 733.*)

It was my good fortune to be called upon to make a professional examination of the Yuspensski mine, and as this mine has produced nine-tenths of all the copper of the steppes, and is the only mine which has been seriously developed, a brief outline of the deposit and of the methods employed will prove interesting.

The deposit occurs on the contact of slate and an acid igneous rock, and apparently consisted, on the surface, of an extensive network of veins, whose outcrops covered a large area, containing carbonates (malachite and azurite), cuprite and native copper, the whole being very rich in copper. So extensive are the carbonate outcrops that after having been worked for 40 years they show no signs of exhaustion. On the contrary, 800 tons of sorted and sifted carbonates are being produced this year at a cost of 70c. per long ton, and assaying 10.8 per cent copper. These outcrops were worked in a large open-cut to a depth of 150 ft. The cut is now about 150 ft. in diameter across the top, and, having caved considerably, about 60 ft. deep. Fine ore is still visible at the ends and at the side of this cut. Below the bottom of the cut the vein has become more defined and concentrated, and has been worked by vertical shafts, which are sunk outside of the ore-body and connected with each other by drifts in the slate wall. This drift is connected with the ore-body by cross-cuts. Development is never carried on ahead of the workings, and the result is that the mine comes to periodical standstills. At the present time the deepest level is at 257 ft., and as the ore will soon be exhausted to this point, another standstill is in sight. The ore has been worked down to the level in four shoots:



GRANITE MOUNTAIN AT BAJAN-AOOL.

The first shoot has a length of 101 ft. and an average breadth of 17.06 ft. and an average wet assay value of 15.5 per cent.

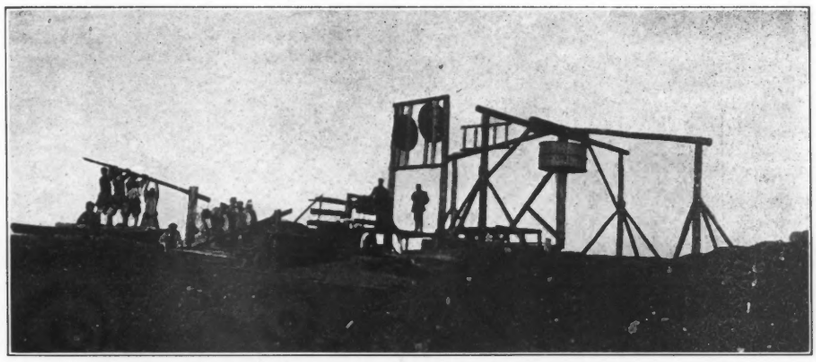
The second shoot has a length of 61 ft. and an average breadth of 21.4 ft. and an average wet assay value of 8.85 per cent.

The third shoot cannot, by reason of old timbering, be accurately measured, but the grade of the ore appears to be higher than either of the preceding cases.

The fourth shoot has an area of 2,005 sq. ft. and an average wet assay value of 22.5 per cent.

These figures are eloquent, but the dimensions given do not, by any means, indicate the extent of the ore-body; for no exploration is carried on outside the stope-areas, and these are always discontinued when the ore-body is less than 6 ft. wide and 10 per cent in value.

Between the bottom of the big cut and the 257-ft. level the ore consists of a gangue of mixed quartz and barite, heavily impregnated with bornite, and not infrequently with copper glance and gray copper. The vein is practically vertical, and lies between a well-defined wall on the slate side and an indistinct wall on the igneous rock side. The slate is heavy when opened, and as the timbering is poor, all the levels are in bad condition. Of the shafts now open, one is 11 by 9 ft., with two hoisting compartments and one ladder-way; the other is 11 by 11 ft., with hoisting compartments, one ladder and one pumping compartment. Pumping is carried on by a single-acting engine with cylinder 20 by 40 in., making 50 to 60 strokes per minute with steam at about 35 lb. This is geared to a separate shaft connected with a series of wooden rods, which raise the water in nine lifts. Under these conditions, the water discharge is about 35 gal. per minute. The water is very destructive to iron work.



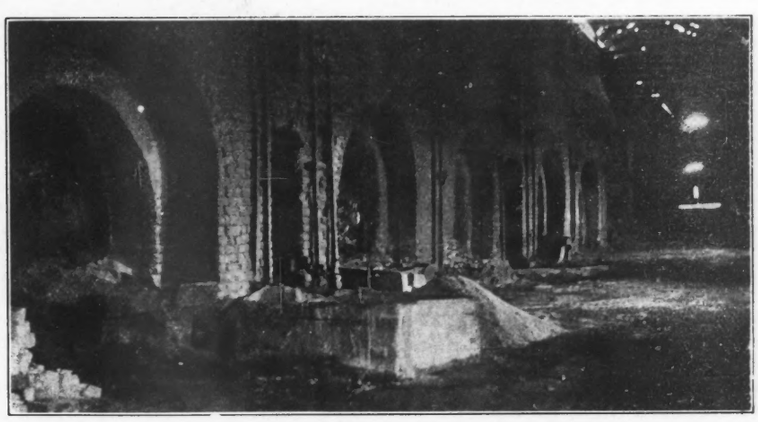
HORSE-WHIM AND PUMPS, DJUNOS-KHOSEE MINE.

Hoisting is carried on by a whim of the old-fashioned kind, to which two horses are harnessed. This operates two wooden buckets with a hemp rope, each bucket having a capacity of about 1,000 lb. At the mouth of the shaft the sheaves are not more than 10 ft. above the collar of the shaft, and there are no conveniences for dumping or facilities of any kind for handling the ore. The buckets are upset on the ground; the ore is shoveled into barrows, wheeled out of the shaft-house, and scattered on the snow. In the mine the stoping may be described as overhand. Massive cribbings, with floors every 7 ft., are built up as staging for the miners, and the ore is dragged and carried and thrown down until it reached the bottom. Here it is shoveled into wheelbarrows and taken to the shaft, again upset, and shoveled into the buckets in the shaft. Fortunately, labor is cheap, but the whole process is slow, expensive and wasteful in the extreme.

Timbering is not understood. The crib system for the stopes, as described above, affords no security for the walls, which are fortunately strong; but the consumption of timber is enormous and costs no less than $1.25 per ton of ore mined. In the levels the timbering is also very bad, and gives way directly it takes any weight; and the art of keeping a level open when renewing timber is not understood. The result is that with every renewal the level grows beautifully smaller and smaller. The 257-ft. level is now useless for working purposes, and is barely passable.

In breaking ground, no attention is paid to the principles involved, nor any supervision exercised over the drillers, who drill by contract at so much per inch. The vein-matter is found in streaks of exceedingly hard ore and soft barite, and the men are allowed to select the places for drilling. The result is that after a round of holes has been fired the drillers can be seen wandering round the stopes hunting the soft spots, and frequently three or four of them can be seen drilling in one small bunch of barite, like flies upon a lump of sugar. I myself counted nine holes drilled in a bunch of barite, within a circle of 4 ft. diameter.

From the moment the ore is broken, the process of waste begins, and from this time until the copper bar is produced, the path of the ore can be traced by a purple trail of bornite which can be seen for miles away.



CUPOLA FURNACES AT SPASSKI WORKS.

There is practically no outlay on permanent work; no bins, no shaft-houses worthy of the name, no headworks, practically no machinery, and a minimum of buildings. The tools employed are very crude, and one almost feels tempted to admire the ability of the

workmen, that they can accomplish anything at all with such implements. Their hammers, drills, picks, shovels, and especially their blacksmith tools, are very bad. The smith work is not good, nor, apparently, is it considered to be of much importance; for on one occasion, when the smith was absent from the mine for a week, work went on in his absence without any comment.

The transport of the ore to the works, 70 miles distant, which are known as the Spasski works, is carried on at a cost of $2.25 per ton of 2,240 lb. in small one-horse wooden wagons with wooden axles. In winter, runners are substituted for the wheels. In order to understand how this is done for so low a rate, it is necessary to make a survey of the economic conditions which prevail. The waste of ore from the mine to the works is very heavy, and, being avoidable, is to be condemned.

OPEN CUT AT DJAM-BHOULDI MINE.

The two following analyses are fairly representative of the character of the ore:

Cu	15.4 per cent.	11.2 per cent.
S	7.8 " "	6.0 " "
Fe	4.9 " "	4.2 " "
CaO	.8 " "	1.1 " "
Al_2O_3	4.0 " "	3.9 " "
SiO_2	56.9 " "	59.4 " "
$BaSO_4$	7.7 " "	11.6 " "
	97.5 per cent.	97.4 per cent.

Small quantities of arsenic and antimony are to be found in ores of this class, but I have not yet estimated the percentages. Out of many samples assayed for the precious metals, the average of the silver was about 5 oz. per long ton, and of the gold, though it was always present, there was never a weighable quantity.

On arrival at the works the ore is roasted in heaps containing about 80 tons each, fired with coal. This process requires 18 or 20 days. This operation is conducted on the top of a hill, exposed to the full force of the furious winds which commonly prevail, and without any shelter. The waste here is excessive. The roasting is uneven and usually too high. Large quantities of copper are formed during this operation. Smelting is carried on in six rectangular brick cupola furnaces, 3 by 7 ft. and 7 ft. high, and these furnaces seem capable of handling about 2.5 tons each of ore daily, when working to their full capacity. Slag and matte are tapped together from the cupola, and separation takes place in the fore-hearth, which is stationary and very small. Every six hours the fore-hearth is tapped by a hole in the side and the matte (which is a mixture of matte, copper and iron) is run out on the sandy floor. As there are always pools of water on this floor, this results in a series of alarming explosions, which scatter the matte on every side. About one-half of the matte is removed by tapping, and the rest is allowed to cool and is dug out by hand. In the meantime most of the slag is being fed back into the furnace, and it performs this dreary round many times before it is finally rejected. Under the practice of previous years, the slags ran about 3 per cent, perhaps more. I have not made an especial test of recent slags. The fuel used is the Karagandi coal, from the mine of the same owners, and the flux used is principally limestone, with occasionally a little iron ore. At the present time the charge is as follows for the six furnaces for 24 hours:

	Poods.
High-grade roasted ore	900
Limestone (hand-cobbed)	900
Old slag and other fluxes	450
	2,250
For every 1.2 poods of this charge is added coal, or	1,875
Total	4,125

(63 poods equal one long ton.)

That is to say, that, in order to smelt 15 tons of ore a day, 54 tons of fluxes and fuel are required. To do this work there are about 500 men, women and children employed. There is not an assayer at the works or at the mine, and the assayer's work is considered a useless expense. The heterogeneous product of the cupola is fed into a reverberatory and brought to black copper, and finally poled and brought to pitch in a third furnace. This last operation is performed with care, and an excellent product is obtained in good-looking bars. The copper runs about 99.5 fine, with about $20 worth of the precious metals in it. It is sold direct, with the stamp of the Spasski works upon it, and commands a high price in the Russian market.

The copper producers in Russia are protected by a duty of 3 roubles 75 copecks per pood, which is equal to about $125 per long ton. This duty, under the new schedule, has been raised to 5 roubles per pood, or about $165 per long ton. The copper production of Russia for last year was about 9,500 tons and the consumption about double. The price of copper in Russia is, therefore, higher than the price abroad, by the amount of duty, and likely to remain so for a long time, as the increase of production hardly keeps pace with the increase of consumption.

As to facilities of working here, they are very great, with the single exception of skilled labor and supervision, which must be imported. Although this country is in a remote part of the world, which has not yet been opened up to modern enterprise, it possesses an ancient civilization of its own, born many centuries ago, when prices were low. Money has not yet come into the country, and its purchasing power is still very great. There is a complete organization for the transport of goods over vast distances at extraordinarily low prices, and a large supply of horses and camels for that purpose. As an instance of freight charges, I may cite the cost of carrying the copper from the Spasski works to Petropavlovsk, a station on the Siberian railway, a 500-mile haul. This charge is $15 per long ton, or 66c. per 100 lb., or 3c. per ton-mile. The price of all the staples of life is exceedingly low, and the duty, which is charged on mining machinery when it enters the country, is refunded when it is erected. Large timber cannot be had, but timber excellently suited for square-setting and other mining purposes can be had at reasonable prices.

The Kirghiz form a fine material from which an admirable class of unskilled and partially skilled labor could be quickly built up. They are intelligent, anxious to learn, careful and painstaking. They form as fine a body of what may be called 'native labor' as can be found in any country in the world, with the very great advantage that, with them, there is no race question involved. They are accorded the same privileges as the Russians, although their habits and their religion of Mohammedanism keep them apart socially. They do not touch alcohol, and like to work 365 days in the year. The following are the rates of wages current for the different classes of work:

OPEN CUT AT YUSPENSSKI MINE.

Machinists,	per	month	$25	to	$35
Foremen	"	"	20	"	25
Licensed do.	"	"	30	"	50
Storekeepers	"	"	15	"	25
Clerks	"	"	15	"	20
Carpenters,	per	day	0.35	"	0.60
Blacksmiths	"	"	0.35	"	0.60
Masons	"	"	0.45	"	0.60
Laborers	"	"	0.20	"	0.25

He would be a very exacting man who would demand a high standard of efficiency for the above rates of pay, and it is a matter of constant surprise to me to see what good work the men do with their wretched tools and without any opportunity for learning.

The government is pursuing an enlightened policy in encouraging the development of the mineral resources of the country. It is true that the administrative supervision is closer than that to which Americans are accustomed in their own country, but in many respects good results follow, and, in any case, the regulations cannot be considered anything more than, at times, irksome. There are numerous precautions taken as to the use of dynamite and poisonous materials, and the law requires that a duly qualified man shall be in charge of all operations. As an examination to qualify is necessary, and as the examination is in the Russian language, this rule precludes most English-speaking engineers or foremen. The necessary qualified men can, however, always be secured, and they can, of course, work under the direction of a foreign engineer. In my opinion, it can only be said that the costs of working are increased by these regulations by an inappreciable fraction.

HORSE-WHIM AT VLADIMIR SHAFT, YUSPENSSKI MINE.

The laws for taking up claims in the steppes are framed in a very liberal manner for the prospector, and no limit is placed upon the number of claims which an individual may hold. Each claim may be a square, with sides 2 versts long, or about 7,500 ft. After making the location, the prospector has five years during which he may make his explorations. For the first two years he is not required to make any payment, and for the last three years he must pay $15 per year for each claim. During this period the law specifies that the claim must not be idle for 12 consecutive months, but the amount of work is not specified, and very little is required. At the end of five years the claim must be surveyed and declared to be a 'mine.' The government engineer declares how much ore or coal must be extracted from the mine every year (commencing two years from the examination), and the scale of payment to the government is based on the quantity of obligatory work. An average requirement is perhaps 150 tons of ore and a payment of $35, both annually. If the ore is not taken out as required, and if the engineer is not satisfied with the reasons which are given for the default, the claim reverts to the government. In some respects the regulations are not good, as it allows one man to monopolize an enormous extent of country as claims, and when they are finally declared mines, a permanent title is not given. At the present time, in practice, the government, so far from wishing to enforce strict regulations upon mine and claim-owners, is doing everything in its power to make their road as smooth as possible for them, and no reasonable request is refused. The legal question of foreign ownership is too lengthy to be discussed here.

This district has received flying visits from both English and American engineers, and they have frequently been depressed by the number of disused shafts and idle smelters. After a protracted stay here, and with unusual opportunities for a close examination of the mining conditions, my feeling is one of confidence in the future of this region, and my belief is that it will play an important part in the production of copper, and perhaps other metals.

A LAKE SUPERIOR EXHIBIT AT ST. LOUIS.—It is understood that the Oliver Iron Mining Company and the Cleveland-Cliffs Iron Company are preparing to make very interesting exhibits at St. Louis next year. The Cleveland-Cliffs will include models, showing some of the company's mines on the Menominee range, and also a model of the Pioneer furnace plant at Marquette, with its charcoal plant and by-product works. The Oliver Company will have models illustrating one or perhaps two of its old-range mines, an open-pit mine on the Mesabi, and the Duluth ore-dock system.

GERMAN IRON PRODUCTION.—The output of the German blast furnaces in September, as reported to the German Iron & Steel Union, was 848,889 metric tons of pig iron, being 26,980 tons less than in August, but 130,187 tons more than in September, 1902. For the nine months ending September 30 the total was as follows:

	Tons.	Per cent.
Foundry iron	1,340,461	17.8
Forge iron	656,640	8.7
Steel pig and spiegel	554,203	7.4
Bessemer pig	324,028	4.3
Thomas (basic) pig	4,649,261	61.8
Total	7,524,593	100.0

The total for the corresponding period in 1902 was 6,175,235 tons, showing an increase of 1,349.358 tons, or 21.9 per cent, this year.

DRY-CRUSHING AND ROASTING AT KALGOORLIE.*

BY W. E. SIMPSON.

The discovery of the various tellurides of gold on the Kalgoorlie gold-field entailed a large amount of metallurgical activity and experimental research, resulting in the devising of many different processes for the extraction of the precious metal.

Ordinary battery treatment, with subsequent concentration and cyanidation of both tailings and slimes, gave poor and unremunerative results. The tellurides floured badly, escaped concentration, floated over into the slimes, and, being practically insoluble in plain cyanide, passed out with the residues. Ordinary cyanide, the worker of such wonders on other gold-fields, had reluctantly to be voted an unqualified failure on these refractory ores.

Smelting was certainly a success so far as the extraction of the gold was concerned, but the cost was so great that only ores of very high assay value could repay it.

Chlorination was out of the question, for analyses of the ores showed the presence, in some cases, of as much as 20 per cent of carbonate and sulphate of lime. Cyaniding was then tried; the ore was roasted and allowed to cool, and charged into vats. A solution of cyanide was pumped into the vats and allowed to percolate through the roasted material. The originators of this style of treatment had quite overlooked the fact that the sulphate of lime present in the ore, as well as that formed in the furnace by the action of burning sulphur on the carbonate of lime, would become converted into plaster of paris. When moistened in the vats, this set hard, became impervious to the solution, resisted further percolation, and, after perhaps a month's treatment, yielded less than half its gold. Another objection, too, was that the residues had practically to be quarried out of the vats, a process which nearly always required the aid of a little dynamite.

Many other examples can be quoted of processes which sprang up like mushrooms, only to again sink into oblivion, and at the present time there only remain two which have survived, viz.: the Diehl process and the dry or all-roasting process. The former was fully described by Mr. Knutzen in July, 1902.[1] The latter, which is equally efficient, begins with dry-crushing, followed in succession by roasting, sliming in amalgamators, agitation with plain cyanide and filter-pressing. Precipitation on zinc shavings is common to both processes.

The first all-roasting plant to give really satisfactory results on a large scale was that of the Boulder Main Reef, and it speaks highly for the process that, although slight improvements have been introduced from time to time in some of the minor details, the main principles have been but slightly altered.

The ore mined and treated varies considerably in chemical composition, being very calcareous from the surface down to the 600-ft. level and becoming more silicious as depth is attained. Analyses show the amount of each constituent to range within the following limits:

Silica	40	to	60	per	cent,
Alumina	13	"	16	"	"
Ferric sulphide	6	"	10	"	"
Ferric oxide	7	"	10	"	"
Carbonate of lime	15	"	20	"	"
Magnesia	4	"	7	"	"

with traces of copper, lead, zinc, arsenic, etc.

There is practically no free gold, all being combined with tellurium.

Crushing and Milling.—The ore, as it comes from the mine, is dumped onto a grizzly, the bars of which are set 2 in. apart. The smalls pass through, leaving

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*Abstract from paper entitled 'Treatment of Telluride Ores by Dry-Crushing and Roasting at Kalgoorlie, Western Australia,' by W. Evan Simpson. Institution of Mining and Metallurgy, October, 1903.

[1]*Transactions* Institution of Mining & Metallurgy, Vol. XI. Also in this JOURNAL, under date of August 1, 1903; 'Treatment of Sulpho-Telluride Ores at Kalgoorlie,' by W. A. Prichard and H. C. Hoover; and in our issue of September 5, 1903, 'Roasting and Filter-Press Treatment at Kalgoorlie,' by J. T. Marriner.

the blocks to be roughly spalled by hand and crushed by the Gates rock-breaker. The crushed stuff falls into a 100-ton bin, from which it is fed, by means of a Challenge ore-feeder and a Robins belt-conveyor, to the ball-mills; these deliver it by a bucket elevator and screw-conveyor to one or two small bins over the roasters. The mills are not now fully employed, as the shaft furnace, the original roaster, has been discarded, and only sufficient ore is milled to supply the three Edwards furnaces.

Roasting.—At the Boulder Main Reef mine the ore is conveyed from the mills to one of two small storage bins, which supply the three Edwards furnaces, each treating on an average 18 to 20 tons per day.

The raw ore of the Boulder Main Reef contains about 3.5 per cent sulphur as sulphide, and the roasted product from a mere trace to about 0.04 per cent.

The success of the 'dry process' depends very largely on the sweetness of the roast, and the presence of more than 0.05 per cent of free sulphide begins to tell very seriously upon the extraction. Sulphides are generally supposed to interfere with, or rather prevent, the solution of the precious metal; but it seems more likely that the apparently poor extraction is due to the subsequent precipitation of the gold by the sulphide in the pulp. At any rate, it is always found that, in the residues from a foul roast, nearly all the valuable part is contained in the fines; if residues assaying, say, 7 or 8 dwt. are sifted, the coarse particles retained on a 200 sieve will often contain only from 2 to 3 dwt. of fine gold per ton.

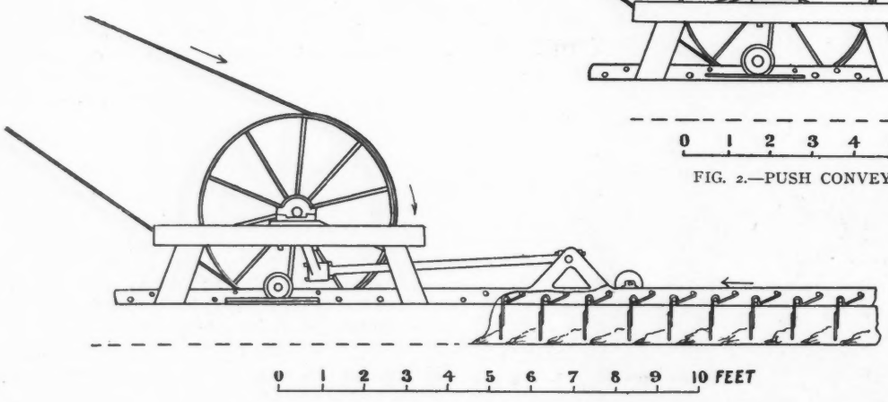


FIG. 1.—PUSH CONVEYOR, FORWARD STROKE.

The roasted ore is discharged from the furnace through a small orifice in the side and falls into a 'push-conveyor.'

This consists of a semi-circular trough about 60 ft. long, provided with a ladder-like frame, with blades hanging from the rungs, which is made to move horizontally to and fro on rollers. The blades are free to swing in one direction, but are prevented by a stop from swinging further back than the perpendicular. When the ladder is traveling forward, each blade hangs vertically, and pushes a little heap of ore before it for a distance of 20 in., the length of the stroke. (See Fig. 1.)

On the return stroke the blades, being free to swing, slip over the tops of the little heaps, and on the completion of the stroke resume their original vertical position. (See Fig. 2.) A succession of these pushes conveys the hot ore to the end of the trough, and by alternately collecting and then flattening the little heaps, exposes new surfaces to the oxidizing atmosphere and so improves the quality of the roast.

This conveyor has now superseded all others on this field. Its action is extremely simple, it costs nothing for repairs, and the power required to drive it is practically negligible.

From the conveyor the ore falls into a rapidly flowing stream of weak cyanide solution, and the dry part of the process is at an end. The pulp thus formed is elevated by a tailings wheel to the spitzkasten, where it is separated into sands and slimes. The sands, together with any free gold, go to the grinding-pans and the slimes direct to the agitators. The grinding-pans are of the Wheeler type, six in number, and each 5 ft. in diameter, and all of them were required when the plant was running to its full capacity of 2,000 tons per month.

The charge of quicksilver is 10 lb. per pan every 10 days, and the loss of mercury is 0.2 to 0.3 oz. per ton of ore treated, or 25 to 30 lb. per month. Each pan is cleaned up once a fortnight.

Grinding and Amalgamating.—The free gold becomes amalgamated in the pans and the sand is reduced to a slime. The pulp then goes to another set of spitzkastens, and any coarse sand still remaining is separated out and returned for re-grinding in the pans, the slimes passing on to the agitators. It will thus be seen that every particle of ore is eventually reduced to a fine slime.

Each pan makes 60 revolutions per minute and requires nearly 7 h. p. to drive it.

Agitation and Filter-Pressing.—Every particle of the ore is eventually reduced to slime and sent to the agitator vats. Of these there are four, each 20 ft. in diameter and 7 ft. deep, and fitted with mechanical stirrers making eight revolutions per minute. It is here that the pulp is tested and the solutions brought up to working strength—0.04 per cent—by the addition of solid cyanide. The solutions are always found to be strongly alkaline from the lime present in the wasted ore, and the addition of alkali is superfluous.

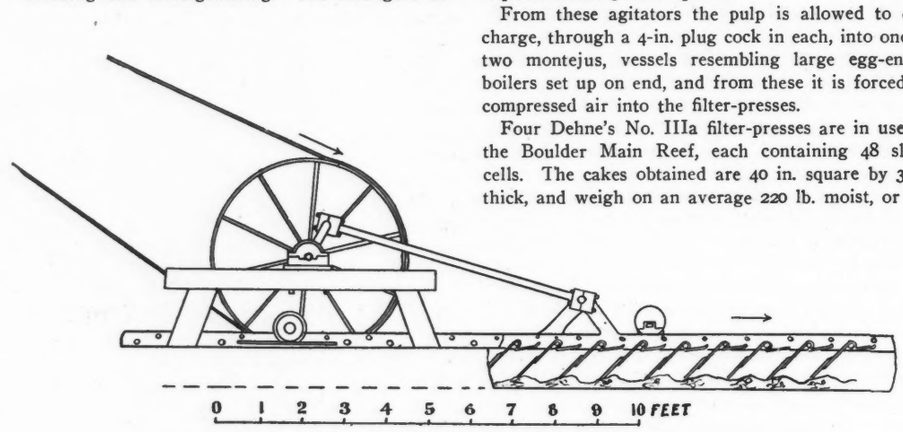


FIG. 2.—PUSH CONVEYOR, BACKWARD STROKE.

Seven hours are usually occupied in filling a vat, then ten in continuous agitation, after which the pulp is ready for filter-pressing. The fact that the solutions are always hot, ranging in temperature from about 120° F. when entering the tailings wheel to 80° when leaving the agitators, may have something to do with the rapidity of the extraction.

Each vat holds 20 to 25 tons of dry slime mixed with 40 to 50 tons of solution, and for agitation requires about 3 horse power.

From these agitators the pulp is allowed to discharge, through a 4-in. plug cock in each, into one of two montejus, vessels resembling large egg-ended boilers set up on end, and from these it is forced by compressed air into the filter-presses.

Four Dehne's No. IIIa filter-presses are in use on the Boulder Main Reef, each containing 48 slime cells. The cakes obtained are 40 in. square by 3 in. thick, and weigh on an average 220 lb. moist, or 182 lb. dry, so the complete press contains 3 tons 18 cwt. of dry slime.

Each of the presses is filled and discharged twice per shift of eight hours.

The rich solution resulting from the filtration of the pulp is forced by a plunger pump through a small clarifying press, and passes on to the precipitation boxes. The cakes or residues are washed, first with spent solution, under a 40-lb. pressure for an hour, then with water, and are finally dried by blowing compressed air through them for a few minutes.

The press is now opened and cleaned out, and the residues are trucked to the dump. The moisture still left in the cakes varies from 18 per cent to 24 per cent, and appears to be in a state of chemical combination, as no amount of mechanical effort can appreciably reduce its quantity. A considerable degree of heat is required to expel it completely.

The pulp from roasted ore is passed through a filter-press with more difficulty than that from raw slime, as the action of the hot saline solutions soon hardens the filter-cloths, and makes them less porous, consequently the presses take longer to fill. For the same reason the washing with water is less effective, and the amount of air consumed in drying is slightly greater. The roasted ore, however, is finely granular, and consequently is exceedingly porous; the washing of cakes a foot thick presents no greater difficulty than is now experienced with those only 3

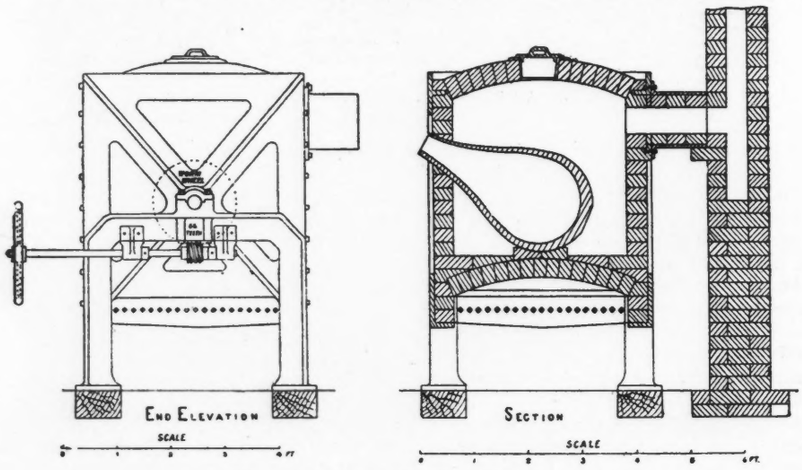


FIG. 3.—TILTING RETORT FURNACE.

inches. But the great drawback is that a 12-in. cake will weigh nearly 8 cwt., and this is far more than a couple of press-men can handle efficiently.

Up till quite recently montejus alone were used for charging the filter-presses. They are convenient, as the compressed air is easily regulated, and gives a steady pressure, free from all jar or percussion, on the presses, and thus does not cause leaks; but compressed air is expensive. Triplex pumps are now being installed at many of the mines. They are much cheaper in operation, but have some disadvantages. The weak point is the packing round the plungers, which appears to be unable to stand the highest working-pressure, 120 lb. per sq. in., and is constantly blowing out. The slime also works up about the glands, and the plungers become so much scored that they will probably have to be replaced frequently.

An internal jet of cyanide solution might be used with advantage, but its introduction would always mean so much dilution of the pulp.

Pumps also cause jars in the presses, which lead to leaks; and an even greater apparent disadvantage of pumps is the liability of obtaining a diminished extraction of gold, owing to the lack of efficient aeration of the press charges.

It must be remembered that as the operation of charging proceeds the press becomes filled, the filtering area diminished, and consequently the capacity for receiving pulp is gradually lessened. It is therefore necessary that the rate of delivery to the press should be correspondingly reduced; in other words, the speed of the pump must be gradually reduced. The best pump would appear to be one driven by an electromotor, regulated by a switch which would automatically reduce the speed as the press filled and as the pressure on the plungers increased.

On the Boulder Main Reef, the air from the montejus which has just charged a press is exhausted into its pulp-filled neighbor, thereby making it unnecessary to use the compressor except for the end of the charging process.

The residues are discharged from the presses through chutes into trucks underneath, and these are drawn out to the dump by horses; but the tendency is to supersede the truck as far as possible by the Robins belt-conveyor, and the horse by the electromotor.

There seems to be a splendid opening for a filter-press which could be discharged by some simple mechanical means; for instance, it might be possible to sluice out the cakes with water, and run the resultant pulp into reservoirs.

This would reduce the labor cost to a minimum, diminish the wear and tear by rendering it unnecessary to be opening and closing the presses continually, save the filter cloth, dispense with the use of compressed air for drying, set free the obligation of limiting the thickness of the cakes to sizes which can be easily handled, and probably bring down the cost of filter-pressing to one-half of what it is to-day.

The clean-up is performed in the usual way, viz., treatment of the precipitate with sulphuric acid, filter-pressing, drying the bullion slimes and smelting with borax or other flux.

On the Boulder Main Reef the gold from the amalgamation and that obtained by cyaniding are melted together, and an analysis of the bullion obtained on June 3, 1903, was as follows:

Gold	71.73	per cent.
Silver	25.65	" "
Copper	00.91	" "
Iron	00.82	" "
Zinc	00.89	" "

On all the larger plants the Fabur du Faur, or tilting furnace, is in general use for melting gold, and it certainly seems strange that in spite of its superiority to the Cornish furnace and to the reverberatory furnace, it has not yet made its appearance in South Africa. Its construction is extremely simple (Fig. 3); it is merely a cast-iron box lined with fire-brick, and mounted on a pair of trunnions like the Bessemer converter. The crucible, or retort, as it is called, is bricked in with the lining, and rests on a fire-brick arch a few inches above the fire-bars. When the charge has to be poured in, the whole furnace is tilted over by means of an endless screw and worm-wheel, and the molten metal is discharged into moulds or other convenient receptacles.

With this furnace 10,000 oz. of bullion slime from a clean-up of a cyanide plant can be melted in from 12 to 16 hours. The crucible itself will last for two runs, and costs in Kalgoorlie $57.60.

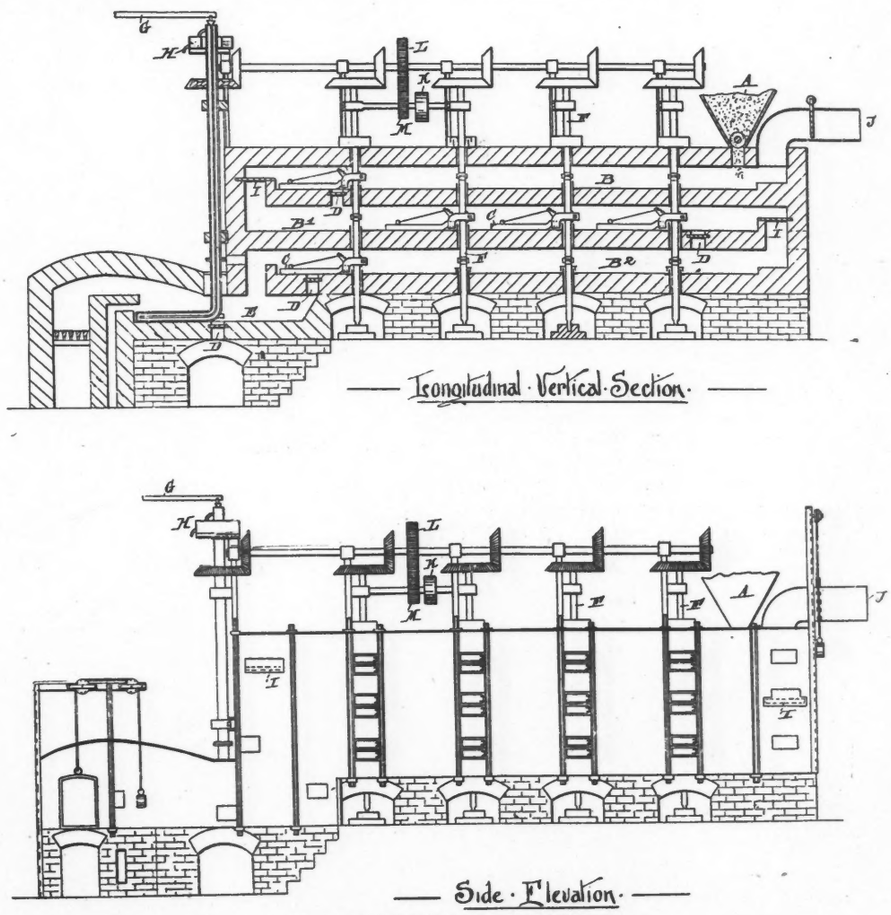
The advantages of this contrivance are numerous; its capacity is great, the crucible remains undisturbed and embedded in the hot fuel during the whole of the melting; no heat is lost in pouring; the crucible mouth is outside the furnace away from the fierce draft, and therefore no fine bullion-dust can be drawn into the flues and the loss by volatilization is at a minimum. These are all matters of great importance, deserving serious consideration.

MERTON'S CALCINING FURNACE.

By F. Danvers Power.

This furnace was designed by Mr. T. D. Merton, of Melbourne, Victoria. It consists chiefly of three hearths, one directly above the other and a finishing hearth at one end of, but a step lower than, the lower one. The rabbling is done mechanically. Four vertical shafts pass through the three main hearths, 4 ft. 3 in. apart from center to center. These shafts revolve on step-bearings, situated in chambers below the lowest hearth, where they are protected from the heat of the furnace, so that they require no special cooling device. Mr. Merton has had a set of these shafts in use for a period of 12 years. Each shaft is set in motion by a worm and worm-wheel, or by spur-and-pinion wheels, and is made to revolve 1½ to 2, or, for quick roasts, even as many as 3 times per minute. An arm is attached to each shaft for each hearth, which projects out 2 ft. 6 in. from the center of the shaft arms on the same shaft, but in adjacent hearths are placed at right angles to each other, but three of the rabbles in the same hearth are made to point in the same direction, while the fourth, or end, rabble is at right angles to them. The rabbles vary in construction according to the nature of the ore; sometimes they are plough-shaped, the ploughs being made at different angles and bevels, and arranged so that they can slide on carriers; sometimes they are the cut-under type. The different kinds of rabbles can be readily interchanged as desired. The finishing hearth has a special rabbler to itself which is larger than those working on the other hearths; it may be water-cooled, as shown in the accompanying drawing, but this is often dispensed with.

The whole furnace is encased in ¼-in. plates, well braced with buckstaves and tie rods. The total length of the furnace over iron-work is 32 ft. 6 in. The main body of the furnace measures 23 ft. 9 in. long inside the plates, 8 ft. wide, and the height of the three hearths is 6 ft. The hearths are horizontal, being given no fall whatever. The height from the bed to the roof in the center is 1 ft. 4½ in., and at the sides 9 in.; the thickness of the crown of the arch is 4½ in. Each of the main hearths has four doors on either side, the doors being situated opposite the shafts; the finishing hearth has a door on one side only. The fire box is of the usual type, and is fed from one side.



THE MERTON ROASTING FURNACE.

The ore is fed in at the coolest end of the upper hearth, and is soon spread out level by the rabbles. Though these rabbles have a circular path, and consequently one might expect to find certain dead corners, in practice it is found that the ore untouched by the rabbles is constantly displaced and moved on by the weight of the ore carried forward by each revolution of the rabbles. The ore is discharged by the fourth rabble on each hearth, through a slide drop-hole near the shafting. This class of furnace enables ore to be calcined in stages, without any fear of one stage being mixed with the next, as in a furnace with a continuous hearth. The heat can be so regulated on each hearth, by means of dampers, that

if there is any chance of the upper hearth being too hot, the heated air can be drawn off before it gets so far.

It is claimed that this furnace is compact, simple and so constructed as to be able to take full advantage of all the sulphur in the ore for heating purposes, and that there is a very slight loss of heat through radiation, thus reducing the amount of fuel required.

That this furnace gives satisfaction is demonstrated by the fact that at the Associated Gold Mines, Kalgoorlie, the Ropp straight-line furnaces are being dismantled and replaced by twelve of Merton's furnaces. At the South Kalgoorlie the Brown horseshoe furnaces are to be replaced by six Mertons. Merton's furnaces have also been or are being erected at the Northern Associated, Oroya Brown Hill, Great Fingal mine, etc.

The cost of the ironwork for this furnace, which weighs about 12 tons, is £530, f. o. b. Melbourne, which includes the royalty. A self-feeder, if required, costs £25 extra. The brickwork needed is 10,000 ordinary brick and 3,000 fire-brick. The cost of erection naturally varies in different places, but in Melbourne is about £50 for the furnace proper, without flues or stack. Buildings and motive power will, of course, be extra. The horse-power required is from one to two, depending on the class of ore to be treated. The wear and tear does not exceed 1d. per ton of ore treated.

An idea of the capacity of the furnace for different classes of ore may be obtained from the following:

Kalgoorlie sulpho-tellurides, from 18 to 25 tons per day of 24 hours.

Zinc ore, assaying 33 per cent zinc, 20 per cent sulphur and 19 per cent lead, in which the sulphur is reduced to 1.5 per cent, 8 to 10 tons per day.

Iron pyrite, from 6 to 15 tons per day.

Copper sulphide, up to 10 tons per day.

Arsenical pyrite, 5 to 8 tons per day.

Lead sulphide, 8 to 20 tons per day, according to the character of the ore.

The cost of calcining depends very largely on local circumstances, as regards labor, fuel and the number of furnaces employed, as one man can attend to a nest of six furnaces. The nature of the ore also has an influence on the cost, as some require more fuel than others, which will almost burn by themselves when once started, unless a dead roast is required, when, of course, fuel must be used to finish it off. At the Great Boulder, Kalgoorlie, where there are six furnaces, wages are 12s. 6d. ($3) per shift of eight hours, and firewood costs 14s. 6d. ($3.48) per ton. The cost of calcining in the Merton furnaces has been brought down to 2s. 6d. (60c.) per ton of ore.

THE OCCURRENCE OF SILVER AT KONGSBERG.—According to recent investigations of Professor Vogt, the occurrence of silver in the celebrated mines of Kongsberg, Norway, is probably due to secondary alteration, the original ore being argentite. The latter is frequently found accompanying the native metal. The presence of carbonaceous matter suggests that the reduction may have been brought about by gaseous hydrocarbons.

A NEW CHROMIUM-TUNGSTEN COMPOUND.—A double carbide of chromium and tungsten, corresponding to the formula $W_2C.3Cr_3C_2$, recently prepared by H. Moissan, possesses particular interest in view of the important rôle which these metals play in the constitution of tool steels (*Comptes rendus*, August 3, 1903). The carbide can be used in the electric furnace, either by direct reduction of the mixed oxides by carbon, or by heating a mixture of tungsten, chromium, copper and carbon to the boiling point of copper, which is afterward dissolved away with nitric acid. The compound possesses great hardness, scratching topaz and ruby, and is extremely stable toward chemical re-agents. It is dissolved by fused alkalies, but resists the attack of all ordinary acids.

THE PRECIPITATION OF GOLD FROM CYANIDE SOLUTIONS.*

BY W. A. CALDECOTT AND E. H. JOHNSON.

The precipitation of gold from cyanide solutions is a matter which has often been discussed, and a considerable literature already exists upon the subject. At the same time, in spite of its primary importance in that, after the preliminary operation of dissolving, it is precipitation which concentrates the gold from auriferous material in a solid form, many of the reactions involved are still doubtful. Besides the complexity of the subject, this is no doubt due to the fact that the majority of those engaged in the actual conduct of gold precipitation have their energy fully occupied in the daily running of the plant, and that there is little time available for pure research and extensive investigation, from which an immediate and definite profit cannot be guaranteed. It hence follows that any attempt to explain the reactions which occur must be based on the observation by other workers of various isolated facts. The reactions intermediate between observed phenomena can at present only be explained by that hypothetical reasoning which seems most probable until more is actually known. Though not absolute, such tentative conclusions may be of use, as shown, for instance, in the parallel case of the practical recognition of the validity of Elsner's equation, indicating the utility of oxygen in the dissolving of gold long before it was proved to be quantitatively correct by Maclaurin.

One view of gold precipitation based on the ionic theory has been dealt with by Professor von Oettingen in this society and by Professor Christy in America; but although this view, when fully worked out, may prove the more correct, at present its comparative novelty and the complexity of the reactions of double metallic salts such as potassium aurocyanide may render the elaboration of an older and simpler hypothesis of more use to some of us as a working tool for the time being. This latter view, to which we refer, is based on the hypothesis that the precipitation of metallic gold from solution may be conveniently and comprehensively regarded as due in practice to the reducing action of nascent hydrogen, which replaces the gold in solution. We are encouraged to consider an explanation of gold precipitation other than the ionic by the opinion of the eminent authority Bertram Blount, that "the practician . . . can grapple successfully with any problem . . . irrespective of the precise explanation which may be at the moment most agreeable with the teachings of the ionic hypothesis."—('Practical Electro-Chemistry,' 1901.)

In 1892 B. C. Molloy patented a precipitating agent for gold from cyanide solutions in the shape of an amalgam containing an alkaline metal, which he stated to yield nascent hydrogen when in contact with the solution. Louis Janin, Jr., states in an article on the cyanide process, published in Vol. I of the 'Mineral Industry' (1893), that "hydrogen is always evolved when the gold is precipitated" in the zinc-boxes, and W. R. Feldtmann, one of our past presidents, in his pamphlet (1894) on the cyanide process on the Witwatersrand, surmises that "the accelerating influence on precipitation of excess of potassic cyanide is probably due to generation of nascent hydrogen." But earlier than all these references was the recognition by the first workers on the cyanide process of the fact that effective precipitation was always associated with a 'good action,' or vigorous evolution of hydrogen bubbles in the zinc-boxes.

One of the main features in the precipitation of gold from cyanide solutions is that it exists therein in the form of potassium aurocyanide ($KAuCy_2$). In this state the gold does not form the basic portion of the compound, as is usually the case with metals in combination, but is part of the solid radicle $(AuCy_2)'$ which is combined with the potassium as a salt of the hypothetical aurocyanhydric acid ($HAuCy_2$).

*Abstract of paper read before the Chemical and Metallurgical Society of South Africa, Johannesburg, 1903.

This compound is similar to cuprosocyanhydric acid ($H_2Cu_2Cy_4$), and is stated to have been prepared in solution in 1878 by C. G. Lindboom (*La Société Chimique, Tome* XXIX, No. 9) by addition of sulphuric acid to barium aurocyanide ($BaAu_2Cy_4$). The solid radicle $(AuCy_2)'$ is exceedingly stable or difficult to entirely decompose, and its tendency to form comparatively soluble compounds renders it difficult of precipitation. The gold may, however, be replaced by H′ and caused to assume the solid form, or the potassium may be replaced by some other metal such as silver or copper (cuprosum), in which case the gold comes down as an insoluble double metallic cyanide. This latter reaction is, of course, only possible in the absence of free potassium cyanide, in which all cyanides are soluble. In consequence, though equally perfect results can be obtained either way, the former is so far the only method for gold precipitation on a large scale, and the latter, involving the destruction of free cyanide, is at present usually confined in practice to one stage in the 'precipitation method' of assaying cyanide solutions.

One grain of gold per ton of solution is equivalent to one part by weight in fourteen millions. Any method of precipitation which leaves in solution more than one part of gold in ten millions of solution cannot from a working standpoint be considered first class. With 2 dwt. solution this would be about equivalent to 97 per cent efficiency.

The precipitation of gold in cyanide solutions is essentially in practice a process of reduction, just as its solution is conversely a process of oxidation. This is obvious if we compare the equations representing in the simplest form the two reactions:

(a) Solution of gold:

$$4KCy + Au_2 + O' + H_2O = 2KAuCy_2 + 2KOH$$

(b) Precipitation of gold:

$$2KAuCy_2 + 2H' + 2KOH = Au_2 + 4KCy + 2OH_2$$

The nascent hydrogen indicated in the latter equation is one of the most powerful reducers known at ordinary temperatures. It is readily evolved in cyanide solutions, as, for instance, by zinc shavings (MacArthur-Forrest process), zinc dust, sodium amalgam (Molloy's and Zerener's processes), aluminum-mercury couple (Moldenhauer's process), and various zinc couples (such as zinc-lead, zinc-mercury, zinc-copper, zinc-iron, etc.).

The explanation of electrolytic precipitation of gold from the ionic standpoint may be expressed in the following extract from Macmillan's 'Electro-Metallurgy' (1899): "It may be shown that the gold travels with the ion which migrates from cathode to anode and only the potassium migrates from anode to cathode, yet the gold is deposited only to the cathode. This is due to chemical reaction. The ions of such a cyanide ($KAuCy_2$) are apparently K and $AuCy_2$, the K ion giving up its charge at the cathode, but immediately attacking the solution in contact with it and depositing, not hydrogen, but gold from the liquid around, because potassium can break up the complex aurocyanide of potassium that is present.

$$KAuCy_2 + K + H_2O = 2KCy + Au + H_2O$$

"Thus gold is deposited at the cathode, not because ions of free gold exist in the liquid, but because potassium is deposited and exchanges with the gold in some of the complex substance $KAuCy_2$ in contact with the cathode. At the same time gold does not form at the anode, because the ion $AuCy_2$ cannot exist alone in the liquid, but breaks up into cyanogen, Cy, and gold cyanide, AuCy, which re-dissolves in the free potassium cyanide in the solution, re-forming potassium aurocyanide. The free cyanogen is then able, with its negative charge, to allow of the passage of another atom of gold to withdraw its positive charge from the anode and to pass into the ionic condition."

Viewing the equation quoted above from the ordinary chemical standpoint, and assuming the reaction it indicates in this sense as occurring, an intermediate stage may be inserted thus:

$$KAuCy_2 + K + H_2O = KAuCy_2 + H' + KHO$$
$$KAuCy_2 + H' + KHO = 2KCy + Au + H_2O$$

In other words, the intermediate stage corresponds

to the equation (b), previously given as indicating the precipitation of gold by nascent hydrogen. On this hypothesis it appears that the nascent hydrogen produced by electrolysis of the water may also serve to precipitate the gold. In the case of ordinary zinc (really an alloy of zinc with negative elements, such as lead, iron, carbon, etc.) and of zinc couples, water is also decomposed with evolution of nascent hydrogen and deposition of the gold on the less positive element and with liberation of oxygen at the zinc. This primary reaction, if viewed from a thermal standpoint, thus:

$$Zn + OH_2 = ZnO + 2H'$$
$$86.4 - 69.0 = +17.4 \text{ cal.}$$

indicates a strongly exothermic reaction, or, in other words, the hydrogen is liberated owing to the superior affinity zinc has for the oxygen of water; the free potassium cyanide serves to assist the reaction by continually dissolving away the coating of zinc hydrate formed and presenting clean metallic surfaces in contact with the solution. The same reasoning applies with an amalgam containing an alkaline or alkaline earth metal, or with a magnesium or aluminum couple, or with any metal or metallic couple of which the more electro-positive element possesses a stronger affinity for the oxygen in water than does the hydrogen combined with it. The function of the less positive metal in the couple appears to be that of affording a locus, in the shape of innumerable points or roughnesses, for the liberation of hydrogen away from the oxygen simultaneously liberated at the more positive metal. By this separation the reducing action of the hydrogen, possibly in some cases occluded in the less positive metal, is not interfered with. Mr. MacArthur informed one of the writers that the precipitating efficiency of chemically pure zinc is almost *nil*. In a suggestive paper read by Mr. Ehrmann before this society in April, 1897, he quotes some very interesting experimental results with zinc and the zinc-copper couple to show that the precipitating efficiency increases with the volume of hydrogen liberated from the solution in the respective instances.

Even if the view expressed in most text-books of precipitation being caused by the dissolving of the zinc to directly replace gold in solution be taken, it amounts to much the same thing, except that the nascent hydrogen is set free from the water by the potassium liberated by the solution of the zinc instead of by direct decomposition of the water, thus:

$$Zn + (4KCy) + (2H_2O) = K_2ZnCy_4 + (2KOH) + (2H')$$
$$2KAuCy_2 + (2KOH) + (2H') = Au_2 + (4KCy) + (2H_2O)$$

or, eliminating similar compounds (bracketed) on both sides, we obtain the equation usually given:

$$Zn + 2KAuCy_2 = K_2ZnCy_4 + Au_2$$

In all methods of precipitation the liberation of oxygen is a source of trouble; in electrolytic precipitation the anodes constantly waste away, mainly for the same reason as zinc in the MacArthur-Forrest process, and the discovery of a practicable permanent anode is still a subject for research. Besides the waste of material, the formation of the oxidation products in the extractor box interferes with efficient working. In case of zinc, as it wastes away, the oxide formed reacts further with the solution, yielding various products.

In the Siemens-Halske and electrolytic processes generally the energy required for the precipitation of the gold is originally derived from the burning (or oxidizing) of coal in the boiler room, whereas in the case of ordinary zinc or zinc couples it is derived from the oxidation (or burning) of zinc in the solution. Hence in the former case the efficiency of precipitation is not directly dependent upon the strength of the solution, but upon the electric energy applied, whereas in the latter it depends upon the rate of oxidation of the zinc, which increases with the strength of the solution and its cleansing effect already referred to. This cleansing effect may be compared with the dissolving of zinc in sulphuric acid. Speaking of the action of water on zinc, Macmillan says ('Electro-Metallurgy,' p. 349): "The action must stop almost at once, because solid undissolved and insoluble zinc hydroxide $Zn(OH_2)$ would be formed on the surface of the zinc, and so gradually prevent further contact between the water and the zinc. But when an acid, sulphuric acid for example, is substituted for water, the action is different, for zinc sulphate ($ZnSO_4$) is soluble in water."

When comparatively strong cyanide solutions (say 0.07 per cent and upward) are used, the products of oxidation of the zinc dissolve as they are produced, and the efficiency does not decrease. With weak solutions (say 0.01 per cent to 0.03 per cent), however, they do not wholly dissolve, but accumulate in the extractor boxes as a coating on the zinc, thus gradually impairing its efficiency by keeping it from actual contact with the solution until it practically ceases to act. Deposits of finely divided matter from unfiltered turbid solutions act in the same way. The silica found in the zinc-boxes is probably mainly due to mechanical causes, such as dust and slight defects in filtering, but may also be partially derived from the charge, owing to the slight solubility of silica and silicates in the alkaline solution. Sulphate of lime, produced when treating acid tailings or slimes which require much lime, is also liable to crystallize out from the cyanide solution which is saturated with it upon the precipitating agent. The deleterious effect of calcium sulphate in solution upon electrolytic precipitation, owing to its small conductivity, has been investigated by Mr. A. F. Crosse. Among other coatings zinc sulphide can usually be detected, and its formation is apparently due to alkaline sulphocyanides in the solution, which serve as a carrier of sulphur from the ore or the commercial cyanide used to the boxes. The reactions seem analogous to those of gold, being probably due to oxidation first and then reduction, as shown in the following typical equations:

(a) $FeS + 6KCy = K_2S + K_4FeCy_6$
$K_2S + KCy + O' + OH_2 = KSCy + 2KOH$

(b) $KSCy + Zn\ (OH)_2 + 2H' = ZnS + KCy + 2OH_2$

It seems possible that selenium acts similarly to sulphur, as at the Redjang Lebong Mine in Sumatra the zinc-gold slimes as cleaned up from the boxes were found to contain up to 3.4 per cent selenium (*Proceedings* Institution of Mining and Metallurgy, April 23, 1903). The presence of common salt and ammonium salts in solution appears to assist precipitation, owing to their slight solvent effect on the zinc hydrate formed. Caustic alkalies should presumably act in this way also, but in practice they seem to have the opposite effect, and to induce the formation of zinc hydrate to a still greater extent than the alkaline zincate formed serves to remove it. The presence of alkaline carbonate in commercial cyanide serves, when lime is used, to form caustic alkali in the solution, thus:

$$Na_2CO_3 + Ca\ (OH)_2 = CaCO_3 + 2NaOH$$

Mechanical removal of the zinc coatings is effected to some extent by the ordinary practice of washing, and the use of a dilute acid solution for this purpose has also been suggested. A most efficient aid to zinc precipitation would be the discovery of some innocuous solvent for zinc hydrate compatible with cyanide.

Increase of temperature, as shown by Mr. Ehrmann, accelerates precipitation from its natural tendency to promote chemical reactions, with, of course, increased zinc consumption. In the absence of free alkalies and presence of free hydrocyanic acid there does not seem much tendency to form zinc hydrate, thus:

$$Zn + 2HCy + 2KCy = K_2ZnCy_4 + 2H'$$

Apart from undissolved zinc hydrate, the general interaction of zinc, potassium cyanide and caustic alkali may be expressed as follows:

$$Zn_2 + 4KCy + 2\ (x - 1)\ KOH = 4H' + K_2xZnO\ (\times+1) + K_2ZnCy_4 + (x-3)\ H_2O$$

x is a variable quantity, increasing with the dilution of the solution in alkali, and always much greater than indicated in the ordinary formula for potassium zincate, namely, K_2ZnO_2. The relative amount of zinc, as double cyanide and zincate respectively, in the solution leaving the boxes is possibly in proportion to the respective amounts of free potassium cyanide and caustic alkali in solution. Hence on adding additional alkali a certain amount of zinc is transferred from the cyanide combination to the state of zincate and the percentage of free cyanide in solution consequently increased.

It might be expected from the formation of nascent hydrogen in the boxes that all dissolved oxygen in the solution leaving them would be removed, and Mr. A. F. Crosse's analyses show this to be the case.

The great barrier to continuously effective precipitation is lack of *contact* between the precipitating surface and the solution; and owing to the readiness with which this surface becomes coated in various ways, as shown, it is necessary to employ enormous areas to insure good results. A pound of ordinary zinc shavings exposes about forty square feet of surface, and hence every ton of shavings in the boxes is equivalent to nearly two acres. A ton of solution per cubic foot of zinc per twenty-four hours is equivalent to forty-five minutes' contact, and yet so thoroughly may coatings preserve the zinc from actual contact with the solution that even this rate of flow may, with weak solutions, have to be diminished to secure good results. The use of lead salts in all dissolving solutions, besides the effect in assisting solution of the gold, apparently owes its advantage of maintaining lengthy efficiency of precipitation with weak solutions to the fact that deposition of lead on the zinc in the boxes enables fresh uncoated precipitating surfaces to be continually exposed. Similarly with cupriferous solutions, lead prevents the copper depositing as a smooth, coherent metallic coating on the zinc, which otherwise would be thus shut out from contact with the solution. As might be expected on the assumption that the negative element merely forms a site for disengagement of hydrogen, there appears little difference in the efficiency of the freshly prepared metallic couples zinc-lead, zinc-copper, zinc-mercury, etc., and advantages of one over the other depend on other considerations. Thus the zinc-mercury couple is brittle and crumbles in use, while the zinc-copper tends to yield base bullion. A mixture of lead and zinc shavings has a lengthy efficiency, possibly due to the fact that the zinc hydrate formed does not coat the whole couple to the same extent as with the usual lead-coated zinc shavings.

Hydrogen which has assumed the molecular condition and is visible in the liquid as bubbles is useless for precipitation purposes, the available energy for reduction having been degraded by the self-combination of the nascent atoms into molecules. A vigorous evolution of hydrogen bubbles in the precipitation boxes of any process indicates good precipitation merely, since it shows that a corresponding amount of nascent hydrogen, a portion of which performs work, is being generated.

Besides nascent hydrogen, however, one or two other means of precipitating gold are available. As chemical precipitants, $AgNO_3$, which forms the insoluble double gold-silver cyanide $AuAgCy_2$ (Crosse), and copper sulphate, reduced by SO_2 from the acidulated solution, which precipitates the gold as the double aurous-cuprous cyanide $Au_2Cu_2Cy_4$ (De Wilde), are rapidly and perfectly efficient.

It is stated that commercial calcium carbide and also phosphine precipitate gold from cyanide solutions. Any such action is probably due to the decomposition of water by substances with such a strong affinity for oxygen.

Many acids and salts effect partial precipitation of the gold in rich solutions, possibly by partly decomposing the potassic aurocyanide, with formation of the hypothetical $HAuCy_2$, which sets free insoluble AuCy to some extent; thus, for example:

$$HCl + KAuCy_2 = KCl + HAuCy_2$$
$$2\ HAuCy_2 = HAuCy_2 + HCy + AuCy$$

A current of H_2S, generated externally and passed through the acidulated auriferous cyanide solutions, effects some precipitation. Metallic salts, such as $FeCl_3$, $CO(NO_3)_2$, $Pb\ (NO_3)_2$, or $ZnCl_2$, even when

added in excess to gold-bearing cyanide solutions, have little precipitating effect when the original amount of gold in solution does not exceed a couple of dwts. per ton (3.4 mg. per liter). Oxidizing agents, such as excess of $KMnO_4$, K_4FeCy_6 or HNO_3, used with a view of decomposing by oxidation the soluble $KAuCy_2$, are of small efficiency on solutions low in gold, as also are reducing salts such as $FeSO_4$, or $SnCl_2$, or organic reducers such as formic aldehyde, glucose, glycerine and Fehling's solution. The powerful oxidizing effect, however, due to addition of sulphuric acid and potassium bichromate to auriferous cyanide solution, seems to thoroughly break up the potassium aurocyanide and precipitate the gold.

The cleansing effect of acids on zinc has already been referred to, and hence it is reasonable that acidulated auriferous solutions, when brought in contact with any metal such as zinc or iron, should rapidly and completely deposit their gold, and this is actually the case.

Freshly burned charcoal acts for a time as an efficient precipitant of gold from cyanide solutions, apparently until the occluded hydrogen, which constitutes about 10 per cent of the gas condensed in the pores, becomes exhausted. It is probable that other materials containing occluded hydrogen would act in the same way.

In general, past experience shows that, apart from acidulated solutions and from processes where electric energy from an external source is made use of, research for a precipitating agent having the following properties would be on the right lines, namely: a body exposing a large amount of surface in proportion to its weight, which gradually dissolves in a solution containing cyanide and possibly some other neutral or alkaline substances compatible with cyanide, with ready evolution of nascent hydrogen. Applying these requisite conditions to filiform zinc or zinc couples and ordinary cyanide solutions, it will be seen that they are fulfilled to a great extent, the main objection being that a comparatively strong solution of costly KCy is required to obtain and maintain the highest possible precipitating efficiency.

The ideal method of precipitation is not only perfectly efficient, but fulfills all the following conditions:

1. Is independent of cyanide strength of solution.
2. Presents large surface for joint contact of precipitating agent and molecules of auriferous compound dissolved in the solution.
3. Concentrates continually the precipitated gold in a limited space.
4. Free cyanide contents of solution are not appreciably lessened by the operation of precipitation.
5. The solution after precipitation must not carry any compound which would interfere with its direct re-use after further addition of cyanide.
6. Allows of ready conversion of precipitated gold into bullion.
7. The apparatus employed must be cheap and simple to install and operate.

IRON ORE IN SPITZBERGEN.—In addition to the recent discovery of coal in Spitzbergen, it is stated that a large bed of hematite iron ore has been found, the extent of which is not yet determined.

MINERAL IMPORTS AND EXPORTS OF SPAIN.—Imports of fuel into Spain for the nine months ending September 30 were 1,514,781 tons coal and 142,810 tons coke. Exports of minerals for the nine months are reported by the *Revista Minera* as below, in metric tons:

	1902.	1903.		Changes.
Iron Ore	5,540,545	6,939,811	I.	1,399,266
Copper ore	738,248	821,712	I.	83,464
Zinc ore	61,548	93,271	I.	31,723
Lead ore	2,554	2,011	D.	543
Pyrites	336,377	432,731	I.	96,354
Salt	207,983	241,194	I.	33,211

Exports of metals included 37,045 tons pig iron, against 30,543 tons in 1902; 22,110 tons copper against 20,404 tons; 1,384 tons spelter, against 1,494 tons; 122,236 tons lead, against 127,445 tons last year.

A NEW COAL CONVEYOR.

The accompanying illustrations show a double-strand retarding conveyor, designed to supply a simple, safe and reliable apparatus of large capacity for delivering coal from high openings in hills and mountains to the railroad cars below. It is made by the Aultman Company, of Canton, Ohio.

The conveyor proper is of the drop-flight type, and is constructed of two strands of heavy drop-forged steel chain, with steel flights attached at stated intervals to give the required capacity. The conveyor travels in a trough made of ¼-in. steel and designed for either wood or steel-supporting structure. The center links of the chain are drop-forged from solid pieces of steel and connected by flat steel side-bars. The connecting pins are of large size, made of cold-rolled steel, and articulate in machine-finished holes in the forged links, thus providing a smooth wearing surface which adds greatly to the life and easy running qualities of the chain. The factor of safety is large, and there is practically no danger of breaking. The chain being the backbone of the conveyor, its strength and durability must be beyond question. The conveyor flights are made of ¼-in. steel plate rigidly braced with cross-bars and angle-iron. The flights are connected to the chain by a forged steel attachment, which is riveted into slots in the forged links of the chain.

A storage bin of requisite size is located at the head-end of the conveyor, having an opening fitted with a gate in the bottom. Immediately under this opening is a feeder of the plunger type, which feeds the coal into the conveyor trough between the flights. A similar bin, with discharge gate, receives the coal at the lower end. Several of the lower sections may, if desired, be fitted with screen bars and a large part of the fine coal separated from the larger pieces.

The power may be steam, electricity or compressed air. When the conveyor can be located on a sufficiently steep angle it will only be necessary to apply power to place the machinery in motion, after which it will operate by gravitation. A friction clutch is provided for starting and stopping and a brake for emergency use.

The coal is brought from the mine in cars in the usual way and placed in the storage bin, which should be of sufficient capacity to receive the contents of a large trip of cars, thus permitting the conveyor to be kept in operation pending the arrival of the succeeding trip. The feeder, as stated above, receives the coal from an opening in the bottom of the bin and delivers it evenly and regularly to the conveyor. The movement down the conveyor line is entirely noiseless and the coal is not broken, two very desirable features.

The bin at the foot end receives the coal and may be made large enough to store several hundred tons of coal; the size, of course, depending upon conditions existing at different mines. The flow of coal is regulated by means of a gate or valve.

The advantages of this method of delivering coal are of considerable value. The conveyor can be placed on any angle of incline, and made any length up to 1,500 ft., with any desired capacity up to 4,000 tons per day of 10 hours, when running at the normal speed of 60 ft. per minute. As more coal is produced in the mine, the capacity of the conveyor may be increased by slightly increasing the speed. Its capacity is large; it is not dangerous to life and property, as there are no cars, nor monitors, to break away from chain or cables. The double strands of drop-forged steel chain reduce the danger of breaking to the lowest possible limit. In many instances only two men are required to operate the conveyor; one at the top to dump the cars and look after the engine or motor, and one at the bottom to load the coal for shipment. Sometimes, where the quantity of coal is large, it may be desirable to have an additional man to look after the driving machinery. It is much cheaper to operate than an inclined plane system and at several mines the services of from two to five men have been dispensed with. It is also of advantage at times to separate the fine coal from the larger sizes, and this can be readily done by means of screen bars placed in the bottom of the trough. The conveyor may also be conveniently used as a picking table.

COAL CONVEYOR, URSINA COAL COMPANY, HUMBERT, PA.

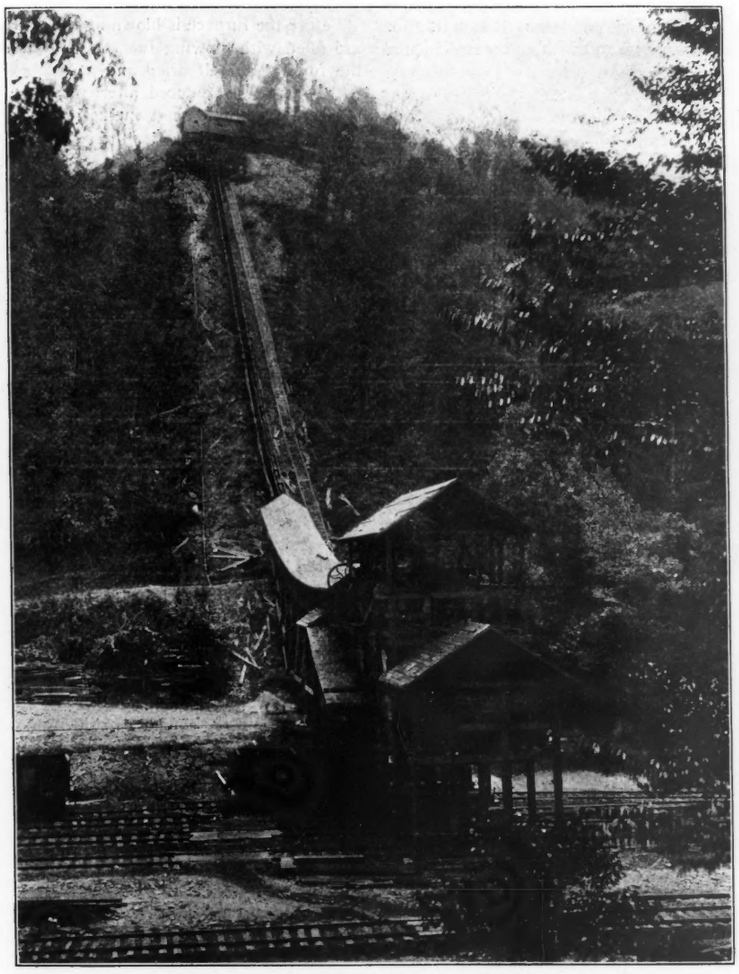
The accompanying illustrations are from photographs, the first showing the plant of the Ursina Coal Mining Company at Humbert, Pa. Here the conveyor is 630 ft. long between centers of head and foot shafts, and has a capacity for handling 2,500 tons of coal per day of 10 hours. The second shows the plant of the Thacker Coal Company, at Thacker, W. Va. This is 614 ft. long between centers of shafts and also has a capacity of 2,500 tons. The Aultman Company has plants of this type under construction for several other large Virginia concerns, ranging in length from 410 ft. to 860 ft. length of conveyor.

THE LAKE SUPERIOR IRON DISTRICT AT THE CLOSE OF THE SEASON.

By Our Special Correspondent.

A general survey of conditions in the Lake Superior region, as the season approaches its close, shows that the iron ore shipments for the year will not exceed 24,000,000 tons, and will possibly fall somewhat below that.

The Minnesota shipments are practically over. Only a few small mines on the western Mesabi and one or two in the central part of the range are being worked. The United States Steel Corporation is through for the season; its mines, little and big, are on their winter schedule. The open-pit, steam-shovel properties are closed down completely; the milling mines are doing only development, while the underground mines are all on their regular winter basis. The independent companies are all through except that the Minorca, of Pickands, Mather & Co., is still shipping.



RETARDING COAL CONVEYOR AT THACKER MINES, WEST VIRGINIA.

The Hull and Rust mines of the Steel Corporation, at Hibbing, have closed, with shipments this year of 600,000 tons and 180,000 tons left in the stock-piles on the surface. This has been a very large year for these mines. They are now closed down and the men have been withdrawn to other properties in that vicinity. It is understood that both of these mines will be stripped for steam-shovel mining. There is a large territory that has been untouched by underground work, and is well adapted for stripping, having a comparatively light surface. The ore taken out this year largely exceeds the minimum under the leases. The Lake Superior mines—the Burt, the Sellers and the Day—have also closed. The Burt was made an open-pit property this season, while the two others are still worked underground. The Chisholm and the Clark have closed with a production of about 500,000 tons and a large stock-pile. They are being equipped with new shafts, which will be ready for next year. The Pillsbury and the Glen are closed, so far as shipments are concerned, while the St. Clair is shut down for the winter. The three mines shipped 250,000 tons this season. They are all close to Hibbing, and are managed from the mine offices there.

The Mahoning Iron & Steel Company is stripping with two shovels on the north and west sides of its large open-pit, and will have the deposit uncovered much more extensively in another year, probably starting a new mine. The Mahoning open-pit is by far the most systematically worked and the best laid out of all the steam-shovel mines on the Mesabi.

Two new mines will be opened during the winter on the Chemung purchase. The first is the Monroe, which is so far along that stripping has begun at the milling pit; on the other mine, the Niles, work has just been commenced, clearing the ground and starting buildings. Both will be large mines and extensive shippers.

In the neighborhood of Virginia, the Sauntry has stopped stripping for the season and laid off the steam shovel which was engaged in that work. Shipments of ore from this mine ceased some weeks ago. It is the only mine of importance at Virginia that will be entirely idle this winter, though at some others the work to be done is small. The Lincoln mine, at Virginia, owned by the Jones & Laughlin Steel Company, has ceased shipments, with the largest output even made, about 300,000 tons. Ore is now going to the stock-pile. The mine will be developed during the winter, with the intention of putting out 500,000 tons next season.

At Eveleth, part of the old stock-pile of the Cloquet mine, which has been on the surface several years, has been shipped.

Exploring is quiet on the Mesabi and the Vermilion iron ranges. Only three drills are working, and those are on section 30-63-11; all the others have stopped. On the Mesabi range one contracting firm has laid off 40 drills and another 20, while nearly all the outside concerns which have been drilling have ceased work for the winter.

On the Vermilion range the situation is very much the same. Most of the mines are through, although some ore is still being shipped from stock-piles. The drilling situation is referred to above.

On the Gogebic range shipments have stopped, and the mines of the Oliver Iron Company, which are still working, are stocking for next year.

On the Menominee range the big shippers, like the Chapin, the Aragon, the Pewabic and the Penn, are through, and most of the smaller mines have closed for the winter and will do nothing until spring, or until there is a better inquiry for ore. At the mines of Corrigan, McKinney & Co. but little is doing, and all but three of their Crystal Falls properties are closed down. At Iron River there is little doing for the winter.

On the Marquette range matters are very quiet, so far as shipments are concerned, and some mines are shut down altogether. The mines owned jointly by the United States Steel Corporation and the Cleveland-Cliffs Iron Company are still shipping, and some of them will make small shipments by rail to furnaces all winter.

Marquette and Ashland combines have not shipped quite 5,000,000 tons for the season, while Escanaba is nearly 1,000,000 tons behind last year. The Chicago & Northwestern and the Chicago, Milwaukee & St. Paul railroads both report smaller shipments than in 1902, against which there is only a small quantity from the new Wisconsin & Michigan road to be offset by way of increase.

LARGE GAS ENGINES.

An announcement of some importance is that the Cockerill type of gas engine, which has been very successfully used abroad, is to be introduced into this country, the John Cockerill Company, of Serang, Belgium, having concluded a contract with the Wellman-Seaver-Morgan Company for that purpose. This type of gas engine was orginally designed for the purpose of utilizing gas of a somewhat low efficiency in combustion, such as the waste gases from blast furnaces. Beginning with small experimental engines, the business was expanded until engines of the largest size were built; in fact, these engines abroad include some of the largest units ever built in gas engines. The contract includes not only the right to manufacture and sell, but also the use of all the drawings, plans and other information of the Cockerill Company, and the use of any improvements which may be made. These engines are used in France and Germany for all the purposes for which large power-units are required, such as blowing engines for blast furnaces and steel works, engines for electric plants, for rolling mills and the like. Manufacturers will also furnish all necessary accessories, such as apparatus for cleaning and purifying the gases. The introduction here of this type of engine, which has been thoroughly well tested, will, we believe, give an impetus to the direct utilization of gases which are now wasted, like those from blast furnaces and from coke ovens.

AN OLD IRON CASTING.—At the Kelvingrove Museum, Glasgow, Scotland, a very interesting cast-iron crossing has just been placed in position. It was laid on the Liverpool & Manchester Railway in 1829, at Rainhill. It has just been taken up out of a siding after being 74 years in traffic.

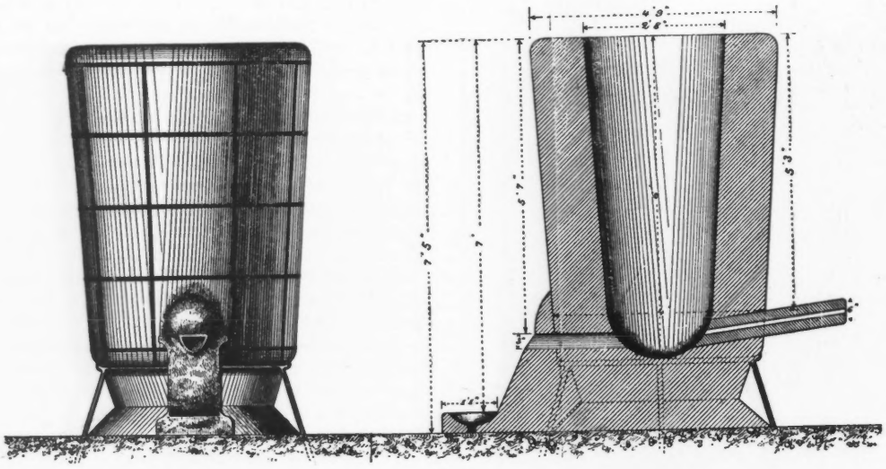
IRON METALLURGY IN THE PHILIPPINES.*

By H. D. McCaskey.

The metallurgy of iron, as practiced at present in the Philippines, is confined entirely to the province of Bulacan. At the time of my visit to the iron mines of Angat only one furnace was in blast, but a description of the methods used in its operation will suffice for all the other furnaces, as I have learned of no variation from the practice here.

The buildings in which the smelting is done are constructed entirely of the products of the forests in the neighborhood. The posts and rafters are made from the trunks of trees; the pieces are secured in place by rattan, and no metal of any kind is used in the structure.

Preparatory to the erection of the smelter, the *maestro*, or foreman, assembles his assistants, and with them clears and levels the land selected for the smelter site, digs the clay from the stream banks, which is baked into bricks, erects the *camarin*, and prepares the molds, tuyeres, slag-pots and blowers. The *camarin*, once constructed, is divided roughly into three parts. One side is given up to little rooms, in which live the workmen, and where are stored the supplies and the furnace products, and another side is divided into ore-bins and charcoal-bins. The main central space is open and is used for the smelting operation proper. In the center of the space are the two furnaces, with bamboo platforms at the sides upon which the feeders stand, with a tapping hole and slag runways at the front, and with the blower or air compressor and the connecting clay tuyeres behind. Opposite the furnaces there is a row of molds placed in position for pouring immediately after the last castings have been dumped.



BLAST FURNACE AT BULACAN, PHILIPPINE ISLANDS.

The furnaces are usually constructed of sun-baked fire-clay, the material being obtained from the decomposition of the crystalline feldspathic rocks of the neighboring hills. In some cases the bricks are molded and the furnace is built up of these; in other cases the furnace itself is molded as one piece, dried, and bound with rattan or iron. The thickness of the walls is so great that, notwithstanding the intense heat on the hearth during the smelting, the rattan is not burned off. In building the furnace a rectangular space 6 by 3 in. is left above the blow and tap holes, and into the latter are inserted blocks of a very silicious rock called *buga* by the natives. This word is the Tagalo for pumice, and is a misnomer. The quartzose rock is quarried near La Mesa for this especial purpose, and the ironmasters pay two pesos for each block measuring 6 by 8 by 15 in. The principal function of these blocks, seemingly, is to furnish silica to the slag.

The hearth of the furnace is shallow and nearly circular. It is from 4 to 6 in. deep and about 2 ft. 4 in. in diameter. The total height of the furnace is 7 ft. 5 in., measured from the ground, and the distance from bottom of hearth to top of furnace is 6 ft. An average section shows a thickness of the walls of about 1 ft., with a slight increase in thickness toward the hearth. The tuyere is a pipe, made from the best fire-clay, connected with a blower at one end, and passing through the furnace and opening upon the hearth at the other end. It is 2 ft. 7 in. long, 6 in. gross diameter, and with an inner diameter of 1.5 inch.

The air compressor, or blower, is as ingenious as it is interesting. It is made from the hollow cylindrical trunk of a *tanguile* tree, and is 9 ft. 8 in. long and 1 ft. 7 in. in its greatest diameter. One end of the blower rests upon the ground, while the other is supported by a cross-piece of wood. The ends of the blower are furnished with semicircular valves of leather and wood, suspended from above, and closing by the pressure of air against them, when the piston moves forward. A separate piece of wood, serving for the compartment into which the air is forced, and from which it is driven through the tuyere end of the furnace, is fitted into the main blower and made air-tight. The connection between the tuyere and the air compartment is made by means of a short piece of cast iron tightly fitted. The piston is a circular piece of wood carrying on its perimeter a double row of feathers, while the piston rod is of *balite* wood, 15 ft. long and furnished with a double handle.

The molds used in the present operations are of two shapes and of variable sizes, suited to large, medium and small castings. They are made of clay, carefully selected and ground, the bottom portions being shaped by pieces of wood cut in the desired patterns. The inner surfaces of the molds are freshly coated for each casting with a paint made of a mixture of boneblack, ground *palay* and water. The halves of the molds are placed in wooden frames, bound closely together with rattan and set upon a pair of forked sticks for the pouring.

The pouring-pot or ladle is made of fire-clay, bound with iron and furnished with a stout wooden handle. Its inner dimensions are about 8 in. and 6 in. for the larger and smaller diameters, and 6 in. deep. The few tools, such as pokers, ore-hammers and picks, are of wrought iron.

The ore, after mining, is carefully sorted and carried by *cargadores* to the smelter, where it is reduced to a uniform size of 1.5 in. diameter by means of a small hammer. The charcoal is burned by the laborers employed in the smelter and is of excellent quality. The degree of success attained by the native smelters depends largely upon the quality of the fuel.

Before the furnace is blown in, the hearth and body are filled with glowing fuel, the blower started, and the furnace is well dried and heated. The ore and fuel are then introduced alternately, the proportion at the beginning being one-half basket of ore to four baskets of fuel. After the furnace is well heated and the smelting operations are in full course, the charge consists of one full basket of ore to four of charcoal, and the furnace is kept filled, a cone of heaped charcoal being maintained on the top. The air compressor is worked at an average rate of 17 strokes per minute, furnishing ample pressure and volume for the purpose. The process of reduction is comparatively simple, as the ore is self-fluxing and the fuel of high quality. The slagging of silica and alumina, with a certain proportion of the iron, takes place quickly, and the slag is drawn off every two or three minutes, when the furnace is under full headway. Casts are made every two or three hours. The pouring-pot is filled, and the *maestro* passes down the line of molds, with the pot of molten metal, upon which floats a cover of burning charcoal. As rapidly as the castings harden the molds are opened, the castings removed, and the surfaces of the mold prepared for another pouring.

The products made in the smelters operating at present are plowshares and points, a share of the largest size weighing nearly 5 lb. The castings are only of fair quality, and might be greatly improved. The prices obtained for the products vary with the season. During the months of May and June the entire output of the smelter is sold in the Angat district at the price of one peso per pair, that is, a plowshare and a point. During the other months a large part of the product is sent to Manila, where it is sold at the rate of from 70 to 90 pesos per 100 pairs. When the furnace is run steadily the output averages from 2,000 to 3,000 pairs a month.

The laborers required for operating one furnace are two *maestros*, or foremen, who have general charge; one *escribiente*, or clerk; two *escoradores*, or slagmen, who also act as molders; four *heladores*, or blowers, and from four to seven common laborers, who obtain and prepare the ore and fuel. They are paid according to the output of the furnace, the average wages for the entire force being about 60 pesos a month during the working season of four months, or about 40 pesos per month throughout the year.

It would seem that, if a market could be assured for a large output of castings, a modern furnace could be operated here at a handsome profit. The success of such an undertaking, however, would depend upon certain other conditions, such as supply of fuel, transportation costs and labor supply. I am inclined to the opinion that, on the whole, the conditions are favorable and that there is a future for the iron industry of the Philippines.

*Abstracted from 'Report on a Geological Reconnoissance of the Iron Region of Angat, in Bulacan.' *Bulletin No. 3*; The Mining Bureau, Manila, P. I.

GOLD IN INDO-CHINA.—This French colony has recently been added to the list of gold producers. The mines under operation are situated at Bong-Miu, and are said to give promise, although their present output is small.

LAKE SUPERIOR TRAFFIC.

Notwithstanding the heavy coal shipments to the Northwest, the October tonnage passing through the Saulte Ste. Marie canals was somewhat less than last year, the difference being due to the falling off in iron ore and in grain; nevertheless, the reports for the season up to November 1 still showed an increase, amounting to 438,572 tons. The withdrawal of a number of large ore boats and the prospect of an early close of navigation will probably wipe out this increase before the end of the season is reached. The total freight reported as passing the locks at the Sault up to November 1 this year was 31,369,785 short tons, of which 6,895,230 tons were west-bound and 24,474,555 tons were east-bound freight. The total number of vessels passed through was 16,815, so that the average cargo was 1,866 tons. The mineral freights included in these totals compared as follows with those reported last year, the figures being in short tons, except for salt, which is given in barrels:

	1902.	1903.	Changes.
Anthracite	124,608	1,034,211	I. 909,603
Bituminous	3,904,667	5,197,255	I. 1,292,588
Total coal	4,029,275	6,231,466	I. 2,202,191
Iron ore	21,524,409	20,538,577	D. 985,832
Pig and m'nuf'tured iron.	168,113	162,821	D. 5,292
Copper	97,026	91,658	D. 5,368
Building stone	35,804	14,790	D. 21,014
Salt, barrels	382,519	362,407	D. 20,112

The falling off in iron ore, it will be seen, was 985,832 tons this year, and it may be said that the heavy movement of ore practically closed with the month of October, shipments since November 1 having been comparatively light. It is probable that the stocks on Lake Erie docks at the close of the season will be pretty heavy, as most of the ore which came down during the latter half of October, with most of that which is now coming down, is being stored on the docks, shipments to furnaces being very slow.

A SEARCH FOR RADIUM MINERALS.—The Academy of Sciences of Vienna has appointed a commission to investigate the occurrence of minerals containing radium in the Bohemian Erzgebirge.

COAL IN INDIA.—Borings under the charge of Mr. E. C. Agabeg have, according to Indian *Engineering*, discovered coal at Arkonam, near Madras. It is supposed to be connected with the Singareni coal measures.

A NEW ASBESTOS DEPOSIT.—A concession has been granted by the Russian Government for the exploitation of asbestos deposits in Central Siberia, near the Angara river. The material is said to be of good quality.

NATURAL GAS IN ENGLAND.—According to recent investigations of the Geological Survey of Great Britain, there are prospects that considerable stores of natural gas may yet be found in southern England. It is known that pockets of gas occur in the Wealden and Purbeck beds of Sussex, and they have yielded in times past limited quantities of gas. Below these beds there are considerable thicknesses of sands and sandstone, belonging to the Portland series, which form natural reservoirs and are worthy of investigation.

DEEP MINING IN NOVA SCOTIA.—A report just issued by the Commissioner of Public Works and Mines calls attention to the favorable conditions for deep mining in the Nova Scotia gold-fields. A study of the geological structure shows that the veins follow planes of stratification along the crests of anticlinal folds and are analogous to the gold-bearing saddle-reefs of Bendigo. Mining operations in the past have been limited to the veins outcropping at the surface, and as these deposits are now nearly exhausted it would seem advisable to undertake developments in depth with the view of exploring the underlying reefs. Such operations have already been started at the Doliver Mountain, Richardson, Bluenose and Dufferin mines, with results thus far favorable. They show that the veins recur in close succession and may continue to great depths. The Provincial Government has recently authorized an appropriation to aid in the sinking of these shafts to depths of 2,000 ft. If successful, these undertakings will undoubtedly lead to the inauguration of a new era of extensive gold mining in Nova Scotia.

ABSTRACTS OF OFFICIAL REPORTS.

Hall Mining & Smelting Company, British Columbia.

The report of this company for the year ending June 30, 1903, as issued from the London office, shows receipts in sterling as follows: Ore and royalty, £1,537; matte and bullion produced in smelter, £147,602; sundry receipts, £24; total, £149,163. The mining expenses were £811, and the smelter expenses £145,932, leaving a total profit of £2,420. Sundry receipts increased this sum to £2,733. General expenses and interest on debentures were £3,587, showing a loss of £854 for the year.

In the mining department comparatively little was done. The tonnage from the Hall mine was 2,508 tons, containing 72,614 oz., and 201,580 lb. of copper, the gross value being $48,337, or $19.27 per ton. The lessee is carrying on development work and doing some stoping. The company has secured an option on a quarter interest in the Emma group, and has established a plant there, having mined 17,946 tons of ore during the year. The object of this work was to supply a fluxing ore for the smelters.

Mr. Robert H. Hedley, manager of the smelter, refers in his report to the fall in prices of silver and lead during the first part of the fiscal year. The report then goes on to say: "During the last few days of December and first of January, I took advantage of the slackness of receipts to concentrate my stock of lead-copper matte to about 240 tons carrying about 33 per cent copper; but finding it impossible to procure a favorable rate for treatment, held it till April, and re-concentrated to 46 per cent copper, when it was shipped to the Granby Consolidated Mining, Smelting & Power Company. In this re-concentration we smelted about 1,300 tons of Silver King ore. Since January, we have been practically dependent for dry ore on the low-grade quartz ores of the Republic Camp, in Washington State.

"Extreme cold during February and March, and extreme high water during June, prevented the Highland mine from producing, and forced us to be much idle and do much unprofitable work. We have been in blast on lead smelting but two-thirds of the time for the past five months. With all this disappointment, and through all these adverse conditions, we have to congratulate ourselves on two points: first, the possession of an excellent flux supply from the Emma, and second, the fact that our stock of coke tided us over the period when the Crow's Nest collieries were idle through accident and strike.

"The large furnace was in blast 222 days, and the small one 165 days; and we smelted during the year, 7,510 tons of dry ore, 5,270 tons of lead ore, 4,000 tons roasting ore, and 6,100 tons of matte, besides other by-products. Our coke consumption averaged 14.3 per cent of charge. We shipped 1,023,250 oz. silver, 8,000 oz. gold, 112 tons of copper and 3,350 tons of lead. Our roasting plant has been used to the best advantage, occasionally working both mechanical and hand roasters, and occasionally only mechanical or only hand roasters, according as it seemed most desirable from the work accomplished and character of ore treated. The mechanical roaster has generally given very good satisfaction during the year, though far from perfect in its product.

"Our crushing and elevating plant has been overhauled and improved, resulting, not in a lower working cost, but in practically eliminating the heavy item of plant maintenance. We have somewhat improved our bin system, floored our coke shed, built a new and satisfactory dry house, and further equipped our mechanical department so that our bills for machinery parts have been considerably reduced. The electric power service has been eminently satisfactory; with the exception of stoppage, through the line being destroyed by forest fires last fall, we have suffered no considerable inconvenience through stoppages of power.

"Through the latter months of the year, we looked forward quite confidently to some action by the Dominion government toward a change in tariff that would gradually improve our conditions and stimulate the industry of lead mining and smelting; instead of that, however, the government saw fit to offer a bounty amounting to $15 per ton of lead. It was thought that this would have an immediate effect on the lead production of the country. For some reason, however, such has not been the case, and owners of large properties have not yet taken action."

Homestake Mining Company, South Dakota.

The report of this company covers the year ending June 1, 1903. The company owns a very large property in the Black Hills country; the extent of its operations and the value of its gold product make it one of the great gold mining companies of the world. Unfortunately the report is made in such form that it requires very careful analysis to ascertain the actual results of the year; while it is impossible to give full details of its operations.

The report gives the total of ore milled at 1,279,075 tons. It does not give the tonnage mined; nor does it state the quantity passed through the cyanide plants.

By carefully analyzing the statement of expenditures, and separating the various items, we obtain the statements of expense and the income account as given below. The earnings and expenses were as follows:

	Totals.	Per ton.
Proceeds of bullion saved	$4,526,942	$3.54
Miscellaneous receipts	102,779	0.08
Total earnings	$4,629,721	$3.62
Mine expenses	$2,606,120	$2.04
Mill expenses	628,150	0.49
Cyanide plant	371,248	0.29
Tramway	42,577	0.03
Water	96,100	0.08
Taxes	67,530	0.05
Interest	31,139	0.02
Property bought	5,168	0.01
General and miscellaneous	178,067	0.14
Total expenses	$4,025,099	$3.15
Net earnings	$603,622	$0.47

The averages are calculated on the total tonnage of ore milled.

A condensed statement of the income account may be made as follows:

Net earnings, as above	$603,622
Debit balance from previous year	$210,407
Dividends paid	819,000
Total	$1,029,407
Deficit at close of year	$425,785

This deficit is represented in the accounts as follows: Due superintendent, $2,309; superintendent's checks outstanding, $205,326; due treasurer, $218,150; total, $425,785. The dividends paid exceeded the net surplus by the amount of the deficit shown.

Superintendent T. J. Grier's report says: "During the year all operations at the company's property went smoothly, and without special interest. The second cyanide plant—referred to in the last report as under construction—started last fall, and is running satisfactorily and profitably.

"The Ellison shaft was sunk from the 900 to the 1,100-ft. level. The Golden Gate—a new shaft at the north end of the mine—from the surface to the 700-ft. level. We are preparing to add 100 stamps to the Amicus mill, but the time required, to get a necessary new engine, will delay their dropping until early next summer. The installation of our new and large air-compressor is completed.

"Physically, everything about the mine and works is in excellent condition, with ore reserves for a number of years."

BOOKS RECEIVED.

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

Race in Industry. Prepared by the Massachusetts Bureau of Statistics of Labor; Charles F. Pidgin, Chief of Bureau. Boston: State Printers. Pages, 132.

Proceedings of the American Water-Works Association, 1903. John M. Diven, Secretary. Elmira, N. Y.; published by the Association. Pages, 724; illustrated.

Ein Neues System zur Be-Rämpfung von Grubenbränden. By J. Krzyzanowski and S. Wysocki. Berlin, Germany: Julius Sittenfeld. Pages, 36; illustrated.

Hypochlorite und Elektrische Bleiche. By Viktor Engelhardt. Halle-u-Salle, Germany: Wilhelm Knapp. Pages, 288; illustrated. Price (in New York), $4.25.

Geological Survey of Western Australia. Progress Report for the Year 1902. A. Gill Maitland, Government Geologist. Perth, W. A.: Government Printer. Pages, 28; illustrated.

Western Australia. Speech on the Bill for Amendment and Consolidation of the Mining Law. Henry Gregory, Minister of Mines. Perth, W. A.: Government Printer. Pamphlet, 28 pages.

Quicksilver Resources of California. Prepared by the State Mining Bureau; Lewis E. Aubury, State Mineralogist. Sacramento, Cal.: State Printer. Pages, 276; illustrated. Price, 75 cents.

Proceedings of the Chemical and Metallurgical Society of South Africa. Volume II. Johannesburg, Transvaal; published by the Society. Edinburgh, Scotland: R. W. Hunter. New York: the ENGINEERING AND MINING JOURNAL. Pages, 928; illustrated. Price (in New York), $5, net.

BOOKS REVIEWED.

Les Mesures Prophylactiques Prises ou à Prendre contre l'Ankylostomasie. By Victor Watteyne. Brussels, Belgium: P. Weissenbach. Pages, 41.

In substance, this is a report on the subject of Ankylostomasie, or 'miners' disease,' which was presented at the eleventh international congress of hygiene and demography at Brussels in 1903. The spread of this peculiar disease throughout the coal mining districts of Europe and the serious effect it frequently has upon the health of the workmen has necessitated taking stringent measures for its control. The pamphlet shows the topographical distribution of the disease in the different countries and its relation to local conditions of hygiene, and indicates the course to be pursued in suppressing the evil. As the disease is not prevalent among miners in this country, it is unnecessary to give the contents of the pamphlet in detail.

Geological Survey of New Jersey. Part IV. By Henry B. Kummel and Walter Harvey Weed. Trenton, N. J.; published by the Survey. Pages, 29.

This pamphlet includes a review of the iron mining industry of New Jersey during 1902, and a description of the copper resources of the State, the latter paper being prepared under the direction of the United States Geological Survey. The year's developments in the iron industry are reviewed in some detail, and are shown to have been of a satisfactory character. In discussing the copper deposits, Mr. Weed inclines to the view that the metal has been derived from the accompanying basalt—a theory that is supported by the known presence of copper in the rock. The future commercial importance of the deposits is stated to be conditional upon the continuance of the native copper in depth, and the author recommends that they be thoroughly explored before any large outlay is made for reduction works.

Gemeinfassliche Darstellung des Eisenhüttenwesens. Edited and published by Verein Deutscher Eisenhüttenleute. Dusseldorf, Germany, 1903. Pages, 164; illustrated.

This little volume has been prepared for the purpose of informing the general public upon the present status of the iron industry throughout the world. It attempts to give a clear but succinct account of the methods of iron mining and smelting and the economical conditions surrounding the industry. The book admirably fulfills its purpose. In the first part, which takes up the technology of iron, the reader may follow the course of operations from the mining and the preparation of the ore to the smelting in the blast furnace and the manufacture of the finished products. The second part of the volume describes the commercial features of the industry in the different parts of the world, and contains a great deal of information that will be useful to those engaged in the trade. After giving detailed statistics of the production of iron ore, pig iron and coal in the principal countries, the industry of each country is discussed at some length. While the volume has been prepared by German authorities and is intended for German readers, it is impartial in its treatment accorded to other countries. The pre-eminent position occupied by the United States as a producer of iron and steel is fully recognized, and the status of the industry in this country is presented with considerable insight into the prevailing conditions. The volume is to be commended for its general accuracy and comprehensiveness.

Wisconsin Geological Survey. Preliminary Report on the Lead and Zinc Deposits of Southwestern Wisconsin. By Ulysses Sherman Grant. Madison, Wis., 1903; published by the State. Pages, 103; illustrated.

This small volume, describing briefly the geological features and ore deposits of southwestern Wisconsin, is intended for the use of practical miners and those desiring definite information on the resources of the district. The opening chapter gives an historical account of mining operations in the region and of the work done at various times in mapping and describing the geology; and the succeeding chapters are devoted respectively to discussions of the physical features, general geology, ores and associated minerals, ore genesis, ore deposits and mining. The lead and zinc deposits, as is known, occur in Grant, Lafayette and Iowa counties, and are a part of the large district which extends through portions of Wisconsin, Illinois and Iowa. The ores comprise galena, sphalerite, smithsonite and hydro-zinkite, and are accompanied by pyrite, marcasite and other iron ores. Nearly all of the important deposits of lead and zinc have been found in the formation known as the Galena limestone, belonging to the Lower Silurian. Some ore has been found also in the Trenton limestone, which underlies the Galena, and in the Lower Magnesian limestone and the St. Peter's sandstone of the Cambrian system. The ores occur as vein deposits, filling cracks and crevices in the rocks, as brecciated or honeycomb deposits, and as disseminations through the rocks.

In the course of his investigation, the author brings out some important considerations regarding the present and future conditions of the district which are of general interest. In the first place, the conclusion is reached that the surface deposits of galena and smithsonite are by no means exhausted, although they will probably not be of such importance in the future mining operations as they have been in the past. There is reason, also, for believing that extensive deposits of zinc ore occur beneath many of the old workings, which were carried down only to the level of ground-water. The lower 75 ft. of the Galena limestone and the upper few feet of the Trenton probably carry larger quantities of ore than have yet been produced in the district, forming reserves sufficient for many years to come. There is a possibility that other ranges will be discovered, and that other minerals of economic importance will be found in the Trenton limestone and lower formations. The author recommends that explorations in the immediate future should be confined to the ranges which have produced large quantities of galena and smithsonite from surface workings. Those ranges in which the level of ground-water is some distance above the base of the Galena limestone are especially favorable for exploration.

In the chapter on the genesis of the ore deposits the author follows Van Hise in ascribing the formation of not only these, but the greater number of all ore-bodies, to the circulation of ground-waters. While this method of origin may rightly be applied to the ore deposits under discussion, authorities are by no means unanimous in giving it the wide importance originally ascribed to it, as might be easily shown by reference to recent literature.

In Search of a Siberian Klondike. Narrated by Washington B. Vanderlip, the chief actor, and set forth by Homer B. Hulbert. New York: the Century Company. Pages, 324; illustrated. Price, $2.

This is a most readable description of the experiences of a mining adventurer—giving that word its pleasant olden meaning—in the wilds of northeastern Asia. Mr. Vanderlip recounts his story by means of the pen of Mr. Hulbert. It is a plain, straightforward tale, with plenty of incident, a dash of the extraordinary and the spirit of the pioneer. The country covered in these wanderings of Mr. Vanderlip is nearly identical with that described by Mr. George Kennan in his 'Tent Life in Siberia,' one of the best books of travel ever written. The Kamchatkan port of Petropavlovsk, the pathless tundra behind Ghijiga, the wandering Koraks, the herds of reindeer, the traveling by dog-sled, the wintry wastes, the long Arctic day and the weird detachment from the hurrying crowds of the rest of the world, all leave a decided impression upon the reader. There is no picturesque exaggeration or romantic coloring; it is a sober, plain tale rendered interesting by its evident clinging to facts.

As to gold-fields, there are none; Mr. Vanderlip braved many dangers and covered a wide area, only to find occasional traces of the precious metal. He went up several rivers which empty into the Okhotsk Sea; he prospected in the Stanavoi range, he traversed the country of the Tschuktches in northern Kamchatka, and he tested the beach sands on the shore of Bering Sea, but in no case did he discover gold in paying quantity.

At the end of his search there was a dramatic moment when he met the *Samoa,* which brought an expedition from San Francisco, sent out by Anglo-American and Russian capitalists to explore a concession which was supposed to include the Asiatic extension of the gold-bearing sands discovered at Nome. The gentlemen on the *Samoa* were naturally surprised to meet a man who had already spied out the nakedness—from a gold-mining standpoint—of the land, which they had been led by rumor to consider a possible El Dorado. If gold had been found there would have been a pretty quarrel, because the concession of Count Wolnarlarsky (which the author spells incorrectly, and we cannot very well blame him for it!), which the *Samoa* expedition was organized to take up, had not been secured in all respects, it being necessary for the concessionaire to present his papers to the Governor at Anadyr before he could take legal possession, and Anadyr is far up a river which is ice-bound most of the year. Mr. Vanderlip was informed of these facts by cablegram and started off in a hurry to take out claims before the representatives of the Count could do anything. He was

there first, and investigated the ground before Bogdanovitch (whom the author erroneously styles a count, for he was only a Russian mining man of no consequence) and his partners on the *Samoa* could get there. However, there was nothing doing, Bogdanovitch and the Anglo-American mining engineers fell out, and the expedition disbanded in thorough disgust with the way the Russians had behaved, while Mr. Vanderlip evidently reached home safely and wrote an entertaining book. This book we can commend, to mining engineers especially, as well worth reading.

CORRESPONDENCE.

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

'Official' Prices of Iron and Steel.

Sir.—I note your remarks in the JOURNAL about 'official' prices of iron and steel, and presume that your contemporaries, who take a good many things for granted, mean the quotations made by the chief selling agent—or whoever performs the duties of that office—for the United States Steel Corporation. These, by the way, do not always correspond with the prices made to actual buyers; but "that is another story."

Undoubtedly, it was the belief of the organization of the Steel Corporation that its prices would be 'official,' or fixed for the entire trade; and it was their intention that they should control. But there are ins and outs in the trade which a great financier may not—and usually does not—know. In the years of the boom, now just closing, the Corporation did control prices by preventing too great and sudden rises. The big concern steadied prices, and kept speculation from running away with the market. In this respect its policy was generally judicious and deserves commendation. In boom times, when the whole world, apparently, had money in its pocket and wanted to spend it, this regulation of the market was comparatively an easy matter. The little fellows had to conform to the big one's dictation; and they did so, except in those cases where they were able to exact higher prices under the guise of premiums for early deliveries.

Now we have come to a much more difficult proposition, the maintenance of prices when demand and consumption are falling off. The dictation, which was accepted a year ago, does not seem so formidable now, when buyers are no longer rushing for material, but sellers are, instead, hustling for orders. We are coming to a time when the smaller competitors have a chance to get business by underbidding, and will do it, if they want to keep going. The Steel Corporation must keep its plants at work, and to do so it must meet its smaller competitors. When there is not work enough to go around, there is a temptation to cut prices in order to secure a good order. The big concern cannot prevent this, and it can only follow the cuts, for it is too big and unwieldy to stop. Of course, it can turn out material as cheap, perhaps cheaper, than its competitors, though they have not so much of what sailors call 'top-hamper' to carry; and this 'top-hamper' is a mighty bad thing in a gale, as many a sailorman knows to his cost.

The Steel Corporation has a problem before it, the solution of which may well keep its managers awake of nights. It will take hard thinking and shrewd management. Its officers ought to supply both, and I sincerely hope they will.

One point there is, to which, I think, very little attention has been called. The Corporation has been so busy pushing production and rushing things, ever since its formation, that comparatively little attention has been given to the unification of its business; that is, to the co-ordination of the working of its various plants, so as to secure the best results from each at the lowest cost. This may be done in time, but very little progress has been made in this direction, from all appearances. If rumor be correct, there is a certain clashing of interests still; and there are so many rumors of this kind afloat that it looks as if there might be some truth behind them.

Perhaps I have wandered from my original text, but the subject is a very tempting one. Just as there are "times that try men's souls," so there are times that try big combinations. From all appearances, such a time is at hand.

IRONMASTER.

Pittsburg, Nov. 17, 1903.

RECENT DECISIONS AFFECTING THE MINING INDUSTRY.

SPECIALLY REPORTED.

RIGHT TO INSPECT MINE PLANS.—The right to inspect underground workings in a mine carries with it the right to inspect and make copies of the maps or plans of such workings.—Star Mining Company v. Byron N. White Company; Supreme Court of British Columbia.

FALLING MATERIAL IN A SHAFT.—In an action for damages for personal injuries it was shown that the plaintiff was a miner, and, while at work at the bottom of a shaft in the mine, he was injured by a cage, used for lowering and hoisting men, falling on him. The place where he was working was a few feet below the 800-ft. level, and the cage was operated by a hoisting engine at the 350-ft. level. At the 800-ft. level there was a bulkhead or cage platform. The cage fell, broke through the bulkhead and struck the plaintiff. The court held that a cage for lowering and hoisting men is not 'falling material,' within the meaning of that term as used in the Mine Inspection Act. No duty is imposed by the law upon the mine-owner to provide protection from a falling cage.—McKelvey v. Le Roi Mining Company (Martin's 'Mining Cases'); Supreme Court of British Columbia.

QUESTIONS AND ANSWERS.

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

Titaniferous Iron Ore.—Is there any value in iron ore, hematite, carrying 12 per cent titanium? Is the titanium valuable?—J. H. B.

Answer.—An iron ore carrying 12 per cent titanium would be practically worthless. No iron-maker would purchase such ore for use in the blast furnace, nor would the titanium have any special value by itself. The iron-makers have an inveterate prejudice against titaniferous ores, or at least ores carrying more than a very small percentage of this material.

Gold in Newfoundland.—Is there gold in Newfoundland?—N. M.

Answer.—According to the official reports there has been a production, for several years, varying from 3,500 to 4,000 oz., from Newfoundland mines. This gold is found in copper ores, which are shipped to the United States for treatment. Recently, gold-bearing quartz has been found at Rose Blanche, on the south coast of the island, and at Sop's Arm, on the northeast coast. The value of these discoveries is still to be determined, as work has only just been begun, at both places.

Aluminum.—I am informed that aluminum is being made at Providence, R. I., by a new process chemically, at a cost of 4c. per lb. The by-product is stated to be more. Can you tell me anything about it?—J. D.

Answer.—You have probably seen some of the paragraphs, that are constantly floating around in the press, as to cheap methods of manufacturing aluminum. No one has yet found a commercially practicable chemical process of separating this metal, nor has any one succeeded in making it at anything like the cost of 4c. per lb.

Amber.—Can you tell me where I can get information regarding amber? I would like to know the uses, market prices, source of production and who are the purchasers and dealers.—O. J.

Answer.—The trade in amber is a somewhat peculiar one and is carried on by very few parties. Amber has been found in many places—in Sicily, on some of the Greek Islands, in Switzerland, in France, near the Mediterranean, while small quantities have been found in the United States, in New Jersey and North Carolina. The chief sources of supply, however—in fact the only commercial sources—are along the Baltic coast, principally in Germany, where it is found in the sand, usually buried to some depth. Another commercial source, but much less reliable, is in a deposit found in Burma, where it is mined in shallow excavations. In Germany, also, besides the amber found along the sea-coast, it is mined in the neighborhood of the coast, especially near the towns of Memel and Königsberg; here it is found in association with mineralized wood under a covering of sand and clay, varying from 40 to 50 ft. The occurrence, however, is very irregular, and there seems to be no regular vein or lead. The amber finds its use chiefly in ornamental work and in the manufacture of mouthpieces and stems for pipes. Beads and other ornaments are made of this substance and are very popular in Germany, although they are less known here. No regular price can be given for this material, as the price paid for it varies very much with the size of the pieces in which it is found, their freedom from cracks and flaws, and the clearness and color of the lumps. The trade in amber in Germany is almost entirely in the hands of one firm—Stantien & Becker, of Königsberg, Germany. According to this firm, the total production some years ago varied between 150 and 200 tons, of which probably three-quarters is derived from the mines; the balance being picked up or dredged up along the shore. The price, as stated before, depends upon various contingencies, but the average value of the whole output is not far from $3 per pound.

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 the receipt of 25 cents. In ordering specifications correspondents are requested to name the issue of the JOURNAL in which notice of the patent appeared:

Week Ending November 10, 1903.

743,413. ORE-SEPARATOR.—Joseph W. E. Allen, San Francisco, Cal. In an ore-separator, the combination of a frame, an endless apron, rollers supporting the same with its supported portion in an inclined position, and cleats disposed adjacent to the upper edge of the supported portion of the apron to clamp the latter in position.

743,431. METHOD OF CONVERTING OXYGEN INTO OZONE.—Frederick S. Blackmarr and Joseph L. Willford, Minneapolis, Minn. A method of converting oxygen into ozone, consisting in applying an induced electric current to the opposite sides of a wall of dielectrical material, through terminals which are at all points in contact with said wall, and passing air or oxygen along said wall, in proximity to one of said terminals.

743,432. APPARATUS FOR CONVERTING OXYGEN INTO OZONE.—Frederick S. Blackmarr and Joseph L. Willford, Minneapolis, Minn. An apparatus for convert-

ing oxygen into ozone, consisting of a tube or cylinder formed of a dielectric material, an induction-coil and terminals for the secondary circuit of the induction-coil located upon the inner and outer surfaces of said tube or cylinder, each terminal being in contact at all points throughout its length with one surface of said tube or cylinder, and means for passing oxygen or air through said tube or cylinder and in contact with the inner terminal.

743,434. APPARATUS FOR STORING AND DELIVERING COAL.—Charles H. Boardman, Columbus, Ohio, assignor of one-half to Theophilus King, Quincy, Mass. An apparatus comprising a storage-bin having an inclined floor and a door at the lower end thereof whereby the floor of the bin may be employed as a delivering chute, and leveling apparatus in the upper portion of the bin.

743,468. PROCESS OF MANUFACTURING GAS.—Robert Dempster, Marietta, Ohio. A process for the manufacture of gas, said process consisting in forcing opposing jets of heated air and of previously mingled air and oil into a heated retort to form a fine spray or mist, subjecting the mixture to the action of heat and forcing the same in the form of vapor through a mass of finely divided heated material, the latter serving as a strainer and filter and arresting the heavier impurities to be subjected to an oxidizing process by a portion of the air forced into the retort.

743,487. GRADING AND DITCHING MACHINE.—Thomas J. Gray, Chicago, Ill., assignor to National Drill and Manufacturing Company, Chicago, Ill. In a ditching and grading machine, a wheeled body-frame; an evener; a suspended plow-beam provided with a plow, and a draft-chain attached to and connecting the plow-beam with the evener and arranged to transmit to the latter the draft strain produced by back pull on the part of the plow in opposition to the draft of the team on the evener.

743,501. ORE-CAR.—John M. Hansen, Pittsburg, Pa. A metallic-car underframe comprising longitudinal sills removed from the longitudinal center of the car and extending from body bolster to body bolster, of draft sills adjacent to the longitudinal center of the car and extending from the body bolster to the end of the car, and a body bolster comprising a vertically disposed web-plate extending above the center sills, a bottom cover-plate secured thereto, horizontal tension members secured to the web-plate above the longitudinal sills, and vertically disposed stiffening members secured to the web-plate adjacent to each longitudinal sill and draft sill.

743,525. METHOD OF MOLDING STONE.—Albert Lake, Washington, D. C. A method of molding stone, which consists in first partly filling the mold with water and then feeding a cement mixture thereto.

743,538. ROTARY KILN.—Wilhelm Michaëlis, Jr., Chicago, Ill. In a rotary kiln, in combination, a rotatable cylinder having a section lined with fireproof material, fireproof shelves projecting from the inner surface of said section and arranged spirally, rectangular lifting and agitating brackets radially mounted on the inner shell of the unlined portion of said cylinder, partitions arranged spirally with reference to each other dividing said brackets into parts or series and means for imparting motion to said cylinder.

743,550. PROCESS OF EXTRACTING METALS FROM CYANIDE SOLUTIONS.—James A. Ogden, Deadwood, S. D., assignor of one-fourth to S. W. Russell, Deadwood, S. D. A process of treating gold, silver or other metals from a cyanide or primary solution, consisting in mixing in a receptacle a given quantity of said primary solution with a given quantity of a secondary solution having a metal base and capable of liberating the metals in said primary solution; leaving said mixture in said vessel until said liberation is partially effected, then passing said mixture into a second receptacle and agitated therein so as to produce a complete commingling of said solutions, from thence running the mixed solution into a settling-tank and allowing it to settle, drawing off the clear solution, and then drying the precipitation and pressing and melting it into bullion.

743,551. APPARATUS FOR EXTRACTING PRECIOUS METALS FROM CYANIDE SOLUTIONS.—James A. Ogden, Deadwood, S. D., assignor of one-fourth to S. W. Russell, Deadwood, S. D. The combination of primary and secondary solution tanks with graduated measuring-glasses, a mixing receptacle, an agitating device adapted to receive the mixture of said solutions from said mixing-receptacle, a settling-tank and a clear-solution-receiving tank.

743,566. ALLOY.—Walter Rühel, Berlin, Germany. An alloy consisting of aluminum, copper and cadmium.

743,591. APPARATUS FOR PURIFYING GAS.—Charles I. Tenney, Mason City, Iowa, assignor to Practical Gas Construction Company, North Chicago, Ill. In a gas cleansing and purifying apparatus the combination of an exterior tank with an interior inverted tank, gas inlet and outlet pipes connected with the inner tank and means for giving a circuitous horizontal route to the gas passing through the upper part of such inner tank, said means consisting of a downwardly-depending interrupted diaphragm and a layer of cleansing material such as charcoal within such inner tank and within the path of such gas.

743,611. CAR-HAUL.—Alfred M. Acklin, Pittsburg, Pa., assignor to Heyl & Patterson, Pittsburg, Pa. In a car or like haul, an endless traveling chain, a swinging dog on said chain adapted to engage the object to be moved in either direction, and a guide or support on which said chain travels.

743,613. CONVEYER.—Gaston A. Bronder, Brooklyn, N. Y.—The combination of a conveyer, a liquid-sealed conduit between the body of the conveyer and its running gear, means for propelling the conveyer in the conduit and means for maintaining the water in the conduit at a uniform level when operating the conveyer.

743,664. ANTHRAQUINONE-ALPHA-SULPHONIC ACID.—Robert E. Schmidt, Elberfeld, Germany, assignor to Farbenfabriken of Elberfeld Co., New York, N. Y., a corporation of New York. The herein-described new anthraquinone-alpha-sulphonic acid, which in the shape of the potassium salt forms straw-yellow brilliant leaflets soluble with difficulty in water; its aqueous solution acidulated with hydrochloric acid turning into intense yellow by the addition of zinc-dust; being transformed into alpha-amidoanthraquinone when heated with ammonia to 180° C., and being transformed into alpha-metbylamidoanthraquinone upon treatment with an aqueous solution of methylamin at 170° to 180° C.

743,668. EXTRACTING CHROMIUM FROM CHROME-IRON ORE.—Robert Suchy and Heinrich Specketer, Griesheim-on-the-Main, Germany, assignors to the Chemische Fabrik Griesheim Electron, Griesheim-on-the-Main, Germany. A process of making soluble chrome-iron ore and obtaining chromium compounds, which consists in heating the ore together with sulphuric acid and an oxidizing agent.

743,677. FUEL.—Havens B. Bayles, New York, N. Y. As a new article of manufacture, fuel composed of a fibrous substance, saturated with glycerine.

743,681. SECTIONAL CAM FOR ORE-STAMPS.—August P. J. Bossell, Angels Camp, Cal. In a cam, the combination of two separable members having interlocking hub-sections divided on lines substantially within the ends of the cam, each of said cam members formed integral with a curved tang or segmental flange which overlaps the line of division of the hub and is adapted to bear upon an opposite hub-section, each hub-section having a curved recess of which the segmental flange forms an outer wall and a projection on one section adapted to fit the recess of the opposing section, and said sections having cam-grooves in their bearing-surfaces, and a segmental key slidable in said grooves.

743,710. MEANS FOR ELECTRIC SEPARATION.—Elmer Gates, Chevy Chase, Md. In apparatus for electric separation the combination of an electric terminal constituting a collecting member, provided with an annular crevice, means communicating with said crevice for drawing into it electrically-attractable particles electrically attracted toward the collecting member, and means for exhibiting to the collecting member the mass to be separated in a thin tubular veil, whereby the entire field of attractive energy generated about the collecting member is utilized.

743,715. MANUFACTURE OF STEEL.—Robert A. Hadfield, Sheffield, England. In steel-making by the pneumatic method, the process of controlling the oxidation of the molten metal during the conversion thereof into steel, which consists in making successive introductions of manganese to the charge subsequent to the commencement and before the completion of the blow.

743,732. PROCESS OF MAKING CUPROUS MAGNETIC OXIDE.—William J. Knox, West Fairlee, Vt., assignor to George Westinghouse, Pittsburg, Pa. A process of producing cuprous magnetic oxide, which consists in oxidizing molten copper in the presence of magnetic oxide.

743,733. CHEMICAL COMPOUND.—William J. Knox, West Fairlee, Vt., assignor to George Westinghouse, Pittsburg, Pa. A compound consisting of couprous oxide carrying in homogeneous molten solution magnetic oxide of iron.

743,752. SEPARATOR.—Walter G. Read, Davisville, Cal. A separator having a table provided with grooved, convex surfaces; means for carrying off material retained by the grooves to one place; means for carrying off to a different place material which is not retained by the grooves; and means connected with the table for shaking it.

743,791. BALL GRINDING-MILL.—Max F. Abbé, New York, N. Y. A ball grinding-mill, comprising a drum composed of a cylinder having heads, and provided with heads exterior to and at some distance from the cylinder-heads, a hopper in the feed-end heads of the cylinder, a plurality of transverse steel bars arranged between the heads of the cylinder concentrical to the cylinder, screens between the bars and the cylinder, openings in the feed-end head of the cylinder at the inner side of the screens, a spiral conveyer between the feed-end cylinder-head and exterior head, openings in the discharge-end head between the outer screen and cylinder, a spiral conveyer between the discharge-end cylinder and exterior heads, and means for discharging the ground material at the inner end of the discharge-end spiral conveyer.

743,799. METHOD OF CRUSHING AND STAMPING ORES.—James C. Anderson, Highland Park, Ill. A method of milling ores, which comprises essentially first, the direct application of the weight of a suitable column or head of water, delivered to the point of application of power through a pipe or similar closed conduit to overbalance and elevate the die; and, secondly, permitting the water to escape and the die to descend by gravity.

743,800. STAMP-MILL MACHINERY.—James C. Anderson, Highland Park, Ill. A stamp-mill consisting of one or more mortars and dies mounted in a suitable frame, mechanical means for lifting the dies, and a closed conduit for directing a column of water from an elevated source by gravity alone directly to the die-lifting mechanism, whereby the dies after being lifted are permitted to fall by gravity and independent of the lifting mechanism.

743,802. PIGMENT AND PROCESS OF MAKING SAME.—William J. Armbruster, St. Louis, Mo. A process of making pigment which consists in mixing barium hydrate, the carbonate of an alkali metal, and a soluble salt of aluminum, and recovering the resulting precipitate.

743,854. WELL-ROD EXTRACTOR.—Warrin W. French, Vanderbilt, Mich. A well-rod extractor comprising a body portion having two side members with two collars rigidly attached to the lower ends of the same and spaced apart as described, a sliding collar arranged on the side members between the two rigidly-attached collars and spring clutch-arms attached at their lower ends to the sliding collar and extending upwardly inside of the upper rigid collar and arranged as described to work between the side members to grip the well-rod.

743,871. AMALGAMATOR. — Henry Hoeschen, George Marks and Hieronymus Eisele, Omaha, Neb. An amalgamator comprising a rotatable cylinder, an internal spiral amalgamating and conveying plate carried by the cylinder and rotatable therewith, mixing-paddles and collecting-blades adjustably held between the convolutions of the spiral plate, a settling-chamber formed at one end of the cylinder, means for rotating the cylinder, means for feeding pulp into the cylinder, means for removing the exhausted pulp from the settling-chamber, and means automatically controlling said removal.

743,922. APPARATUS FOR MAKING MIXTURES OF NITRIC AND SULPHURIC ACIDS.—Francis I. Du Pont, Wilmington, Del. In an apparatus for obtaining mixtures of nitric and sulphuric acids, the combination with a retort, of an absorber, a conduit connecting the same for conveying fumes from the retort to the absorber, a return-conduit connecting said absorber and retort, arranged to discharge the returned unabsorbed gases into said retort, and means for maintaining circulation of gases from said retort through said outgoing-conduit, absorber and return-conduit into and through the retort.

743,947. FURNACE.—David R. Steele, Curtis Bay, Md., assignor of one-half to Harry D. Harvey, Baltimore, Md. A smelting apparatus comprising a casing forming a furnace, a crucible fixedly mounted therein, a burner for forcing flames into said furnace around the crucible, and a baffle-block mounted upon the bottom of the furnace and supporting the crucible above the said bottom, the said block dividing the flame and delivering it equally beneath and around the crucible.

743,955. SCRAPER FOR ROLLER-MILLS.—George F. Thompson, Philadelphia, Pa., assignor to Nordyke & Marmon Company, Indianapolis, Ind. The combination with the rolls of a mill, of a scraper composed of a body, an arm and a scraping-blade, a fulcrum-rod by which said scraper is supported, and a spring-tension connection attached to the outer end of said arm.

744,014. METHOD OF CUTTING STEEL PLATES.—Edwin W. Lewis and John S. Unger, Munhall, Pa. A method of finishing armor-plate consisting in carburizing the face thereof, liquid-quenching the carburized portion, and then cold-sawing through the plate by a rapidly-revolving metal disk.

GREAT BRITAIN.

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

Week Ending October 24, 1903.

14,112 of 1902. ELECTRIC GAS DETECTOR.—H. G. Prested, London. An electric glow-lamp for detecting the presence of explosive gas in mines.

20,984 of 1902. COKE CONVEYOR.—G. and A. Little, Smethwick. Improvement in the inventors' coke conveyor, consisting of pushers in a trough, the object being to prevent the breaking of the coke.

22,663 of 1902. WHITE LEAD MANUFACTURE.—W. R. Oliphant and H. S. Elworthy, London. In the manufacture of white lead introducing pure carbonic acid under pressure into a rotating vessel containing a mixture of litharge, acetic acid and water.

23,021 and 23,022 of 1902. MINERS' LAMP.—R. O. Best, Morley. Improvement in the inventor's system for igniting miners' oil lamps by electricity.

25,683 of 1902. PRODUCING BASIC SULPHATE OF ALUMINA.—H. Spence, Manchester. Treating normal sulphate of alumina with ammonia, so as to produce a basic sulphate having the formula $Al_2O(SO_4)_2$.

18,292 of 1903. FUME-CATCHER.—R. McKnight, Philadelphia, U. S. A. A rotating vessel for catching in water the fumes thrown off in volatilization or roasting processes.

TO ENGINEERS VISITING NEW YORK.

A room for the exclusive use of visiting mining engineers is maintained at the New York office of the ENGINEERING AND MINING JOURNAL. Visitors to the metropolis are cordially invited to take advantage of the facilities it offers, by having their mail addressed in care of the JOURNAL and making this office their headquarters. The managers of the branch offices will also be glad to welcome visiting engineers and to be of any service to them that they can.

We are informed that the Institution of Mining and Metallurgy offers to all members of the American Institute of Mining Engineers non-resident in Great Britain, the privilege of free use of the Institution offices and library in Salisbury House, London Wall, E. C. Visiting engineers may have their letters addressed to the offices of the Institution, and thus enjoy the advantages of temporary office accommodation in the city of London.

PERSONAL.

Mining and metallurgical engineers are invited to keep the ENGINEERING AND MINING JOURNAL informed of their movements and appointments.

Mr. J. H. Curle is at Melbourne.

Mr. Edward G. Stoiber has taken up residence in Paris.

Mr. J. Parke Channing has returned from Nova Scotia.

Mr. Paul de Rilly is at San Felipe, Guanajuato, Mexico.

E. E. Chase, of Denver, is at Butte on professional business.

Mr. Lewis A. Dunham has returned from New York to Kansas City.

Mr. Ross Hoffman, who was recently in New York, is now at San Francisco.

Mr. W. L. Honnold has returned to Johannesburg after a vacation in Natal.

Mr. Jas. W. Neill, of Salt Lake City, has been examining mines in Montana.

Mr. W. N. Cowell is manager of the Barranca Copper Co. in western Chihuahua.

Mr. Wm. Beals is now at Albion, Florida, investigating certain phosphate deposits.

Mr. Chas. D. Lane, of San Francisco, has returned from Nome and is now at Seattle.

Mr. George F. Duck, of Pittsburg, Pa., left recently for Iowa on professional business.

Mr. J. E. Spurr, of the United States Geological Survey, is visiting at Gloucester, Mass.

Mr. E. M. Rogers has returned to New York from professional work in Montana and Nevada.

Mr. Lewis T. Wright is general manager of the Mountain Copper Co., at Keswick, California.

Mr. A. B. Frenzel, commissioner of rare metals to the St. Louis Exposition, is visiting New York.

Mr. Charles S. Curtis, formerly of Mexico, is chemist for the Board of Health in New York City.

Mr. A. L. Dean has been appointed metallurgist to the Mt. Lyell Mining & Railway Co. in Tasmania.

Mr. Sidney C. Malcomson, of Butte, Mont., is en route to El Oro, Mexico, on professional business.

Mr. T. Irwin Crowley, from Western Australia, arrived by the *Campania* and proceeded to Denver.

Prof. F. C. Smith, of Chicago, has been inspecting properties in the neighborhood of Harrisburg, Ariz.

Mr. Chris Outhett has been appointed assayer to the Copper King mine, Kamloops, British Columbia.

Mr. Eric E. Watson has been appointed manager of the Queensland Smelting Co. at Aldershot, Queensland.

Mr. D. S. Johnson is with the Centennial and Green Mountain companies at Grass Valley, California.

Mr. Ferdinand Dietzsch has been appointed consulting engineer to the Giant Mining Co., in British Columbia.

Mr. J. J. Irvine-Jameson, until lately on the Rand, is now manager of the tin mines at Kuils River, near Cape Town.

Mr. B. L. Jones, of Arizona, has been appointed manager of the Josephine mine at Cusihuariachic, Chihuahua, Mexico.

Mr. Jas. Macfarlane, formerly engineer with the Anaconda Co. at Butte, Mont., has taken up residence at Denver.

Mr. R. L. Lloyd is manager of the reduction department of the Greene Consolidated Copper Co., at Cananea, Mexico.

Mr. Sam V. Newell, of Central City, Colo., has returned from Mexico, where he has been inspecting mining properties.

Mr. Gordon Forbes and Mr. F. C. Roberts have been making an extended tour of their companies' mines in Rhodesia.

Mr. John J. Vandemoer, the representative at Denver of THE ENGINEERING & MINING JOURNAL, is visiting New York City.

Mr. Richard H. Pascoe, formerly of Rossland, B. C., has been appointed superintendent of the Cornucopia mines in Oregon.

Mr. Dwight B. Huntley, engineer to the Matabele Gold Reefs Co., is now residing permanently in the Gwanda district, Rhodesia.

Mr. Robert T. Hill has severed his connection with the American Finance & Securities Co. He is now at Cananea on professional work.

Mr. R. E. Briggs, of Mexico City, representative of the Loomis-Pittibone Co. and the Holthoff Manufacturing Co., is visiting New York.

Mr. John Brooks has been engaged as superintendent at the Dewey mill, Bingham, Utah, now owned by the Columbia Copper Company.

Mr. B. B. Thayer, manager of the Santa Rita Mining Co., in New Mexico, has returned to the mine, after a business trip to New York.

Mr. H. T. Pomberton, of Montreal, is to have the business management of the Montreal and Boston Co., Boundary Falls, British Columbia.

Mr. Richard McBride, Premier of British Columbia, has resigned the portfolio of Lands and Works to assume charge of the Department of Mines.

Mr. W. N. Nesbit, Pocatello, Idaho, has been engaged as superintendent of the properties of the Fort Hall Mining & Milling Co., near Pocatello.

Mr. G. F. Beardsley has resigned his position as metallurgist to the Mt. Lyell Mining and Railway Co. He is expected at San Francisco shortly.

Mr. Simon Guggenheim is at Denver, making one of his regular visits to the smelting establishments of the American Smelting & Refining Company.

Mr. B. F. Bush has been appointed vice-president and general manager for the properties of the Consolidated Coal Co. at St. Louis, effective November 1.

Mr. E. H. Garthwaite, consulting engineer to the British South Africa Co., is leaving Africa early next year to take six months' holiday in the United States.

Mr. John Calder has resigned his position with the C. W. Hunt Co. at West New Brighton, N. Y., to enter the employ of the Remington Typewriter Company.

Mr. Joseph F. Body, formerly of New York, has accepted the position of general manager of the Arroyo Rico Mining & Milling Co. at Chihuahua, Mexico.

Mr. S. L. Pearce, of Louisville, Ky., president of the La Luz Gold Mining Co., has been visiting the company's mines at Maguarichic, in western Chihuahua.

Mr. W. C. Marshall has resigned the management of the Marshall-Russell Mining Co.'s property at Georgetown, Colo., and has been succeeded by Mr. F. A. Maxwell.

Mr. C. N. Fenner, of the Engineering Co. of America, recently returned to New York from Bolivia, South America, after inspecting mining properties for his company.

Mr. W. H. Webber has resigned as superintendent of the New Rambler mine, Holmes, Wyo., and accepted a position with the Interstate Mining Co., Stateline, Utah.

Mr. George Madera, field assistant to the California state mining bureau, is now in the northern part of the State gathering data and minerals for the exhibit at the St. Louis fair.

Mr. W. Broadbridge, who has had charge of the Sons of Gwalia, Ltd., mines at Leonora, Western Australia, has been appointed manager of the Vivien Gold Mines Ltd., at Lawlers, Western Australia.

Mr. Wilfrid S. Holloway, of London, formerly of Los Angeles, Cal., has accepted the management of the reduction works of the Gwendolen mine, Corea. He is now on his way thither by the Trans-Siberian route.

OBITUARY.

Frank W. Tracy, of Springfield, Ill., president of the Sangamon Coal Co. of that place, died November 8. At the time of his death he was also president of the First National Bank of Springfield, a director in the Racine-Sattley Co., Interstate Telegraph & Telephone Co., Baltimore & Ohio Southwestern Railway, Chicago & Alton Railway, and the Capital Electric Co., of Springfield, and chairman of the committee on uniform laws in the Bankers' Association.

SOCIETIES AND TECHNICAL SCHOOLS.

AMERICAN CHEMICAL SOCIETY, NEW YORK SECTION.—The second regular meeting was held at the Chemists' Club November 6. Papers were read by C. W. Volney, on 'Nitro-Sulphuric Acid and Its Action on Organic Compounds;' H. T. Beans, on 'Meta-Animo-Benzolitril and Some of Its Derivatives;' P. A. Levene, on 'The Proliolytic Cleavage Products of Gelatine,' and W. E. Chamberlain, on 'A Device for Accurate Reading of Burettes.'

INDUSTRIAL.

The Utah Commission has contracted with the Allis-Chalmers Co. for the construction of a miniature mill to operate at the St. Louis Exposition.

The American Car & Foundry Co. has secured a contract for 10 box and 10 coke cars from the Coahuila & Zacatecas Railway Co., of Mexico.

The Bouse Hydraulic Machinery Co. has opened at 503 Mission street, San Francisco, Cal., with a complete line of hydraulic and mining machinery.

It is not probable that the coking plant and chemical works of the Zenith Furnace Co., of Duluth, Minn., will be ready for operation this fall. The furnace may not be running before spring.

The Crocker-Wheeler Co., of Ampere, N. J., has established headquarters for the southern representative of its Washington office, Mr. S. M. Conant, at 425 Empire Building, Atlanta, Ga.

The Lunkenheimer Co., Cincinnati, O., has opened a branch office in Paris, France, No. 24 Boulevard Voltaire, where the company will carry a complete stock of its goods. This company has offices in Cincinnati, New York and London, England.

The Stanley Electric Manufacturing Co., of Pittsfield, Mass., announces the opening of two new sales offices, one at Cincinnati, with headquarters in the Perin building, in charge of O. H. P. Fant, and the other in the Century building, St. Louis, in charge of F. Johnson.

Hendrie & Bolthoff Manufacturing and Supply Co. has the contract for erecting and equipping a 50-ton concentrating mill for the Waldorf Mining Co. near Georgetown. The mill is being equipped with crusher, parallel rolls, impact screens and Card concentrators. The same house is erecting a concentrating plant for the Valley Mining Co., near Westcliffe, which will have a capacity of 100 tons of ore daily. Parallel rolls and Card tables will likewise be installed in this mill.

One of two locomotives which are being built at the Baldwin Works in Philadelphia, for the Canadian Copper Co., at Sudbury, Ont., will have parts composed of nickel steel. Every 100 lb. of steel in the boiler will contain from 3 to 4 lb. of nickel. The other parts which will be of nickel-steel will be the frames and rails, driving axles, crank pins, piston rods and other important parts. The International Copper Co., which controls the Canadian, will provide the nickel.

The Crucible Steel Co. of America has decided to discontinue the publication of its bi-monthly journal, "Sparks from the Anvil," and in accordance with its general policy of retrenchment will also abandon its publication department. Albert L. Butler, the editor and manager of this department, will retire from the company's service November 15. Mr. Butler organized the company's export and publication departments. His address until February 1 will be Hammonton, New Jersey.

Douglas McLean, formerly of Denver, has been appointed manager of the Department of Mines and Milling of the Freid Engineering Co., at Orange, N. J. Mr. McLean will handle the Freid dry process gravity separators and such other machinery as pertains to his department. His office is at 156 Broadway, New York City. Messrs. Copleston & Saxelby are the selling agents for the Freid separator, made by the Freid Engineering Co. Their New York office is at 39 Cortlandt street. They are selling machines for replacing screens and for sizing various materials.

Referring to the affairs of the Chicago Pneumatic Tool Co., President Duntley says that the company has paid promptly all its interest and sinking fund charges on its bonded indebtedness. It has declared its dividends out of actual earnings, after writing off all expenses, fixed charges, and allowing liberally for depreciation of plants, etc. It has paid its dividends out of its own moneys. It does not owe a dollar of borrowed money. It has no floating indebtedness, except current monthly bills for material and supplies, which do not exceed $48,000, and these it is ready to pay promptly when due. The company has over $1,000,000 in quick assets over and above all current liabilities, including current bills, accrued interest, dividends, etc. Its net earnings for the past nine months are $513,224. Its present business, and the outlook for the future, is satisfactory in every way. Its European business is growing faster in proportion than the local business. The company is now

selling its tools and machines in every civilized country in the world, and is no longer dependent solely on the American trade. The regular annual statements will be published at the end of the year.

TRADE CATALOGUES.

Coal handling machinery, including hoisting engines, automatic buckets, steel hooms, towers and coal pockets; also revolving screens and coal cars are shown in a 72-page pamphlet published by the George Haiss Manufacturing Co., of New York City.

A folder describing the Prairie fire drag, a device for extinguishing prairie fires, is being sent out hy the H. W. Johns-Manville Co., of New York. The drag consists of a chain mat covered with an asbestos smothering blanket, and may be easily and quickly adjusted to drag by two saddle horns or hy single tree.

The Joseph Dixon Crucible Co., of Jersey City, N. J., issues a descriptive price list, a 20-page pamphlet, of its graphite lubricants. The pamphlet contains some general information on graphite as a luhricant, the varieties of graphite used hy the company, and gives price lists of a great variety of special lubricants, including axle and cup greases, motor chain greases and Dixon's special graphite for the lubrication of gas and gasoline engines, scientific instruments, etc.

The Cleveland Crane & Car Co., which has its factory at Wickliffe, O., and branch offices in New York, Pittshurg and Chicago, is issuing a series of illustrated bulletins, calling attention to the various products of its works. Bulletin F describes the Armington electric hoist for chain attachment or for overhead tramrails, having a capacity from 2.5 to 10 tons. Bulletin G describes the company's hand and electric jib, post and car cranes. Bulletin J mentions cranes, of the electric traveling type, for use in hoiler and machine shops, etc. Bulletin H describes the company's hand-power travcling cranes, ranging in capacity from 5 to 40 tons.

A pamphlet of 52 pages, issued hy the Christy Box-Car Loader Co., of Des Moines, Ia., describes in detail the construction and use of the company's loaders for loading all sizes of bituminous or anthracite coal, ore or other minerals into box or stock cars. Simplicity, durability and capacity are some of the merits claimed for this machine. It is stated that at a number of mines the company's loaders are handling from 1,500 to 2,000 tons per 8-hour day each. Either shaker or gravity screens can be used before this loader, and the size of the load dumped is immaterial. The loaders are equipped either with a steam engine or with an electric motor. The pamphlet contains a long list of testimonial letters from users and contains illustrations of mines where the loader has been installed.

Catalogue No. 5, a 48-page pamphlet published by the Risdon Iron Works, of San Francisco, Cal., describes Evans' hydraulic elevators and hydraulic mining machinery. The company states that an Evans elevator having a 16-in. discharge pipe now in use at the Golden Feather channel in California was fitted up and put in operation in 12 hours handling water at the rate of 18,000,000 gal. in 24 hours. The only excavation necessary was a space 4 ft. square, compared with a space of 128 sq. ft. required hy an elevator put in previously. Two of the elevators have elevated 52 ft. with 250 ft. pressure, and a 2.75 in. jet handling all the water from a 2.5 in. giant with the same head, together with the sand and gravel piped down the sluice. In one instance only 400 in. of water were used for both elevator and giant, and 2,400 tons of material were elevated daily. In connection with its hydraulic outfits the company calls attention to its Evans' iron riffles for sluice hoxes and flumes; also its undercurrents and gold-saving tables. The company's hydraulic giants equipped with deflectors are made in sizes using from 2 to 5 in. nozzles. The catalogue contains information on the measurement of the miners' inch and its duty, the flow of water through orifices over weirs through pipes and nozzles, etc., and is in a way a condensed treatise on the subject of hydraulic mining.

SPECIAL CORRESPONDENCE.

Butte. Nov. 13.

(From Our Special Correspondent.)

Resumption of operations in all of the properties of the Amalgamated Copper Co., which were ordered closed on October 22 throughout the State took place to-day. The local management gave orders to that effect on receipt of word from the Governor of the State that he had called an extra session of the legislature to meet on December 1. The Governor required such assurance before he would issue the call. The mere fact of the resumption is a great relief to all classes, although considerable opposition to the stand the Governor has taken is showing itself. Now the question is, what is the legislature going to do? The people of the State, especially of that portion of it outside of the litigating zone, are heartily weary of all this wrangle that is cutting such a figure with the politics that no section is entirely free from its influence.

A most appalling disaster occurred last week at the Kearsarge mine, situated near Virginia City, in Madison county. R. B. Turner, superintendent of the mine and seven employees lost their lives therein from smoke from the burning of the boiler house located at the entrance to the tunnel. The Kearsarge mine is owned and operated by the Millards, of Omaha. The property was purchased by them some months ago, and was being extensively developed. A 60-stamp mill and cyanide plant is now in course of erection thereon. R. B. Turner who was in charge of the mine and improvements has made the cyanidation of the gold ores of the State a life study, he it was who built the first mill in the State using cyanide. That was erected at the Revenue mine at Richmond Flats in 1892. Mr. Turner was well known throughout Colorado, where he formerly lived.

The Granite Bimetallic Mining Co., of Philipshurg, which has been in the hands of a receiver for several months has paid up all of its indebtedness so that the receiver will soon get his discharge. Mr. Paul A. Fusz has, as receiver shown net earnings of about $112,000. The debts of the company were about $75,000.

A severe snowstorm has completely buried the State, interfering with mining operations.

The completion of the Montana Railroad to Lewiston, the county seat of Fergus county brings the mining sections and camps of the North Moccasin and Belt mountains into direct railroad communication with the outside world. The railroad connects with the main line of the Northern Pacific at Lombard, 45 miles east of Helena. The line is 160 miles long, and such camps as Gilt Edge, Kendall and Maiden where a number of cyanide mills are in operation will find it of advantage.

Denver. Nov. 14.

(From Our Special Correspondent.)

On the 9th inst. several thousand coal miners in Colorado, comprising both union and non-union men, ceased work pursuant to the strike call of the United Mine Workers of America, of which John Mitchell is president. The tie-up was more complete than the operators had anticipated or the union agitators had hoped for. In the northern coal-field, where it was hoped the strike would be avoided, about 1,500 men quit work, while 400 continued at work in independent properties. In the southern coal-field in Las Animas county, nearly 8,000 went out, while nearly 1,000 continued at work. Of the 1,800 miners in Huerfano county 450 walked out. In Fremont county, practically all the 1,800 miners quit work. The Colorado Fuel & Iron Co. and other large operators in the southern field, claim that some of the men have since returned to work, and that they are expecting more to do so.

The conditions growing out of the coal strike are said to be now changing for the better. The leading coal companies unite in saying that there will be no coal famine; that the coal in reserve, added to that which is still being mined, is enough to carry Colorado well through the winter, and in the event any emergency should present itself, coal can be brought from other States. Generally speaking, the old prices still prevail.

Six of the 15 departments of the Colorado Fuel & Iron Co.'s manufacturing plant at Pueblo will close to-night, and about 3,500 men be thereby thrown out of employment. This will liberate the large coal reserves at that plant for the local market in Denver and other Colorado points. It is considered that the best interests of the public will be served by tiding the consumers over the present stringency of production. About 2,000 men will remain at work in those departments of the plant least affected by the coal shortage.

No acts of violence have so far been reported from the coal-fields. The officials of the unions are hopeful of victory, but are not making statements that reflect such confidence as was apparently felt at the beginning of the week.

Yesterday the operators in the northern coal-field met their men in conference, and went half-way in mutual concessions, which may result in the strike being called off in that section. It was proposed that the men go to work on Monday at the eight-hour day and that the eight-hour day should remain if the miners in the southern coal-fields are granted an eight-hour day. If not, the northern coal-field to go back to a ten-hour day. The Union demand was for a raise of pay of 20 per cent and eight hours. If the men accept the offer of the operators, they will get an increase of about 10 per cent and the eight hours. The northern coal-field produces about 6,000 tons of coal a day.

The Colorado Fuel & Iron Co. voluntarily raised the wages of the men employed in its numerous coal mines 20 per cent a year ago, and a similar advance in wages was made in the northern coal-field about the same time. The company officials insist that their miners have no grievance; that the men have made no demands, and are not striking for any grievance that has ever been brought to the attention of the management.

The mines in the Cripple Creek and other districts are said to have an ample supply of coal on hand to carry them well into the winter, the mine managers having been accumulating a stock ever since the first threat of a strike on the part of the coal miners.

San Francisco. Nov. 11.

(From Our Special Correspondent.)

Up in El Dorado county the local Miners' Association is trying to find a way to build a debris-restraining dam on Webber creek at the narrows below its confluence with Hangtown and Cold Springs creeks. This Weaver or Webber creek is one of the principle tributaries of the South Fork of the American river. The water-shed occupies a considerable area in the central portion of El Dorado county, in which are very extensive and numerous deposits of auriferous gravel adapted to be worked by hydraulic mining, but the properties are all idle on account of the requirements of the law as to impounding debris. Before these restrictive laws were in force many famous hydraulic mines were worked on Weaver and Hangtown creeks, and this work would be renewed if suitable provision could be made to prevent the debris from reaching the navigable waters of the Sacramento valley. An examination has been made for a site for the proposed dam, and they find that at the point most favorable 12,000,000 cu. yd. of material could be impounded close to the dam and the coarser material impounded above would permit the dislodgment of 50,000,000 yards of auriferous earth. The land to be inundated by the backing up of the water is mostly mined-off bed rock. The committee think $25,000 would pay for the dam and title to the necessary lands. The Government requires individual miners to pay for their own restraining dams for debris. The great dams being built at Daguerre Point in Yuba county by the Government are not, as often supposed, to permit miners to work behind them, but to stop debris already in the streams from coming down to navigable waters. All miners above these public dams must still impound their debris as before.

The numerous miners' and other labor strikes throughout the country have caused many people to be idle, and numbers of men are going into the mining regions to get work. This is particularly apparent in Shasta county where large mining operations are going on, but there is little or no demand for outside labor. There are at present as many miners employed in that county, as for any time during the year, and there is no room for new men.

Mr. G. W. Rumble, manager of the Sunset Mining Co. of Oroville, who was recently indicted by the Federal grand jury on the charge of using the mails to further alleged fraudulent mining schemes, and was held to answer, gave bail bonds for $3,000. When the case was taken out of the jurisdiction of the Commissioner and transferred to the United States district court. Judge De Haven asked that Rumble be produced in court. However, he has not been found and a bench warrant has been issued for him, which the United States marshal has been unable to serve owing to his absence somewhere not determined.

Letson Balliet, of the White Swan Mining Co. of Oregon (a California corporation), had delivery of his mail stopped in this city by the local postmaster on order by the postmaster-general. All such letters were to be returned to senders with word "Fraudulent" marked across them. Now Balliet has asked for an injunction against the San Francisco postmaster restraining him from withholding his mail, and the matter is to come up November 16. Meantime, according to an article published in the Blue Mountain American (Sumpter, Oregon) labor liens have been filed by several employees against the White Swan company near Baker City. The Bedrock Democrat says that the pumps have been pulled, the property closed and a number of employees were not paid at the finish. The troubles of the manager with the Government forced the suspension. The same man is "working" a mine in California. Balliet has appealed the case in which he was convicted of using the mails for fraudulent purposes, and he cannot now get his mail. He contends he is injured by this order, as doubtless he is, as many of the letters contain money for purchase of stock in his widely advertised mining schemes.

Quite a surprise was given the public this week when a jury convicted certain Plumas county men for subornation of perjury in connection with the matter of taking up timber lands in that county. In all, about 18,000 acres of timber land were taken up. Most of this timber is in mining sections, and those indicted are men connected with the mining interests, acting as agents for others, by getting people to

make timber locations and then buying their rights, to be ultimately transferred. The Government officials claim this decision will have a salutary effect on land-grabbers in the mountain timber districts.

The important mining suit of Joseph Stephens against the Yreka Mining & Milling Co., of Rollin, Siskiyou county, has been decided by the award of $56,250 damages to the plaintiff, but will doubtless go to the Supreme Court for final adjudication. The plaintiff claimed that the company had taken ore valued at $150,000 from his ground, but the jury gave him the amount named. This is the second suit of this character brought against this company in a year. The former one was brought by John Daggett for taking ore from the adjoining Evening Star and Central mines. He was awarded $1 damages, which proved his boundary line, but he did not prove the value of ore taken from his ground. The Yreka is the old Gold Ball mine, and has been quite a profitable mining operation.

From several interior mining counties come reports of an unusual demand for gold mining properties, and their scarcity has created a demand also for properties in a prospective stage. In Nevada county especially numbers of men are trying to secure options on properties, either old or new. The old ones are to be reopened and properly developed. Numbers of claims which have not been worked for years are being inspected, and some have been reported upon favorably. This state of affairs is not confined to Nevada county, but in a lesser degree is apparent in many portions of the State.

Alaska. Nov. 4.

(From Our Special Correspondent.)

The unexpected re-opening of the Yukon enabled shippers to send down to Dawson a lot of fresh meat and cattle, which were caught in the early freeze, and this should have some effect on prices in that region this winter. It is to be noted that some of the large trading companies have commenced extending winter credit to miners this fall with the object of increasing the gold output by keeping the men at work. This will also encourage outside prospecting, provided the companies give credit to prospectors as well as mine-owners, as used to be the custom. As laborers under the law have a lien on half the gold product of a claim, the lay-men are given preference in the matter of credit at the stores, as each one is responsible for his individual share. About 75% of the work this winter will be done by men working on 'lays.' In former times, before the great Klondike rush of 1897, the miners, throughout Alaska and the upper Yukon region, obtained credit from the Alaska Commercial Co. so as to continue their work and, generally speaking, the money was paid at time of clean-up. When a lot of 'Cheechalkers,' or new men, got into the country, and were not as honest as the old hands used to Alaskan customs, the companies lost some money, and credit began to be much more restricted. But the adventurers have become pretty well weeded out in these days, and most of those who are there are engaged in legitimate mining enterprises, so credit is again being allowed. Where men have the chance for about only one clean-up a year it is hard for any large number of them to get along without some credit system.

A new strike is recorded 60 miles north of the Alsek diggings, northwest of White Horse, and a stampede is on from White Horse and the vicinity.

The Council City & Solomon Railroad Co. intends building a great deal more road on the Seward peninsula next season. The road has been graded from Solomon to Council City, and 10 miles of rail laid. Proposed extensions will tap Ophir creek, Kasotapaga and Cripple river. Material for 50 miles more track is on the ground. The road taps a region where freight has been very high in the past, and where many mines are being worked or opened.

It is reported from the North that, at Teller and the Golovin Bay mining regions, there is apt to be a shortage of provisions this winter. Many of the men depended on getting their supplies late in the season, but ice has prevented vessels with cargoes getting in. Of course provisions can be obtained from Nome, but it is a tough job to haul them across to Golovin.

Word comes from Sitka that the big plant of the Rodman mines has again shut down. Considerable money has been spent on this venture, and a 60-stamp mill has been installed with room for 60 more stamps. There has been no production as yet.

The new placers found on the headwaters of the Sushitna river are now claimed to be as rich as any in Alaska. Numbers of startling stories as to richness of the ground are being circulated.

Spokane. Nov. 6.

(From Our Special Correspondent.)

The Hendryx process of cyaniding ores, described in a recent number of the ENGINEERING AND MINING JOURNAL, is attracting interest here, for it promises much for Republic camp. The district at depth has not made good on the early expectations of high-grade gold ores, but instead has shown large reserves of gold-silver ore, running from $5 to $15 in values. With a freight and treatment rate of $6.50 at the Boundary smelters, in British Columbia, profits in mining have been out of the question, and even the richer properties, like the Quilp and the Mountain Lion, have been constantly troubled to secure a market for their ore. It is almost pure silica, and the self-fluxing character of the Boundary ores will not permit of the addition of any considerable volume of silicious ores. Quilp is shipping to Tacoma, where the ore is used for converter linings, and Mountain Lion is sending some ore to Granby, at Grand Forks, B. C., for the same purpose, and some to the Hall Mines smelter, at Nelson, B. C.; but in both cases the profitable output of the mines has been cut in two by inability to get adequate smelter facilities. The Hendryx process, from tests made on Quilp ore, appears to be adapted to the Republic product. It recovers more than 90% of the gold, and from 60 to 80% of the silver, with an average recovery of 86% on total values. A. E. Palmer, president of the Mountain Lion, is considering the installation of a Hendryx plant in connection with his abandoned mill at the Mountain Lion. The old plant contains all the necessary machinery and stamps for crushing the ore, and it is estimated that at a cost of $3,000 a 50-ton Hendryx agitator could be added.

Victoria, B. C. Nov. 10.

(From Our Special Correspondent.)

The inactivity that still characterizes the silver-lead mining industry in the Slocan and East Kootenay has occasioned much conjecture and remark, and the local press has made a strenuous effort to ascertain the causes. It was at first believed that the local smelters, in an endeavor to indirectly obtain a share of the bounty, had decided to demand a higher freight and treatment rate, and producers, in consequence, had decided to restrict operations until the smelters could be brought to terms. Upon direct inquiry, I learn however, that this rumor is absolutely without foundation; neither the Trail nor Nelson smelter has as yet introduced any change in their schedule of rates on silver-lead ores, which remains at $15 freight and treatment with a 10% zinc limit. This explanation failing, another is now advanced on more reasonable grounds, that of the mines in the Slocan, few have sufficient working capital, and are not in a position to ship extensively at the present time. There is also some rumor that the American Smelter Trust is negotiating for certain properties, and that, while these arrangements are pending, shipments are naturally suspended. But whatever the cause, the outlook in the silver-lead districts is disappointing in view of the anticipations, based on the assurances made by producers to the Government of the activity that might be expected to result immediately from the offer of a bounty of $15 a ton. Although the smelters have as yet made no attempt to increase rates, there is no doubt that it is their intention to do so upon the first favorable opportunity.

Cariboo.—Surveys are about completed at the Consolidated Hydraulic mine, Bullion, for the extension of the company's water system. Estimates of the cost of the proposed work will shortly be placed before the directors by the manager, Mr. Hobson. It is reported that Morehead lake is now 2 ft. higher than it was last spring when the water was turned on in the pits. The Thistle gold mine at Eight Mile lake is said to have made a final clean-up for the season of $50,000.

Rossland.—The Rossland representative of the Canadian Ore Concentration Co., writes that the results obtained so far from the tests given to the Elmore process in that district have been so encouraging as to justify the assumption of its successful application to the treatment of Rossland ores, and adds that the company has just received an order for a 50-ton plant from the War-Eagle Centre Star Companies. Meanwhile strong representations are to be made to the Dominion Government suggesting the removal of the duty of 5c. per gallon on mineral oil of the character used in connection with this process, it being advanced that the duty adds materially to the cost of a metallurgical process which promises to prove of great practical benefit to the mining industry of the Province, and that the Government has already established a precedent in the same direction, by admitting oils used for lubricating agricultural machinery duty free.

Slocan.—It is reported that a new ore-body 3 ft. wide has been encountered in the No. 6 tunnel at the Last Chance mine, assays from which have given 170 oz. silver and 60% lead. A promising strike is also reported to have been made on the Ivanhoe in No. 8 tunnel. At this property 45 men are at present employed, but the working force is shortly to be increased. It is also proposed to install machine drills. There are altogether some 450 men employed in the mines about Sandon. During the year about 1,800 tons of zinc ore have been shipped from the Slocan mines to Kansas. There are about 2,500 tons ready for shipment, which will probably be sent out before February. This supply will be principally drawn from the Payne, Ruth, Ivanhoe, Wakefield, and one or two other properties. In the Slocan city division, the Bachelor group on Carpenter creek has been bonded to Chicago men for $55,000.

Ymir.—The returns from the Ymir mine for September are again unsatisfactory, but it is officially intimated that the increased working costs are merely of a temporary character, caused by repairs. As a result of 27 days crushing with 60 stamps, 910 oz. of bullion were produced from 4,600 tons of ore, estimated value $10,000; 260 tons of concentrates were shipped gross value (estimated) $6,000; 3,050 tons of tailings were treated at the cyanide works, producing bullion to the estimated value of $2,000. The loss for the month was $860. The lessees of the Ore Hill mine have made a first small clean-up from the 2-stamp mill, of 15 oz.

San Luis Potosi. Nov. 3.

(From Our Special Correspondent.)

During the last several weeks that which may almost be considered a boom has made itself manifest throughout the State of Durango, and a great deal of new foreign capital has been going in. In Detroit, Mich., a company with a capital of $1,000,000, gold, headed by E. H. Stanley, has been organized for the purpose of operating extensively in the Yerba Buena district of Durango. San Francisco people are promoters of an English company, that has offered $500,000, Mexican in cash, and 750,000 shares of stock in the company for the Cala mine in the San Dimas district, and it is believed the deal will be consummated. A London corporation is after the properties of D. W. Dwelly, of Durango. In the Reyes district, J. B. Shepard, of Denver, and A. P. Lewis, of Mexico, have taken an option at $50,000, gold, on the Suiza and Eureka group, and another on the Mina Grande, Tres Hermanos and Gavilan at $100,000, gold, from Messrs. Arnold and Lozano, and the sale is looked upon as sure. Monterey capitalists are taking up new ground in the Guancevi district; and in the same district the Providencia mine of Garza y Campos has been purchased at $30,000, gold, by Wilson & Co., of New York, and the said Wilson & Co., who have control of the Carmen Copper Co., of El Carmen, San Bernardino, district of El Oro, have just obtained from the Mexican Congress a concession for the erection of extensive metallurgical works, which will include a large and complete concentration plant for the treatment of a body of low-grade copper ore recently encountered. At Gomez Palacio, near Torreon, a new company, known as the Mexican White Lead Co. is preparing to erect works for the production of white lead. On the Hemayo river the Fernando Mining Co. is preparing to operate its property by electricity from a power plant on the river.

The United Mining & Development Co. of America has just purchased a large group of mines, known as El Doctor, in the State of Queretaro. These mines have been worked continuously at a profit for the past 32 years. Included in the deal are El Doctor smelter and the Naconi smelters of El Doctor Co., and the mines and smelters owned by Braniff Bros. in the Naconi and Ranes districts. The extensive water power system under construction by the Braniffs will be extended by the new management, so as to supply light and power to the city of Zinapam. A ranch, some 20 miles square, also acquired, will furnish charcoal for the company's furnaces for years to come. The ores of this region are principally sulphides and carbonates of lead, occurring in silver, and a small amount of copper. In some of the mines the ore is accompanied by zinc blende, and it is therefore proposed to erect a large central concentrating works within easy access of all the mines. The money involved in this deal is understood to be in the neighborhood of $500,000, gold.

London. Nov. 7.

(From Our Special Correspondent.)

The report of the Consolidated Gold-Fields of South Africa for the year ended June 30 last, is a very good index of the present position of affairs in the South African mining market after debenture interest and preference dividend have been paid, there remains £300,000 profit, but it is deemed best to keep all this in hand until mining conditions improve. The accumulated balance of profits in hand is, therefore, increased to nearly £2,000,000. One good reason for keeping this large balance in hand is that the company has guaranteed £1,000,000 of stock on the Transvaal loan, which it will probably have to take up. The finances of the company are set forth fully in the reports, and the assets are given in detail, the holdings in shares of other companies being separated from other loans on security and cash in hand. In this way, the report differs from those of many

equally high-class companies, who by their example make it possible for Whitaker Wright balance sheets to be issued, without suspicion being aroused. Most of the undistributed balance of profit is employed in lending at short call, no doubt chiefly on the Stock Exchange, and the cash at bankers amounts to £240,000. As regards the general prospects of mining in South Africa, the report points to the labor difficulty as the chief rock ahead. The directors have quite abandoned hope of obtaining native labor. The black under British instead of Boer rule is a "mighty sight too independent." He can get more congenial employment in other ways, and take advantage of the misplaced philanthropy now showered on him.

The general outlook for South Africans is really very depressing, and there is no hope for any rise or activity at present. We don't get booms unless there is an air of mystery and pretence of concealing special information, when the condition of things in a mining center is universally known, there is no special reason for speculation. The importation of Asiatic labor is what everybody is waiting for now, in hopes that it will make things better on the Rand, but even when it is decided on, years may elapse before the results are reaped. It is difficult to persuade the Asiatic to go to a foreign and unknown country. A small party of the more adventurous spirits will be induced to go at first, and not until they return and report to their friends, will any extensive emigration occur. I am aware that the role of pessimist is not a popular one; but candidly, I am not able to adopt any other frame of mind on this subject.

The Mountain Copper Co. owning the mines in Shasta county, California, has been much impeded in its operations this year by the strike of workmen and miners. Until the middle of February, the mines and smelters were closed down, and when work was recommenced, it was on a very small scale. Even now the number of employes is only two-thirds of what it should be. During the first six months the output of copper was only 2,500 tons, and it is calculated that the output for the second half of the year will not be more than 4,000 tons. It has, therefore, not been possible to pay the £1 off the debenture shares, as was provided under the scheme of reconstruction a year ago.

Sydney, N. S. W. Oct. 17

(*From Our Special Correspondent.*)

New South Wales.—Broken Hill has been visited with further good rains, which have filled all the reservoirs to overflowing, so that now they reckon there is a 12 or 15 months' supply of water on hand.

Since compulsory arbitration has become a law in New South Wales, employees in all kinds of trade have taken advantage of the act, through their unions, to ask for higher rates of wages, fewer hours of work, etc. Miners have not been the most backward to make such demands. The Arbitration Court award in the case of the Amalgamated Miners' Association against the Broken Hill Proprietary Co. has lately been made public, and fortunately, the decision of the main points have been in favor of the mine owners. The prevailing rates of wages is to be continued; no alteration is to take place in the existing working hours of the shifts, and no extra pay is to be allowed for overtime. It was pointed out that the highest profit per ton of ore treated at the Proprietary was during the second half of 1886, when it reached £8 7s. 1d., while, starting with the first half of 1887, the working cost per ton was £6 12s. 5d. In 1902 the profit per ton averaged 3s. 1d., and the average working cost was £1 12s. 4d. Some other mines not only showed no profit, but at the time of closing down in July, 1901, were working at a loss.

Now that the water famine is over, the productive work on the mines has resumed its normal condition. In March last the number of men employed along the line of lode was 5,260; to-day official figures give 5,101, an actual difference of only 161 hands. A good wheat harvest is anticipated, which will probably cause a shortage of railway trucks for ore carriage about the end of the year.

The Mount David mine has paid its first dividend of 3d. per share.

Queensland.—Two boys named Porter, while cleaning out a well in the yard of their father's residence, Hall street, the principal residential street of Mt. Morgan, found a few specks of gold, and when a dish was washed from the bottom, it panned out several pennyweights of gold. In a very short time half the town was pegged out as alluvial claims, for the most part in Broken Gully. A good deal of excitement prevailed, which was increased when the original claim was jumped, owing to its not having been properly pegged.

Victoria.—The gold output of Victoria for the month of August was 73,405 oz. fine, valued at £311,806, as against 77,224 oz. fine, valued at £328,029, for the same period of last year.

The record of the Bendigo gold yield for the past nine months is highly satisfactory, each quarter being a steady improvement on the previous one, both in the yield of gold and distribution of dividends. The increase in calls goes to show that prospecting work is being pursued with vigor in the non-dividend paying mines. The following table shows the progress made from quarter to quarter:

1903.	Gold yield, oz.	Dividend.	Calls.
First quarter	46,358	£58,772	£30,250
Second quarter	55,589	71,622	33,160
Third quarter	61,529	86,228	38,936
Totals	163,476	£216,622	£102,346

During the last 9 months, the principal dividend paying mines have been: South New Moon, 35s. per share, £56,000; United Ulster, 25s. 6d. per share, £40,800; Great Northern, 24s. per share, £36,000; New Moon, 24s. per share, £28,000.

When the Bethange gold mine was taken over by the English company, in 1897, it was thought that sufficient capital would be spent on it to enable the mine to pay, but all the money sent out was £18,000, and of that only £8,700 was devoted to mining purposes. The value of the gold won since 1896 was £200,000, all of which went back into the mine. The company is now being reconstructed as the Bethange Gold-fields, Ltd., with a capital of £125,000.

The Victorians are very wisely amending their mines act with a view to meet the altered conditions of the industry, and to stimulate investment. The new bill practically embodies the recommendations of the Mining Conference, which sat for a month in May last, and was attended by representatives from the Chamber of Mines, Mining Boards, Amalgamated Miners' Association, Legal Managers' Association, Amalgamated Mining Managers' Association, and the Mine Owners' Association. The most important recommendation is in connection with the proposed alternation of the labor conditions, in which the Tasmanian law has been followed. The lessee is given the option of employing a certain number of men, the number being set out in the lease, or he may, if he prefers it, elect to spend a certain amount each half-year. The provision with regard to suspensions gives the lessee definite rights; he knows exactly the sum to be spent each half-year, and that if he exceeds that amount he can claim exemptions for a period proportionate to the amount of the excess, but the exemptions must under no circumstances exceed three years. This will serve to do away with the abuse of the labor conditions during strikes when blackmailers have tried to force the hands of the mine owners by jumping the leases. Mine managers will, as in New Zealand and New South Wales, have to hold certificates of competency or of service.

The Royal Commission, appointed to enquire into the advisability of carrying out the provisions of the Iron bonus bill, has decided to recommend the payment of the bonuses proposed. There is any amount of good iron ore in the various Australian States, but there are no iron smelting works, in spite of the fact that in 1900. iron and steel to the value of £6,627,747 was imported.

GENERAL MINING NEWS.

Chesapeake & Ohio Railway Co.—Shipments of coal and coke in September and the three months since July, are reported as below, in short tons:

Coal—	Sept.	July-Sept.
New River	210,695	682,742
Kanawha	150,541	468,019
Kentucky	15,081	41,787
Total	376,317	1,192,548
From connections	17,111	49,207
Total	393,428	1,241,755
Coke—		
New River	25,970	79,844
Kanawha	3,504	15,616
Total	29,474	95,460
From connections	36	87
Total	29,510	95,547
Grand total	422,938	1,237,302
Total, 1902	127,776	272,243

The increase this year has been chiefly in the shipments of New River coal to tidewater.

Petroleum.—Operations in the eastern oil fields during October, according to the Oil City *Derrick*, resulted as follows: Pennsylvania completed 815 wells, 223 being dry, with a production of 5,027 bbl.; Ohio completed in the Lima field, 384 wells, 37 dry, with a production of 4,349 bbl.; Indiana completed 366 wells, 36 dry, with a production of 5,652 bbl.; West Virginia completed 194 wells, 61 dry, with a production of 2,465 bbl.

There were 1,565 wells completed in the Pennsylvania and Trenton rock oil fields, 296 were dusters and gassers, and the new production was 15,028 bbl. This was a gain over September of 31 wells completed and 22 dry holes, accompanied by a decline of 1,991 bbl. production.

The runs of the Pennsylvania and Ohio fields for October were as follows: Transit, 452,909 bbl.; Tidewater, 153,300 bbl.; Southwest, 263,194 bbl.; Eureka, 1,002,754 bbl.; Buckeye, Machsburg oil, 400,986 bbl.; Cumberland, 58,967 bbl.; total, 2,332,192 bbl. Lima oil shipments for October were 2,139,156 bbl. Lima oil runs for the same month were 1,806,476 bbl.

ALASKA.

Wild Goose Co.—This company is reported operating large hydraulic plants on six claims in the Nome district.

At Nome there is considerable excitement over the tin discoveries on Cape Prince of Wales and a camp known as Tin City has sprung up at that point.

In Silver Bow basin, back of Juneau, a 15-stamp mill is being operated on a large body of low grade ore.

ARIZONA.

GRAHAM COUNTY.

Arizona Copper Co., Ltd.—This company informs us that the production of copper from the mines and smelters at Clifton during October was 1,139 tons, of 2,000 lb. each.

Clifton Consolidated & New England.—The consolidation of these companies in the Clifton district is completed, with A. P. Anyling, manager.

CALIFORNIA.

BUTTE COUNTY.

Golden West Tunnel Mining & Milling Co.—This recently organized company, S. D. Chittenden manager, has an option on the Mooretown ditch to develop the Shkoff mining claims and an option on the Davis ranch. It has also bought five claims on Sucker run. The company now owns 10 mining claims and two ditches on the Mooretown ridge. The whole investment is on a large body of low grade quartz upon which work is shortly to commence. There is abundance of water power.

CALAVERAS COUNTY.

Continental.—A cyanide plant is to be put up on this mine near Mokelumne hill, Wilbur & Bartlett, owners.

Johnston.—This mine at Willow creek has been sold to satisfy a mortgage, and was bought by C. V. Gottschalk.

EL DORADO COUNTY.

Eureka.—The wire cable to carry slate is in operation at this slate quarry. The slate will be delivered at Placerville for 6 or 7c. per square. They are employing 115 men, and turning out 40 squares of slate daily. The excavation is 80 ft. deep, and a 1,000 ft. tunnel to drain it completely. An electric lighting plant, power pipe line and compressor plant have been built. The quarry is to be extended north and west.

Silica.—The New Highland Gold & Copper Mining Co. expects to begin operations shortly on this mine at Placerville.

Skinner.—A new mill is to be erected on this mine, Witmer & Fuller owners.

KERN COUNTY.

Zada.—Final payment of the $22,000 purchase price of this mine at Caliente has been made by H. H. Blood and associates. The company is now working the mine.

MADERA COUNTY.

Gambetta.—The plant of this mine at Grub gulch, J. E. Porter, superintendent, is being largely increased, the machinery of the Garibaldi mine being now added. There will be now a 20-stamp mill and two Huntington mills. Fifty men are to be employed.

MARIPOSA COUNTY.

Sweetwater.—A contract has been let to Wm. Wagner to put up the new mill on this mine at Jerseydale.

NEVADA COUNTY.

Murchie Consolidated.—Superintendent J. C. Campbell, of this mine, at Nevada City, expects to start the machinery about December 1. The grading for the new mill is completed.

New Eureka.—The machinery is all in place at this mine Canada hill, and prospecting will now commence.

Orleans Mining Co.—This company, at Grass Valley, is making some changes in its surface plant and erecting a hoist on the Houston Hill shaft. All the waste dirt will be hoisted through this shaft.

Oustomah Extensions.—C. B. Porter, R. J. Ronchi and others are about to organize a company to develop the extensions of the Oustomah and Pennsylvania ledges. They have bonded the Morning Star, Rising Sun and Morning Glory claims, and will run a tunnel to the main ledge.

Oustomah.—This mine, formerly the Pennsylvania, at Grass Valley, idle 25 years, until the present owners took hold of it, has proven to be of value.

Phelps Hill Development Co.—The plant at this

property has been set in motion, and works satisfactorily.

Quartz Quarry.—This mine, formerly the Junction, near North San Juan, Henry Huckins superintendent, is to have a 20-stamp mill. A suspension bridge across the Middle Yuba river is to be started at once.

Sixteen-to-One.—A new road is being built from this mine to the Gaston Ridge road, which will save nearly 10 miles of hauling. The mill of the Champion is to be hauled to this mine.

South Yuba Mining Co.—This company has been incorporated, with the following officers: I. W. Hays, president; J. F. McPherson, vice-president: J. P. Maleville, secretary. The company owns the Virginia-Gold Hill copper mine, near French Corral.

Virginia-Gold Hill.—At this copper mine, near French Corral, owned by the South Yuba Mining Co., J. P. McPherson superintendent, tunnels are being driven and ore taken out preparatory to the erection of a copper smelting plant.

PLACER COUNTY.

Boulder.—This mine at Ophir has been started up.

Crater.—At this mine, Ophir, the contractors have finished 100 ft. of work, and a hundred feet more is to be done at once.

Gaylord.—At this mine, near Auburn, 30 men are working, and getting out good gravel.

Shady Run.—At this quartz mine a good ledge of 88 rock has been struck., Sixteen men are at work under R. A. Watson superintendent.

PLUMAS COUNTY.

A smelter is to be erected at the copper properties in Genesee and Indian valleys, J. S. Wardell manager.

RIVERSIDE COUNTY.

Orocopia.—The mines are 16 miles from Salton, and a survey is being made for a pipe line to convey water from Palm Springs. It is understood that a mill and cyanide plant are to be put up.

SAN BERNARDINO COUNTY.

San Bernardino Mining Association.—A temporary organization of this association has been made with Geo. M. Cooley as president, and J. F. Campbell secretary, at San Bernardino. The first purpose is to prepare a mineral exhibit for the St. Louis fair. However, it is intended to make the organization permanent to act on matters connected with the development of the desert section, such as good roads, water supply, etc.

SAN DIEGO COUNTY.

Stonewall Mining Co.—Col. S. H. Lucas the manager, is to retimber the shaft of this mine at Cuyamaca, after pumping it out, and to spend about $30,000 for this purpose.

SHASTA COUNTY.

Connor.—The strike in this group at Clear Creek is in a big ledge encountered 158 ft. from the surface, 250 ft. from the mouth of the tunnel.

McCarthy.—John Halliday has opened a new ledge in this property near Keswick, and is shipping a carload of ore a week to the smelters.

Mountain Lion.—This mine, near Shasta, H. B. Davis manager, has made a shipment of ore to the smelters, and if satisfactory returns are obtained a plant may be erected at the mine.

Mount Shasta Gold Mines.—The directors of this company have issued a circular asking authority of the stockholders to make a consolidation of interests with the Phoenix Gold Mining Co., of Arizona, the terms of the consolidation providing for extinguishing all debts of the Mount Shasta Co., amounting to some $200,000, leaving the consolidated company free from debt.

Muchmore.—Good ore is being taken from this mine, at Lower Springs, the lost pay chute having been found by Burt Wiser.

Quartz Hill.—This mine, 4 miles from Redding, is being re-opened under supervision of Wm. O'Donnell, and is shipping ore to the smelters. Eleven men are employed.

Star of Hope.—This mine, on Little Churn creek, formerly the Dale & Dawson mine, owned by Creath Dale and S. S. Stickley, is shipping ore to the smelters of the Mountain Copper Co., at Keswick.

SIERRA COUNTY.

Mountain.—This mine, 5 miles from Sierra City at Sardine lake, is being reopened. The mill is connected by aerial tramway, with the mine 6,200 ft. up the mountain. The mill is of 40 stamps. Belt concentrators are to be put in the mill.

Oakland Gold Mining Co.—This company, operating at Gold lake, above Sierra City, is running the lower tunnel to tap the ledge, and they will continue work during this winter. J. A. Anthony has been chosen president of the company.

Telegraph.—This mine at Fir Cap, 9 miles from Downieville, was originally a gravel mine until quartz was struck. Five of the 10 stamps of the new mill have been started up, and preparations are being made to increase the number of stamps. The superintendent is J. W. Finney.

Willoughby.—The new 10-stamp mill at this mine, near Gold lake, will start in a few weeks. The name of the mine has been changed to the Lassiat.

SISKIYOU COUNTY.

King Solomon.—W. H. Young as stating that he and the Cottrells of New York, are reported to have purchased the 24 claims of this property from J. A. Thompson, of San Francisco, and will operate it on a large scale.

McKinley.—For this mine at Humbug, a plant has been shipped, consisting of Pelton wheel, 5-stamp mill, pipes, etc. An eastern company has bought the property.

Siskiyou Mining & Development Association.—This company working the coal vein near Ager, has struck a strong flow of water, and will need heavier pumps. The old pumps have been pulled out. The men have been put to work in the old workings.

SONOMA COUNTY.

Devils' Den.—A reduction furnace is to be put up at this quicksilver mine on Sulphur creek, shortly.

TRINITY COUNTY.

Enterprise and Lone Jack.—This property at Coleridge, owned by Day Bros., Mrs. M. Balch and Chas. Lobdell, is under bond to Geo. R. Woodin & Co., of Boston, Mass., with Mark Manley as manager. The mine is equipped with a 10-stamp mill. At present two tunnels are being run on the Lone Jack claim, the lower one of which is in 1,200 ft., and the upper 700 ft. Ten men are now employed.

Headlight.—The cyanide plant on this mine, which was destroyed by fire, is to be replaced.

TUOLUMNE COUNTY.

Harvard.—This mine has been closed down by orders from headquarters at Boston.

Hyapo.—This mine has been bonded for $10,000 by L. Reid to A. M. Divoll. The bond covers two-thirds interest. The mine is near Columbia.

Prudhomme.—Frank Prudhomme has bonded this mine to the Prudhomme Mining Company.

COLORADO.

BOULDER COUNTY.

Black Bird.—An important strike is reported at this mine at Sunshine. The tunnel has been enlarged and timbered recently, and an ore house and blacksmith shop built. A compressor, engine and boiler house are also to be placed on the property.

Gold Medal.—In sinking the shaft at this property, near Idaho Springs, the ore shoot has been cut and increased in value from $7 to $60 a ton. In the upper workings of the mine a body of ore was opened.

Gum Tree.—This mine at Freeland, owned by John Owen, of Idaho Springs, is reported sold to Rhode Island and Massachusetts men for $250,000, of which $50,000 was cash. A new company will be incorporated called the Gum Tree Consolidated Mining & Milling Co., which will take over and work the property. The shaft is down 340 ft. John Owen will be manager.

Isabel.—The recent strike in this property on Caribou mountain, by the Donald brothers, is reported to be 2½ ft. of ore, showing gray copper, silver glance and native silver, and worth from 400 to 1,700 oz. silver per ton. The property is under bond and lease to M. A. Smith, of Sullivan county, N. Y.

Tambourine.—This property in the Eldora district, has been unwatered and shipments resumed.

Wano.—This 50-ton cyanide plant at Jamestown, is expected to be in operation by December 1, and a large amount of ore is ready for treatment.

CLEAR CREEK COUNTY.

Cedar Ridge.—A 7 by 7 ft. tunnel is being driven by this company on Santa Fe mountain. It is now in about 60 ft.

Commodore Mining Co.—Work is being pushed on the tunnel of this company in Red Elephant mountain near Lawson.

Coronation.—The new boiler and compressor has been set at the tunnel in this property, which will be continued into the ridge between Train Run and Spring gulch, with machine drills.

Gem.—A raise is being driven from the Newhouse tunnel level to connect with this shaft. A new 800-ton concentrator will be built at the mouth of the Newhouse tunnel in the early spring, it is reported and the State ore plant will be rebuilt to handle the surplus ore. Forty stamps and concentration machinery with jigs and tables will be used. The power will probably be supplied from the electric plant controlled by the syndicate. W. E. Renshaw is manager.

Gold Amalgamating Co.—This company, of Boston, is driving a tunnel on North Spring gulch, near Idaho Springs, under the management of S. D. Shaffer.

COSTILLA COUNTY.

La Jara Gold Mining & Milling Co.—This company has purchased a group of claims on Mount Blanca. The property will be grouped with the Commodore mine.

GILPIN COUNTY.

(*From Our Special Correspondent.*)

A number of properties have been compelled to curtail operations, especially in sinking, so as to economize on their coal supplies.

Elk Park Mines & Mining Co.—Pittsburg parties recently had an expert examination made of the Annie H. property in the Pine district. The main incline shaft is down 300 ft.

Clear Creek Mining & Reduction Co.—This company owns and operates the Saratoga group and the pyritic smelter at Golden. Indications are that the smelter will not be active this winter, and that arrangements are being made to operate the Saratoga property through the Newhouse tunnel from the Clear Creek county side. To cut the Saratoga vein, the tunnel would have to be extended about 1,000 ft., and it would cut between 400 and 500 ft. below the present shaft workings in this county, or between 1,300 and 1,400 ft. in all. It is believed this scheme will be carried out by the Berry brothers, of Detroit, Mich., who are the principal owners, and while it would mean the diversion of the ores from this county into Clear Creek before shipments could be made to their own smelter at Golden, it would result in the employment of a much larger working force. At present nearly all of the operating force has been laid off, which gives color to the project as outlined. F. R. Carpenter, Golden, Colo., is manager.

Gowers Mines Syndicate, Ltd.—This English company owns and operates the Running Lode property, east of Black Hawk, one of the best dividend payers in the county. The smelting product is between 400 and 500 tons per month, of a very good grade, while about 100 tons of high-grade concentrating ores are shipped during that period. Nearly 70 men are employed, and the shaft has recently been sunk to a depth of 950 ft. As depth is gained the ores are reported to carry better values and the ore reserves are kept well ahead of the production. Thomas Dunstone, Black Hawk, Colo., is superintendent, and Dr. John Gowers, of Denver, manager.

Kansas-Burroughs Consolidated Mining Co.—The October production of the Quartz hill properties of this company was 160 cars, or 1,360 tons. The large proportion of this output went to the stamp mills and concentrator, the balance being smelting ores.

Orado Gold Mining Co.—The shaft is down 700 ft. and in virgin ground below the 500 ft. workings, which will be the center of developments. Aurora, Ill., capital has become interested, and Alfred Skeels, of Central City, is manager.

Spruce Mountain Gold Mining Co.—This company has been organized by Nebraska parties to operate a group of properties up Silver gulch, in the Enterprise district, near Black Hawk. A small force of men has been put to work already. George D. Johnstone, Black Hawk, Colo., will be in charge of the operations.

Travis Gulch Mining Co.—New York parties have been sinking on the General Garfield shaft in Travis gulch, but quit on account of too much water. Capt. A. M. Willard, Gilpin, is superintendent.

GUNNISON COUNTY.

Gothic Mining, Milling & Coal Co.—The milling and smelting plant of this company in the northern part of the county, has been completed, and the mill is of 50 tons capacity, the smelting plant has a 50-ton copper pyritic furnace and a 50-ton lead furnace. The plant will do custom work for the mines of the district and treat ore of the properties owned by the company.

Keystone.—This silver-lead mine, west of Crested Butte, owned by the A. B. Williamson estate, has been secured by E. L. Clark of New York. The vein is large.

Sylvanite.—This mine in the Gothic camp is reported in rich ore and shipping to the Gothic smelter. The New Sylvanite Mining Co. is developing this property.

LAKE COUNTY—LEADVILLE.

(*From Our Special Correspondent.*)

So far the coal strike has not affected the mine situation here, as most of the big companies have a 30 days' supply on hand. There is considerable uneasi-

ness, however, over the situation. The car shortage has been somewhat relieved, and the tonnage is about 2,600 tons daily. An increase is also noted from the concentrating plants.

Eastern people are at the back of drill-hole explorations to be made on the Quig, Mike and Little Sister territory, south of California gulch. A series of holes 1,000 ft. apart are to be sent down at once. Churn drills are now being placed in position to penetrate the wash and diamond drills for the rock.

A. Y. & Minnie.—Experiments are being made on the old dumps of these properties with a view of handling this material by magnetic separation treatment. There are some 150,000 tons of material in the dump.

Bon Air & Starr.—Under lease to B. S. Schlessinger these properties are making a large iron production of good grade material with occasional shipments of high-grade lead material. Development work is also carried on.

Fairview.—The closing of a part of the steel plant on account of the coal strike will affect this mine, which is working a fine body of manganese iron. The oxidized iron bodies, however, will continue production.

Leadville Deep Mines Co.—This is a new incorporation with a capital stock of $1,500,000, headed by Samuel Collins, of Boston. The company is organized, it is stated, to take in the Reno, the Big Evans, the Arnold and Empire companies, all of which have become financially involved but represent some excellent mineralized territory.

Otis.—This new shaft is located on the north end of the Virginius claim, on north Fryer hill, and the lessees have an encouraging showing.

Reindeer Mining Co.—The shaft is going down to catch the Rock and Dome shoot west of the fault. At a depth of 400 ft. ore is being gone through which shows high lead and silver values.

Sixth Street.—The Osgood-Sullivan lessees, conducting work on this property for many months past, are making only a light tonnage, and reports are current that the Sixth Street will eventually be secured by the Midas-Coronado combination.

Valley Mining Co.—This property is temporarily closed down and several of the directors are expected here to decide on new plans. The company has accepted the resignation of J. H. Henley, but his successor has not yet been named.

Vega Mining Co.—Preparations are being made for work on this group. It is owned by the same people who own the Diamond, and as the ore extends into the Vega group, the new work will be on the same lines as in the Diamond.

OURAY COUNTY.

Last Chance.—This mine is working 25 men and producing about 40 tons of ore carrying lead, silver and some gold. The property is about 12 miles from Fairplay, and operated by the Cerussite Mining & Milling Co. B. S. Schlessinger, manager. The frozen ground obviates timbering.

Tempest Apex Mining Co.—A rich strike is reported on this property in Poughkeepsie gulch. The development consists of a 200-ft. cross-cut tunnel. F. M. Jackson is in charge.

Treasury Tunnel & Mines Co.—This company, after expending about $200,000 has at last encountered good ores, and several cars have been shipped out with good results and encouraged the owners to prosecute the work on the tunnel, now nearly two miles in length.

SUMMIT COUNTY.

Cashier.—A new body of gold ore, 40 ft. wide, is reported in this mine in Brown's gulch, near Breckenridge. The capacity of the mill is to be materially increased. The Lane mill is being installed in the new part of the building. It grinds the ore very fine, then taking the old, slow process of amalgamation. Superintendent Brooks is in charge.

Colorado & Wyoming Development Co.—This company is to ship 50 to 75 tons of heavy silver-lead ore per week. The vein, it is reported, shows an ore shoot several hundred feet long and from 6 to 13½ ft. wide. There are a couple of feet of good zinc ore. The product, except the zinc ore, is bought by the Chamberlain-Dillingham Ore Purchasing Company.

Gold Belt.—This property, at the head of Mayflower gulch, near Kokomo, is erecting a 2,000-ft. tramway. The recent strike is holding out, and the ore is said to average 11 oz. gold per ton. The vein is about 2 ft. thick, and lies between granite walls. Cabins are being built, and the property will be worked all winter.

Iron Mask.—A new plant of machinery has been placed on this property recently leased to D. Masters, of Denver, and the mine unwatered. It is reported the property will soon be in shape for steady shipments.

Mount Quandary Mining & Milling Co.—The 50-ton mill is going up on this property, 10 miles from Breckenridge. All the men that can be accommodated are employed.

TELLER COUNTY—CRIPPLE CREEK.

(*From Our Special Correspondent.*)

The pay-roll is the best indication of increasing prosperity in the camp, and on November 10 a much larger amount was paid out than on any pay day since the strike was called, August 10.

No detriment to the mining interests in the camp is anticipated on account of the coal strike, as a majority of the mines stocked up well in advance of the strike, and no advance has been made in price as yet. The wholesalers report there is no immediate danger of a raise.

Miners' Strike.—On the surface everything seems quiet and the number of men at work is steadily on the increase, so that at present the total, including ore haulers, mill and sampler employes, also men working for lessees out of the center of the district, will approximate 3,000 men.

Cripple Creek Homestake Milling & Reduction Co.—This company is erecting a cyanide mill for the treatment of oxidized ores on Ironclad hill, on the Magna Charta and Ironclad properties.

Isabella Gold Mining Co.—This company recently issued a circular giving particulars of the transfer of the company's property to the Isabella Mines Co., a Wyoming corporation capitalized for $3,000,000. The Isabella Gold Mining Co. has received 1,125,000 shares in the new organization, thus giving each stockholder one share in the new for each two shares in the old company. The new company has also acquired 600,000 shares of the capital stock of the Empire State Mines Co., and 435,000 shares of the Orphan Bell Mining & Milling Co., giving in exchange 600,000 shares of its own stock. This leaves 1,275,000 shares in its own treasury. Negotiations are in progress for the acquisition of the remaining 650,000 shares of the Empire State Mines Co. by the new Isabella Co., and in the event of such transfer a settlement will probably be made of the $1,500,000 litigation now pending against the old Isabella Co. for ore alleged to have been extracted illegally. Certificates of the Isabella Mines Co. will be sent out shortly and the directors will furnish stockholders with a more detailed account of the situation. The board of directors of the Isabella Gold Mining Co. include Messrs. E. W. Giddings, J. A. Hayes, J. A. Connell, K. R. Babbitt and George N. Stone. The board of trustees of the Isabella Mines Co. includes Messrs. Nelson B. Williams, George N. Stone, K. R. Babbitt, Mr. Sherwin, and Mr. McMahon. Messrs. Giddings, Connell and Hayes are relieved of connection with the board.

GEORGIA.

LUMPKIN COUNTY.

McAfee-Lind Mining Co.—This company is now conducting operations on the Rutherford gold property near Auraria. The property adjoins the old Briar Patch mine, and was worked many years ago. It has been worked at intervals by different parties, but has been abandoned for several years. A new shaft is being put down, and a reservoir constructed. A building is being put up which will contain a 10-stamp mill. It will be run by steam, as wood is very abundant and cheap in the neighborhood.

IDAHO.

ADA COUNTY.

Mammoth.—A rich ledge 7 ft. wide is reported struck in this mine, on Summit Flat, near Boise, owned by W. A. Magee, of Pittsburg.

IDAHO COUNTY.

Buffalo Lake.—This company, allied with the Lucky Jack Co. at Hump is erecting a building to enclose its whim. An ore shoot is reported 28 ft. from the surface.

Crackerjack.—A rich shoot of ore is reported in the new lower tunnel. Owing to lack of wood, the new mill is running only one shift a day until the electric power plant can be started in December.

Lucky Lad.—This company is opening 4 claims near Hump. A steam hoist is in use for sinking to 150 ft. on the lead. The company has ordered a 5-stamp mill, and will use 2 stamps to prospect the ground. A. H. Berry is mine foreman, and G. L. Hedges is manager.

Thunder Mountain.—The State wagon road will not be completed until late next summer. Meanwhile, little heavy machinery can be brought in, and the only producer of importance will continue to be the Dewey.

Wise Boy.—Much work has been done on this property at Hump. An additional water supply is being put in for mill purposes. For conveying the ore 800 ft. from the mine to the mill, a friction cable with brake attachments is used. The mill is equipped with 10 stamps of 950 lb. each, two Frue-Vanners and a 5 by 7 Blake crusher, a 40 h. p. Union Iron Works boiler and a 35 h. p. Fraser & Chalmers engine. In the upraise between levels Nos. 1 and 2 an ore chute from the upper workings will be constructed. The upper end of the tram is at the mouth of the lower tunnel. W. E. Kelly is manager.

KOOTENAI COUNTY.

Black Jack.—The North Dakota Mining Co., owning this group, near Sandpoint, has a tunnel in 200 ft., and working a good sized force.

Wisconsin Mining & Milling Co.—This company, operating in the Blacktail district, 10 miles south of Sandpoint, has ordered a 12 by 12 air compressor, an Ingersoll 4-drill machine and a 50 h. p. boiler. The company has a tunnel driven 400 ft. on the Mexico claim, and expects to push the bore about one mile to develop nine claims.

LEMHI COUNTY.

(*From Our Special Correspondent.*)

Owl Gulch.—The Owl gulch gold camp, which has attracted much attention, appears now to be in Lemhi county, instead of in Montana, on the west side of the Bitter Roots and reached from Hamilton, Mont., the nearest railway point. It is 60 miles northwest of Salmon City, Ida, and is tributary to the Salmon river. The camp is about 8,000 ft. high and snow has already stopped prospecting.

SHOSHONE COUNTY.

(*From Our Special Correspondent.*)

All the mining companies have settled the disputed taxes for 1902 under the terms of the recent compromise. The amounts originally claimed and finally settled for follow:

	Claimed.	Paid.
Morning	$12,500	$7,500
Bunker Hill & Sullivan	12,500	6,000
Empire State-Idaho	20,000	10,150
Mammoth	12,250	10,000
Standard	12,500	6,250
Frisco	12,250	4,000
Helca	7,250	2,750
Goldhunter	5,000	1,200

Douglas.—This group of 7 claims in the Pine creek district, near Wallace, is to be taken over by a new company. About 1,000 ft. of tunnels have opened the property to a depth of 400 ft. The deep tunnel was driven 600 ft. on the ledge and the ore shoot averaged 3 ft. The company has the following officers: F. F. Johnson, president; C. C. Titus, vice-president; H. J. Rossi, treasurer; J. C. McDairmid, secretary. They with C. D. Jones, H. E. Howes, J. W. Tabor and J. L. Batterson comprise the board of directors.

Frisco Consolidated.—Suit to foreclose mortgage bonds for $100,000 on the company's mine has been started by the trustee for the bondholders. The bonds were given about a year ago to guarantee the company's indebtedness. The mine has been worked unsatisfactorily at 2,000 ft. but costs of pumping and hoisting were excessive, neither interest nor principal ever having been paid. The present company is a re-organization of the old Helena-Frisco Co. Peter Larson, of Helena, and A. B. Campbell, of Spokane, are interested, besides New York men and D. M. Hyman, president.

Monitor.—This property, which was under bond to the Bitter Root Mining Co., is again being worked by the Monitor Co., with 35 men. Archie McCallum, formerly superintendent of the Standard in the Coeur d'Alenes, is in charge. A hoist is being erected.

Skookum.—Kennedy Hanley has applied to the Circuit Court at San Francisco for an order against the Empire State-Idaho Co., restraining it from working this mine. Hanley has secured judgment against the company for $170,000 for ore extracted from his eighth interest, and wants the mine closed until he is paid. The Skookum is the most valuable property owned by the Empire State-Idaho Co., now a branch of the Federal Mining & Smelting Co., in its Wardner group.

INDIANA.

(*From Our Special Correspondent.*)

Owing to a number of fatalities in coal mines, due to large blasts being made, the State mine inspector is taking steps to rigidly enforce the law limiting the size of blasts.

SULLIVAN COUNTY.

(*From Our Special Correspondent.*)

Rainbow Coal Co.—This company, employing about 200 miners, is having trouble erecting 40 new houses to be occupied by the miners and families. Non-union carpenters were employed to build the houses but were forced to leave by the miners.

ILLINOIS.

MACOUPIN COUNTY.

Royal Colliery Co.—This company has a shaft down about 300 ft. on its 2,000 acres at Virden. About 200 ft. was through solid rock. The vein is reported to be from 7 to 9 ft. thick, and between 100 and 200 tons of coal are taken out daily. The upper works are almost completed, and the output is expected to be 600 tons daily by January 1.

MICHIGAN.

COPPER—HOUGHTON COUNTY.

(*From Our Special Correspondent.*)

Calumet & Hecla.—Diamond drill operations have been begun 1,500 ft. south of the Kearsarge vertical exploratory sbaft. As soon as the location and dip of the lode bave been ascertained at the new scene of operations, a permanent working shaft will be sunk. Sinking in tbe Kearsarge exploratory shaft has reached a depth of 40 ft. Surface water and sand are retarding the work, but tbe ledge sbould be encountered in a few days. Tbe October production of this mine is estimated at 3,100 tons of refined copper. President Alexander Agassiz, T. L. Livermore vice-president, and E. D. Leavitt, consulting engineer, have completed their regular fall visit to the mine, and returned to Boston, Mass.

Centennial.—Production will not begin until next spring, from present indications. No arrangements have been made for tbe use of the Arcadian stamp mill.

Isle Royale Consolidated.—Tbe product of this mine in October was 165 tons of refined copper. Diamond drill explorations on tbe southern portion of the property have been discontinued. A large part of the lands was explored, but notbing important was found.

Osceola Consolidated.—This mine produced 750 tons of refined copper in October. The old Osceola branch was closed down 3 days last week, owing to strike of the trammers, who induced the miners to stop also. The men returned to work witbout gaining any concessions. About 275 are employed at that part of the property.

Tamarack.—This mine produced 550 tons of refined copper in October.

Tamarack-Osceola Copper Manufacturing Co.—The wire mill at Dollar bay is running day and nigbt, and using 1,000,000 lb. of copper a month from tbe Osceola and Tamarack mines.

Trimountain.—The October output of this mine was 425 tons of refined copper.

COPPER—KEWEENAW COUNTY.

(*From Our Special Correspondent.*)

Ahmeek.—Work on another permanent shaft, to be known as No. 2, has been started. A surface plant will be installed at once.

Cliff.—It is planned to continue explorations on this old property all winter. A diamond drill outfit has been secured from the Isle Royale Consolidated Mining Co. Trenching to locate the outcrop of tbe Kearsarge amygdaloid lode has been under way for several weeks.

Mohawk.—Fire destroyed the frame rock and shaft house at No. 3 sbaft recently, causing a loss of $15,000, partly insured. Production will not suffer, as more rock will be shipped from Nos. 1 and 2 shafts. Work on tbe intake crib at the pumping station, at the mouth of the Tobacco river, on Traverse bay, is completed. Tbe crib will prevent the intake from being clogged with bark and ice, and reducing the water supply. This mine produced 358 tons of mineral in October. Work on the third head is nearly completed.

COPPER—ONTONAGON COUNTY.

(*From Our Special Correspondent.*)

Adventure Consolidated.—Tbis mine produced 100 tons of refined copper in October.

Mass Consolidated.—Tbe October production of tbis mine was 125 tons of refined copper.

Michigan.—This mine will start shipping rock regularly next week. One bead at the Mass stamp mill, at Keweenaw bay, will be used. Shipments will be at the rate of 250 tons daily at first.

Norwich.—There is little likelihood of this property being worked, as reported recently. Negotiations for its purcbase bave been dropped.

Victoria.—Excellent progress has been made with the surface work during the last few weeks. Work on the stamp mill will start next spring.

IRON—GOGEBIC RANGE.

Ironton.—This mine, near Bessemer, operated by Corrigan, McKinney & Co. has closed, letting out 70 men.

IRON—MENOMINEE RANGE.

The various Corrigan mines at Crystal Falls and vicinity are to reduce at once, and Great Western, Armenia and Lamont will close entirely and be permitted to fill witb water. At the Great Western the big pit is to be filled with waste, to prevent sand washing into the ore below. Crystal Falls and Tobin will be worked this winter, it is expected, and tbese and Bristol are the only mines at Crystal Falls village that will do anytbing.

Chapin and Aragon.—About 200 unmarried men are to be discharged from each of these mines owned by the United States Steel Corporation.

Commonwealth Iron Co.—This company has its churn drill in operation on section 16, Dickinson county, on lands owned by A. C. Cook.

Deering Harvester Co.—Exploratory work at Lot 3, Crystal Falls, has been suspended by tbis company.

Garfield.—The exploratory work by the Oliver Iron Co. at this old property near East Vulcan, has been discontinued, and about 40 men laid off..

Munro.—This mine at Norway, employing 60 men, bas been closed.

Scott Mining Co.—A second hole has been started at the exploration of this company on section 10, Dickinson county. The first hole was put down 385 ft. and about 30 ft. of soft hematite ore cut and the drill was in the slates when work was suspended.

Tobin.—Tbis mine at Crystal Falls is working a larger force tban usual, grading stockpile ground. Work on the new ground near the Genesee sbaft is nearly completed. The Tobin, it is said, will operate to its fullest capacity the coming winter. Sinking a winze to the fifth level has been started, and the sbaft bas been holed at the Genesee from the fourth to the third level, but will not be timbered till the close of navigation.

MINNESOTA.

IRON—MESABI RANGE.

(*From Our Special Correspondent.*)

International Harvester Co.—The two mines on this range, Mr. Sellwood, manager, have closed shipments, witb about 110,000 tons each. Hawkins is a milling property, but will probably be made into an open pit steam shovel mine some time later. Agnew is to be transformed at once from an underground mine, operated by the caving system, into an open pit mine. The company has begun removing 1,650,000 yd. of earth and 300,000 yd. of taconite, to uncover more than 5,300,000 tons of ore running about 60 per cent. The surface averages 63 ft. and the ore is 121 ft. thick.

Leetouia Mining Co.—Tbis company's new mine, now estimated to contain, on an 80-acre tract, not less than 10,000,000 tons, and in section 11, T. 57, R. 21, is closed, with a total shipment of 200,000 tons. It is a steam shovel mine, and Butler Bros. contractors, have a long time contract for removing 1,000,000 yd. of stripping and mining 3,000,000 tons of ore. The stripping is to be done in tbe next four years. Cypress, adjoining Leetonia, on the northwest, and a new shipper, has closed with a production of 125,000 tons for the summer. It is also a stripping mine. Pearce & Morrow, in sections 28 and 29, T. 58, R. 20, have closed witb about 50,000 tons each. They are all under tbe same management.

Standard Mining Co.—It is understood that although the washing experiments of this company at tbe Arcturus mine have been successful, the company is to surrender its option shortly. Many thousand dollars were spent in this experiment. Arcturus ore is a beautiful hard hematite with seams of fine white silica. When washed it makes a splendid furnace product, but separating and concentrating is a difficult matter.

MONTANA.

BLAINE COUNTY.

(*From Our Special Correspondent.*)

Lippman Mines & Tunnel Co.—This company has been formed to construct a 3,000-ft. drain tunnel to unwater the Hailey district and to operate mines. The capital stock is $3,000,000. The officers are Geo. H. M. Wells, of Utah, president; Fred J. Kiesel, Ogden, vice-president; W. A. Nelden, Salt Lake, treasurer; Fisher S., Harris, Salt Lake, secretary; M. H. Lippman, general manager.

FERGUS COUNTY.

(*From Our Special Correspondent.*)

Gilt Edge.—At this property a large amount of exploratory work is being done by diamond drill.

GRANITE COUNTY.

Good Hope.—The mill of tbis company at Philipsburg, bas resumed operations. A large quantity of ore is reported at this mine, and a good force of men at work.

(*From Our Special Correspondent.*)

Basin & Comstock Mining Co.—This company was organized to operate the old Comstock property, 4 miles from Basin, up Cataract creek. The capital stock is $50,000.

King.—A lease on this mine at Basin, owned by the Basin & Bay State Mining Co., has been executed by the Jefferson County Mining Co., recently organized in Massachusetts.

Molybdenite.—The deposit of this mineral, about 8 miles from Homestake, has been traced for 2,500 ft The find is owned by Geo. W. Winter, of Butte, and Mike Garrity, of Homestake.

LEWIS & CLARKE COUNTY.

Pittsburg & Montana Co.—This company, with a smelter at Butte, has purchased the Christina group of seven claims, near Austin, the Fanny Parnell and two adjoining claims and three other claims for surface. Tbe price reported to have been paid for these properties is $16,000. On the Cbristina group much work has been done and considerable copper-silver ore shipped.

(*From Our Special Correspondent.*)

Argo Copper Mining Co.—The product of the concentrator on this property is being shipped to the National smelter at Rapid City, S. D. The concentrates average 25% copper.

MADISON COUNTY.

(*From Our Special Correspondent.*)

Philpot.—This property, at Red Bluff, owned by R. J. Philpot, of Norris, is being negotiated for by New York parties. It is the intention to place a cyanide mill to work a 10-ft. ledge of jasper quartz exposed. A test run of 30 tons returned $14 per ton, giving an extraction of 92 per cent.

Pole Creek Placers.—This property, known as the Tanner ground, produces corundum material and some gold. The corundum occurs as sapphires of various shades, some of an uncrystallized variety. In the crystallized kind a good many fine gems are found.

PARK COUNTY.

(*From Our Special Correspondent.*)

Emigrant Gulch Placers.—All the placer ground and machinery owned by the late Dwight L. Wing, near Chico, has been sold to George S. Gaudy, of Philadelphia, for $3,300. The depth to bed-rock is from 100 to 150 ft. The gold is light and flaky and deceptive as to weigbt. It is worth about $18.50 an oz. Mr. Wing's operations were the last of a long line of failures made by various people seeking to successfully work the gravels of the lower part of the gulch.

SILVER BOW COUNTY.

(*From Our Special Correspondent.*)

Goldsmith.—This property, west of the Moulton property, is being operated under a lease by C. W. Ellingwood, who has opened up a sboot of silver-gold ore and shipping 25 tons per day. Mr. Ellingwood is paying 50% royalty to the owners. The last shipment gave 260 oz. silver and $31 gold. The present ore body appears to be of greater extent than ever.

Original—The new Nordberg hoist, on this property, is in commission. A round rope is used instead of tbe flat cable.

Raven.—The old incline shaft in this mine has been retimbered and straightened. A new Hendrie & Bolthoff hoist, will be installed. A 5-drill Sullivan air compressor has been ordered. The Raven is a silver-gold property at Centerville, north of Butte. The ore sent to the smelters runs about $1 in gold to each 20 oz. silver. The owners are James Forbes, Charles Madison, W. W. Norris and John Berkin.

NEVADA.

NYE COUNTY.

(*From Our Special Correspondent.*)

Halifax Mining Co.—This company, owning six claims, being an eastern extension of the Tonopah Belmont Development Co.'s ground is installing a pumping plant witb a capacity of 50,000 gal. per day, the sinking pump having a capacity of 400 gal. per hour. The main shaft is down 650 ft. The company is a close corporation, controlled by Senator Kearns and David Keith, of Salt Lake City.

McNamara Mining Co.—The suit brought by this company against the Tonopah Mining Co., claiming a part of the Buckboard claim owned by the latter company, has been dismissed. The McNamara company withdraws all claims and each party to the suit pays its own costs.

Montana Tonopah Mining Co.—The first annual report presented at the meeting recently held in Salt Lake City, showed that work began on August 28, 1902, and since then 2,500 ft. of development has been done at a cost of $18.93 per ft. The shaft is down 625 ft., and was sunk blindly 376 ft., at wbich depth tbe first ledge was struck. Up to September 8 the ore sold realized $50,261 net and ore on the dumps is valued at $65,000 net, with large bodies blocked out in the mine. The company also had ore at the smelters worth $16,260 not settled for. The company owns 167 acres north of the Tonopah Mining Co.'s claims. Since this report was issued the company has received the following returns for 372,506 lb. of ore shipped to smelters, which returned $31,313. The company is sacking and shipping an average of 12 tons per day from development work on six ledges at three levels. The mine is equipped with electric drills and lit by electric light generated by a Fairbanks Morse gasoline engine.

PENNSYLVANIA.

ANTHRACITE COAL.

Mild weather affects shipments of antharcite, but in the Lackawanna region the collieries are averaging

fully nine hours a day for five days a week. Collieries here and there are shut down for a day if coal accumulates too fast. The miners seem generally satisfied with conditions. The Conciliation Board, which is doing much to prevent the miners nursing grievances, met in New York November 12 and will meet in Scranton on November 25. The only strike of miners of any importance new on in the Wyoming and Lackawanna regions is that at the Red Ash mine, near Wilkes-Barre. It is said that the Conciliation Board will consider this strike at its next meeting. Most of the contractors who do rock work—the sinking of shafts or driving of tunnels and planes—for the coal mining companies have granted the rockmen a 10% increase in wages. Only two or three contractors in the whole Lackawanna region have not granted the advance and have the strike still in force against them, but these contractors did not employ a great number of men.

Grassy Island.—At this shaft of the Delaware & Hudson Co., at Olyphant, a large new power plant is being installed, using boilers of the locomotive type. In the shaft no sinking has been done since the rockmen stopped work at the time of the strike last year. The shaft is down about 500 ft. Contractor Isaac, of Dallas, is making satisfactory progress on the concrete work.

Delaware, Lackawanna & Western.—The two 500-kw. Curtis turbo-alternators, made by the General Electric Co., are in successful operation at the great Hampton power plant of this company. The turbines run at 1,700 to 1,800 revolutions per minute and the generators, of the 3-phase type, deliver current at 2,300 volts. In connection with its Hampton plant the company is preparing plans for an electric hoist of novel design for hoisting water from a centrally situated shaft that will drain seven mines.

Scranton Coal Co.—This company, of which James Bryden is general manager, is preparing to put in a central electric plant to supply power for mine haulage, etc., at several of its mines at Scranton. All the contracts have not been let.

SOUTH DAKOTA.

CUSTER COUNTY.

(From Our Special Correspondent.)

Copper Butte Mining Co.—Harry Francis has returned from Chicago and expects to begin shipping copper ore to the National smelter at Rapid City.

Gladiator Consolidated Gold Mines & Milling Co.—Mill machinery is to be purchased in Denver at once and a 10-stamp plant built.

Minnie May Mining Co.—The new stamp mill is expected to be running this month.

Ruberta.—The quartz mill at the old Charlie mine has been set up at the Ruberta, and is being changed to a wet cyanide plant.

LAWRENCE COUNTY.

(From Our Special Correspondent.)

Golden Crest Mining Co.—The additions to the cyanide plant are finished, and the plant has been running 10 days. For the first week the ore treated averaged $18 per ton, and an extraction of 85% was made. The mill has lately received five additional stamps, four new tanks, sand pump and cone separators.

Gold Eagle Mining Co.—A 22-ft. body of quartzite has been penetrated, assaying well. The company contemplates a cyanide plant. J. C. Noland, of Maitland, S. D., is superintendent.

Goldstake Mining Co.—Good cyaniding ore has recently been discovered in the main tunnel. Arrangements are being made for continuous winter work.

Penobscot Mining Co.—Ore is being shipped to two places for smelting. The 40-stamp mill and cyanide plant are running night and day. Alexander Maitland, of Negaunee, Mich., is president and principal owner, and F. R. Baldwin, of Deadwood, is manager.

UTAH.

BEAVER COUNTY.

(From Our Special Correspondent.)

Beaver Consolidated.—The crosscut from the 500-ft. level has encountered the porphyry which assays from 1 to 5 per cent copper.

Majestic Copper.—The first car of matte from the new smelter at Milford has been marketed. The product assayed about $90 a ton. Smelter giving satisfaction and was built by the Colorado Iron Works Co.

JUAB COUNTY.

(From Our Special Correspondent.)

Eureka-Hill Mine.—Three new 200 h. p. boilers are being installed, displacing five 60 h. p. boilers. The shaft, down 1,620 ft., is to be sunk deeper. The fire in the Gem stope destroyed most of the timber, but the miners are all working again.

PIUTE COUNTY.

(From Our Special Correspondent.)

Gold Development Co.—This company, Dr. P. A. H. Franklin, of Salt Lake, general manager, has bonded the M. M., Constellation and Gold Finch groups, containing 24 claims.

SALT LAKE COUNTY.

(From Our Special Correspondent.)

Columbus Consolidated.—Two cars of crude ore 103,050 lb., sold last week, averaged .09 oz. gold, 92.20 oz. silver, 26.6% lead, 1.1% copper, 10.5% zinc and 5.5% iron. Over $2,500 were realized from it.

Boston Consolidated.—The manager, Samuel Newhouse, has authorized the equipment of the mine with electricity, and electric motors are to be used for ore trains.

Bingham Con. Smelter.—Shipments of copper bullion for the week ending November 12 consisted of three cars, 180,000 lb.

United States Smelter.—The copper bullion shipments of the week ending November 12 consisted of three cars, 180,000 lb.

Utah Consolidated.—Contracts for material and equipment of the proposed additions have been let. The Westinghouse Electric Co. secured an order for a 250-kw. generator; the Norberg Manufacturing Co. will furnish a 450 h. p. tandem compound engine, and the Minneapolis Steel & Machinery Co. will erect the steel frameworks. The copper bullion shipments for the week ending November 13 consisted of 5 cars, 300,000 lb.

SEVIER COUNTY.

(From Our Special Correspondent.)

Sevier Consolidated.—The values in the tailings from the new mill are said to run very high and the Moore slimes process may be installed. Much high grade shipping ore is reported in the mine.

SUMMIT COUNTY.

(From Our Special Correspondent.)

Daly-Judge.—The recent strike of high grade ore on the 1,400 ft. level continues to improve with development.

Daly-West.—Work is in progress on foundations for the new slimes plant addition.

TOOELE COUNTY.

(From Our Special Correspondent.)

Daisy.—Arthur Murpby, of Salt Lake, has taken a bond and lease on this mine, and will soon commence operating the mill. The ores are very low grade.

Honerine Tunnel.—About 2,000 gal. of water per minute is reported flowing from the tunnel, and some of the shafts in the region are lowering.

WASHINGTON.

FERRY COUNTY.

(From Our Special Correspondent.)

Ore Shipments.—For the week ending November 12 the following shipments of ore were made: Quilp mine, 12 cars to Tacoma; Mountain Lion, 6 cars to the Boundary Falls, 4 to the Hall mines and 11 to the Trail smelter; Nob Hill, 2 cars, and North San Poil, 1 car to the Hall Mines smelter. From the Zala M., 2 cars to the Crofton smelter.

Golden Eagle.—The shaft is down 190 ft., mostly timbered.

Minnehaha Copper Gold Mining Co.—The shaft on the Minnehaha claim is down 145 ft. through the footwall, where a 12-in. streak of ore is reported to assay $40 per ton. From that point upward the shaft is being enlarged and timbered to make it a 2-compartment. The company is ditching a mile to conduct water from Skivington creek to the mine.

OKANOGAN COUNTY.

(From Our Special Correspondent.)

Mascot Group.—Work has been resumed on this property, which adjoins the Bodie on the south.

Ruby.—Ore is being shipped at the rate of 60 tons per month. The Golden Zone mill has been leased for one year and has been overhauled. A raise from the upper level has cut ore that assays high in silver. Fifteen men are employed. The office building and a 100-ton ore bin have been finished.

Similkameen Falls Power & Development Co.—A 500 h. p. dynamo is being hauled in. The telephone pole line is completed between the falls and the Golden Zone mill, Ruby and Six Eagles mines, and the towns of Nighthawk and Oroville. At Oroville it connects with the line of the Pacific States Telegraph and Telephone Company.

SNOHOMISH COUNTY.

45 *Consolidated Mining Co.*—A mortgage for $77,000 was foreclosed recently against this company by A. W. Pinkham, to whom the mortgage and notes had been assigned by Mrs. Charles H. Pinkham, widow of Charles H. Pinkham, of Essex, Mass., to whom they were originally made. After the consolidation of the 32 claims in 1899, officers of the company proceeded to borrow funds of Mr. Pinkham and of Charles H. Pinkham. A number of notes were made out to him in amounts ranging from $5,000 to $20,000 and the money spent for machinery, the building of a tramway, etc. The property is at Silverton.

FOREIGN MINING NEWS.

CANADA.

BRITISH COLUMBIA—BOUNDARY DISTRICT.

Boundary Ore Shipments.—For the week ending November 7 shipments were as follows: Granby mines to Granby smelter, 8,380 tons; Snow Shoe to Boundary Falls smelter, 2,100 tons; Mother Lode to Greenwood smelter, 3,712 tons; Emma mine to Granby, Greenwood, Trail and Nelson smelters, 957 tons; Oro Denoro to Boundary Falls smelter, 627 tons; Athelstan and Jack Pot mines to Boundary Falls smelter, 525 tons; Winnipeg to Boundary Falls smelter, 125 tons; total for the week, 16,926 tons; total for the year to date 547,054 tons. For the past week the Granby smelter treated 8,643 tons. The six furnaces are now working, giving a capacity of 2,100 tons daily.

BRITISH COLUMBIA—CARIBOO DISTRICT.

Fraser River Gold Dredging Co.—This company is putting into the Fraser river at Lyton, a $100,000 gold dredge. The old dredge and the new one are fitted with patent gold-saving tables.

Iron Mask.—C. E. Bulling, F. E. Marment and W. Jones, principal owners of this property at Kamloops, have decided to place an order with the Vancouver Engineering Works for a $75,000 concentrating plant.

BRITISH COLUMBIA—LARDEAU DISTRICT.

Criterion.—The stamp mill of this mine at Camborne is tied up by delay in getting some iron pipes. Development underground is pushed.

Metropolitan.—This company is to work its Triune mine all winter. A contract is being let for several hundred feet of development.

Silver Cup.—This silver-lead property near Ferguson is working a large force, mostly on the surface, getting ready to ship over the new tram to Five Mile.

BRITISH COLUMBIA—ROSSLAND DISTRICT.

Rossland Ore Shipments.—For the week ending November 7 shipments were as follows: Le Roi, 5,570 tons; Centre Star, 1,470; War Eagle, 1,170; Le Roi No. 1, 630; Le Roi No. 2 (crushed), 350; Jumbo, 112; Spitzee, 30; I. X. L. (milled), 140; Kootenay, 224. Total for the week, 9,646; for the year to date, 340,220 tons. For the week ending November 14 shipments were: Le Roi, 4,980 tons; Centre Star, 1,290; War Eagle, 1,200; Le Roi No. 2, 650; Le Roe No. 2 (milled), 350; Jumbo, 250; Spitzee, 30; I. X. L. (milled), 140; Kootenay, 80. Total for the week, 8,970 tons. Year to date, 349,190 tons.

(From Our Special Correspondent.)

Rossland Power Co.—This company is erecting at Trail a mill for ores from the War Eagle and Centre Star mines, at Rossland. No information is available as to the process to be used, but it is announced that the plant is to be a preliminary one. The mill will have a capacity of 200 tons of ore per diem. There has been delay in getting building material on the ground, owing to the tardiness of the railway company in constructing a spur from the Columbia & Western Railway to the mill site, about ¾ of a mile from the Canadian Smelting Works. The mill building is of timber roofed with corrugated galvanized iron. Its outside dimensions are 105 ft. by 360 ft., and 85 ft. high at its highest part. The concrete foundations for building and machinery are in. Large ore bins will be erected. The high spur line to the top of these bins will be carried on 700 ft. of trestle. A second track will be run to a store building 26 ft. by 100 ft. A boarding house and a bunk house are ready for occupation. Water will be obtained from the Trail smelter flume, a quarter of a mile distant. This supply will be supplemented as soon as possible by water from Murphy creek, conveyed through a 12-in. pipe line. The success of the mill is anticipated with confidence.

BRITISH COLUMBIA—SLOCAN DISTRICT.

Ivanhoe.—The concentrator on this silver-lead property started recently at McGuigan. The output will be increased on the completion of an aerial tram between the mill and the No. 4 adit. Zinc values are saved on jigs and Wilfley tables and the mine is now shipping zinc regularly to the Empire smelter at Iola, Kan. The product runs about 47% zinc and 60 oz. of silver.

MINING STOCKS.

(Full quotations are given on pages 798 and 799.)

New York, Nov. 18.

Once again professional operators have thrown out the life-line of hope to investors. A favorable indication for a firmer market also is the normal trading in such stocks as have witnessed the heaviest liquidation recently. Prices this week have generally fluctuated within narrow limits, though a few stocks of lesser importance have declined rather heavily.

Amalgamated Copper showed some strength when work was resumed at its mines, and sold up to $39¼, but later weakened, and on Wednesday closed at $38. Sales were moderate. Anaconda was invisible for several days, and on Wednesday was quoted at $16.75. On curb, United, of Montana, was rm at $15.75@$15.87½, and Greene Consolidated, of Mexico, at $14@$14.87½. Tennessee softened from $30.25 to $27, which was purely a speculative decline.

A sale of Quicksilver preferred, of California, was reported at $5, which is less than the previous trade.

Alice, of Montana, is down, selling at 19c. Horn Silver, of Utah, traded 800 shares at $1.05. Ontario moved at $5.25.

Portland, of Cripple Creek, Colo., continues to weaken, and has sold at $1.07, while Elkton brought 38c.

Comstock stocks are quiet. Ophir moved at $1.40@$1.45; Caledonia, $1, and Mexican, 73c.

Standard Oil stockholders will receive a $12 dividend for the last quarter, which is $7 more than was paid in the previous three months, and $2 more than last year. In all, dividends amounting to $44 have been declared this year, which compares with $45 in 1902 and $48 in 1901 and 1900. A single share sold this week at $655, being 15 points higher than the previous bid.

Among auction sales recently were $515,000 first mortgage 6% bonds of the National Abrasive Manufacturing Co., of New York, at $600 per bond, and $5,000 at $300; 300 shares Kentucky Iron Co.. at $5, and $2,000 first mortgage 6% bonds of the National Consolidated Oil Co., at 30½ per cent.

Boston. Nov. 17.

(From Our Special Correspondent.)

The only important features in this market during the week were the $6 drop in the price of Daly-West Mining stock to $30.50 and the drop of Consolidated Mercur from 90c. to 35c. The former has recovered to $33.50 and the latter to 60c. The only reason given for the Daly-West decline is possibly labor troubles, which the management telegraphs is unfounded. The company is paying a dividend of 65c. per month and adding to the surplus each month. Last month $30,000 was placed to this account. Although the company is paying $7.80 per annum, the local public does not take kindly to the investment, somehow or other. The break in Consolidated Mercur looked like a fluke, although it is expected that when dividend payments are resumed they will be at the rate of 2c. per month, against 5c. per month up to the time they were discontinued. Daly-West is reported to have a surplus of from $250,000 to $300,000.

The general mining share market remains flat. Amalgamated touched $40 last Wednesday on the announcement that a special session of the Montana Legislature had been called, but broke to $37.25 subsequently, and closed off almost $1 net for the week at $38. A local trader last week bid $3 for the dividend on 10,000 shares of Amalgamated during 1904. He is thought to represent T. W. Lawson.

Copper Range Consolidated made a $2 fluctuation during the week, closing 1.37½ below a week back at $44. It is now expected that dividend payments will begin within the next six months. Old Dominion has been very quiet, selling at from $10 to $8.50, closing with a net decline of $1.50 at $9. A special meeting of this company will be held in Jersey City November 30 to authorize an increase in the capital from 200,000 to 350,000 shares to amalgamate with the United Globe property. There have been deposited almost 125,000 shares under the agreement, and the time for depositing has been extended to November 28.

Tamarack broke $12 to $85 on moderate dealings, but no significance is attached to the decline, as orders will move the stock rapidly either way. Osceola was not influenced by the temporary strike at the mine, selling at $55@$56.50. Utah Consolidated has been quiet but firm at $27 to $27.50, and United States at $17.12½@$17.50. Mohawk fell $1.62½ to $35.12½ on insignificant dealings, but rallied to $36. Quincy holds at $85. Granby sold at $4.12½@4.50. This company is expected to commence dividend payments next month. Boston Consolidated has been active on the curb, selling up to $7.12½. It would be an easy matter to put this stock much higher, but the managers do not wish it. In time the stock will be listed on the exchange. Atlantic fell $1.25 to $7, with a 50c. recovery. Bingham fell 50c. to $21.50 and Centennial broke $2 to $14.50, recovering to $14.87½ Some criticism is heard of the Centennial management, owing to the fact that money raised for a mill has been spent for development work.

Montana Coal & Coke rallied $1.50 to $4 on the resumption of the Amalgamated mines. Parrot sold at $17.50@$18, Shannon at $8.25@$8.50, Trinity at $5.62½@$5, and Wolverine at $64.50@$66. Dominion Coal spurted $2 to $76, and Dominion Steel from $8 to $9.50 per share.

San Francisco. Nov. 14.

(From Our Special Correspondent.)

In the Comstock shares the market has developed a good deal of weakness, doubtless, in consequence of the recent crop of assessments which have been levied. There was a good deal of liquidation going on, with profit-taking on every small turn. Some quotations noted are: Ophir, $1.40@$1.45; Consolidated California & Virginia, $1@$1.05; Caledonia, $1; Mexican, 84c.; Hale & Norcross, 51c.; Sierra Nevada, 31c.; Gould & Curry, 21@22c.; Potosi, 10c.

The sworn statements of financial conditions, as filed in the offices of the mining companies this week, show cash on hand November 2 as follows, with all expenses paid to that date unless otherwise stated: dated, $1,477; Andes, $2,772; Belcher, $1,152, with liabilities of $1,000 and October expenses partly unpaid; Best & Belcher, $550, with indebtedness of $6,500; Bullion, $3,015; Caledonia, $4,945, with October expenses unpaid; Crown Point, $8,049; Consolidated California & Virginia, $9,436; Chollar, $1,198; Challenge Consolidated, $2,938; Consolidated Imperial, $2,314; Consolidated New York, $231, with bills payable of $1,500; Confidence, $218, with October expenses unpaid; Exchequer, $191; Gould & Curry, $6,189, with bills receivable of $2,500; Justice, $201; Julia Consolidated, $2,163; Lady Washington, $104, with indebtedness of $440; Mexican, $1,051; Overman, $2,435, with October expenses unpaid; Potosi, $364; Savage, $171, with bills payable of $500; Segregated Belcher, $2,843; Silver Hill, $16,138, with bullion in transit; Standard Consolidated, $99,457, with October expenses and October clean-up to be accounted for; Syndicate, $2,730; Union Consolidated, $4,671; Utah Consolidated, $2,688.

The following companies report no cash on hand, with indebtedness as given on November 2: Ophir, $2,255; Siera Nevada, $46.

On the San Francisco & Tonopah Exchange business was quieter than for some time past. The selling demand was quite small, and trading limited to comparatively few stocks. Montana Tonopah sold at 97@98c.; Tonopah North Star, 31c.; MacNamara, 12@13c.; Esperanza, 2c.

On the California Exchange oil shares were in moderate demand. but prices remain fairly firm. Home brought 95c.; Monte Cristo, 85c.; Junction, 19c.; Occidental, 18@19c. The largest demand was for Occidental, in which trading was quite heavy.

COAL TRADE REVIEW.

New York, Nov. 18.

ANTHRACITE.

Very little change is to be reported in the anthracite market. It is still practically a weather market and trade is depending very largely upon changes of temperature. As we write, a cold spell is evidently setting in, with strong westerly winds, and this will probably give an impetus to retail trade in the cities. Stocks are generally large, however, as we have already noted, and the wholesale trade will not be affected for the present. At the mines matters are rather quiet and production is not being pushed. Several of the collieries will be stopped this week and next for various causes. Supplies are abundant, however, and there is no probability of a shortage.

Shipments of coal westward are moderate, as the Lake trade is approaching the end of the season, and everybody in the business seems to be looking for an early close of navigation. Ore boats are being laid up, and tonnage at Buffalo is not very abundant. Supplies at the upper ports, however, are very good, as a very large tonnage was sent up early in the season.

Coastwise trade is quiet, although there is a little rush to get coal to the shoal-water ports before cold weather sets in. Trade along the Sound and in southern New England is dull.

Prices for domestic sizes at New York harbor points continue unchanged. For steam sizes, quotations are variable, with a tendency to low prices, which is due to the cheapness of bituminous coal at tidewater.

BITUMINOUS.

The soft coal trade at the Atlantic seaboard remains quiet, although some producers and sales-agents are of the opinion that an improvement in demand may be expected shortly. Others, however, entertain their doubts. It will not be disputed, though, that there is a better taking of coal in a small way, in some directions. Low prices are still being quoted, lower, in fact, than is customary. Nevertheless, there is reason to believe that producers have agreed more or less, by correspondence and personal interviews, as regards minimum prices. Of course, re-sales may not prove this. New business for the coming year has not appeared for consideration yet, but it seems likely that in another month it will be visible.

Trade in the far East is quiet, a few scattered orders reaching producers. Trade along the Sound is also quiet, people buying coal in a hand-to-mouth sort of way. At New York harbor points little is doing. Some coal that has come on the market, on account of demurrage charges, has sold at very low figures. Current quotations are about $2.40@$2.50 per ton for Clearfield, and $2.90@3.35 for the better grades. All-rail trade shows little change, as the amount of tonnage going forward continues only fair.

Transportation from mines to tide is rather slow, coal taking over a week to run through. The car supply is up to all demands. Coastwise vessels are more plentiful than they have been, but the demand is poor. We quote current rates of freight from Philadelphia: To Boston, Salem and Portland, 75c.; Portsmouth, 80c.; Long Island Sound, 60c. From New York harbor to Boston, Saiem and Portland, 60@65c.; Long Island Sound, 50c.

Birmingham. Nov. 16.

(From Our Special Correspondent.)

The coal production in Alabama slacked up a little last week, but this will be temporary, however, as there is a good demand for the product. The closing down of the Birmingham rolling mills will affect the demand for coal produced by the Republic Iron & Steel Co. a little. The railroad car situation is but little, if any, improved, and the superintendents of the railroads in this section are not at all willing to encourage shipments of coal to points off their lines. Three or four of the larger mines in this district were idle one-fourth of the time last week. It is announced that the Pratt Coal Co. is beginning to get out a respectable output from new mines in the western part of Jefferson county. The Sloss-Sheffield Steel & Iron Co. reports an increased production for this time of the year as compared to the same period a year previous. The Tennessee Coal, Iron & Railroad Co. is also producing a larger quantity than a year ago. Other companies are doing well.

The Sayre Mining & Manufacturing Co. was incorporated in Birmingham the past week, capital stock $200,000. The following officers were elected: President, Robert H. Sayre, of South Bethlehem, Pa.; vice-president and general manager, John Adams, of Birmingham (at present assistant general manager of southern division Republic Iron & Steel Co.); secretary, James Weisel, of Birmingham; directors, Robert H. Sayre, John H. Adams, Birmingham; James Weisel, Birmingham; Samuel Thomas, Catasagua, Pa.; W. H. Sayre, South Bethlehem, Pa.; A. N. Cleaver, South Bethlehem, Pa.

Chicago. Nov. 16.

(From Our Special Correspondent.)

Wholesale trade in anthracite is about stationary, awaiting the expected stimulation that should follow the cold wave reported to be advancing over the northern Mississippi valley. There will not be to all appearances any marked change until cold weather sets in. It is the usual quiet period between brisk early autumn buying and heavy winter purchases. All-rail business is slowly increasing and dock stocks are ample for all probable demands of the winter. The dock yards are so full, in fact, that it is difficult to find unloading room for cargoes arriving. Anthracite car load prices remain as fixed September 1—$6.00 for all but grate coal, which is $6.75.

Bituminous is quiet, the only marked activity being in the western trade, which is already looking to Chicago to supply the deficiency due to the Colorado strike. Locally there have been complaints about Chicago getting too much bituminous for the good of her dealers. The cheaper grades of Illinois and Indiana are 10c. to 15c. lower than last week. Block and the better grades of lump are about the same—lump selling at $2.25@$3; run-of-mines brings $1.65@$2.10, and screenings, $1.10@$1.65; Hocking probably has been cut 15c. to 20c. from the circular prices of $3.80 for steam lump, $3.90 for domestic lump, and $3.65 for run-of-mine. Youghiogheny and Pittsburg are not in heavy demand, bringing $3.25@$3.50. Smokeless is picking up a little, but is far from being as popular as it was a year ago; it brings about 50c. less than the circular prices of $4.35 for lump and egg, and $3.90 for run-of-mine. Smithing has a fair sale at $4@$4.25, and cannel is in good demand at $5@$5.50. All grades of bituminous are destined doubtless to advances as soon as cold weather comes, affecting transportation unfavorably, as well as increasing consumption.

Cleveland. Nov. 17.

(From Our Special Correspondent.)

Under the influence of heavy production and decreasing consumption, the prices of coke have receded slightly. The market has been somewhat dull and the high sulphur cokes have been selling off. The standard cokes have been holding off until this week, when they also dropped. Now Connellsville coke has sagged in price and is selling at $2.65 at the oven. The car situation is such as to permit the railroads to make very prompt delivery. The light consumption by furnaces and foundries has eased up the demand also and the general situation is very easy.

The coal trade has not revived to any appreciable extent, and all efforts to advance prices, it is now recognized, will rely entirely upon any decision the operators may make to curtail the production. The prices have held steady in a dull market at $1.15 at the mine for run-of-mine Pittsburg coal, and $3.50 Cleveland for Massillon coal to the dealer. The market for domestic coal is rather brisk. The supply of anthracite in this territory is all that could be desired.

The movement of coal up the lakes continues steady and brisk, with possibilities of an early curtailment, due to the fact that the lake ore movement will soon be over and, as the grain trade is not as brisk as it might be, much of the tonnage will be sent to the docks. The carrying capacity being lessened, the prospects for better freights for the remaining vessels, which will handle coal, will, of course, improve. This will not heighten the movement, however, which is being hampered by a previous heavy shipment which has about supplied the northwestern demand and filled the docks.

Pittsburg. Nov. 17.

(From Our Special Correspondent.)

Coal.—The demand for coal is good and prices for immediate shipment are well maintained. The cut in the circular prices is only quoted for 1904 delivery. The railroad coal mines are working as full as transportation facilities will permit. Lower freight rates for export trade are likely to be put into effect shortly. The heavy rains of the past two days have brought on a coal-boat stage in the rivers, and it is expected that fully 10,000,000 bu. of coal will be shipped to the southern markets to-morrow. It is estimated that there are about 26,000,000 bu., or 1,000,000 tons, loaded and ready for shipment in the pools and harbor. The bulk of the coal to be sent out is destined for the New Orleans market, which is said to be completely out of fuel. The water will take the boats to Louisville, but at the present writing there is no certainty that there will be sufficient water to continue on to New Orleans.

Connellsville Coke.—The committee appointed at the general meeting of coke interests, to devise plans for restricting production and maintaining prices, met here yesterday. Plans for forming a selling agency were discussed, but nothing definite was done. Another general meeting is being arranged. Coke prices are declining. Furnace coke is selling at $1.70@$1.80 and foundry at about $2.50. The *Courier* in its last report gives the production for the previous week at 149,389 tons. The shipments were 5,499 cars, distributed as follows: To Pittsburg and river tipples, 2,611 cars; to points west of Pittsburg, 1,704 cars; to points east of Connellsville, 1,184 cars.

San Francisco. Nov. 14.

(From Our Special Correspondent.)

The coal trade still continues rather quiet, and for foreign and Pacific coast coals there has been no change. A sharp advance of $3 a ton is, however, reported in the Rocky Mountain coals. Whether this can be maintained depends upon strike conditions in the Rocky Mountain district.

Pacific coast coals in large lots to dealers are quoted as follows: Wellington and New Wellington, $8; Richmond, $7.50; Roslyn, $7; Seattle and Bryant, $6.50; Beaver Hill and Coos Bay, $5.50; white ash, $5.25. For Rocky Mountain coals, ex-car, to dealers, prices are $14 for Colorado anthracite; $11.50 for Castle Gate, Clear Creek, Rock Springs and Sunnyside. Eastern coal is still nominal at $14 for Pennsylvania anthracite, and $13 for Cumberland, with very light stocks. Foreign coal in cargo lots is quoted at $13 for Welsh anthracite; $8.50 for cannel; $7.50 for Wallsend and Brymbo.

Foreign Coal Trade. Nov. 18.

No changes can be reported in the export coal market here. Business is very quiet, though it may be helped by the low prices ruling for bituminous coal at shipping ports.

Messrs. Hull, Blyth & Co., of London and Cardiff, report under date of November 7, that business is now much quieter, but owing to scarcity of November coal, prices remain steady, especially for best. Quotations are: Best Welsh steam coal, $3.72@$3.84; seconds, $3.66; thirds, $3.54; dry coals, $3.36; best Monmouthshire, $3.30; seconds, $3.24; best small steam coal, $2.16; seconds, $1.98; other sorts, $1.80.

The above prices for Cardiff coal 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 freight market shows signs of weakness, especially to the East. Some rates quoted from Cardiff are: Marseilles, $1.20; Genoa, $1.20; Naples, $1.08; Las Palmas, $1.38; St. Vincent, $1.56; Rio Janeiro, $2.40; Santos, $2.64; Buenos Aires, $1.92.

IRON TRADE REVIEW.

New York, Nov. 18.

If any change can be reported in the iron market this week it is a slight improvement in buying. Consumers are evidently filling their immediate needs and are extending orders. They are not, however, as yet fully convinced that prices have reached bottom, and the reductions made in several lines have not brought out the business which was expected. The insistence of the plate and structural pools on the maintenance of prices is regarded in many quarters as a bluff, especially, in view of the reductions which have been made in billets, bars and some other lines.

Pig iron buying has been a little better. The foundries have been laying in supplies to some extent, many of them being compelled to do so by the condition of their yards. Southern iron has sold better and some contracts have been placed for future deliveries, although the furnace-men are reluctant to take contracts at present prices for more than the first quarter of the year, believing that there may be some improvement. The reduction of pig iron output is pretty general in the West and in eastern Pennsylvania, but there has been very little change in the southern furnaces, which are running along about as usual.

Interest centers in the fight between the rail association and the railroads over the price for steel rails. Some railroad companies have accepted the continuation of the present prices, and it is understood that a number of contracts have been placed; but the larger companies are still holding out for a reduction.

A great deal is being said now about the export trade. It is understood that the United States Steel Corporation is making great efforts to place material abroad, and that some contracts have already been taken, notably for rails. These, of course, are at a considerable reduction from domestic prices, although it is impossible to find out what quotations have actually been made. Foreign dispatches state that the Corporation has taken contract for the rails needed for the Mecca Railway at a price equivalent to $22.88 per ton at Beirut, Turkey. This statement cannot be confirmed here, but, if it is true, the price would mean somewhere between $17.50 and $18 per ton at mill here. The idea seems to be, to keep the Corporation's works going on export business, if domestic trade falls off. This is all very well in some respects, but may have dangerous results with the presidential and congressional elections pending for next year.

Birmingham. Nov. 16.

(From Our Special Correspondent.)

None of the furnacemen in this section is willing to do much talking in reference to the prices of pig iron or as to whom they are selling the product. There are no indications that prices are going to improve, and sales are being made with delivery to be continued after January 1. However, there is no selling three or six months ahead at present prices. There will be no cessation in shipments this year during the holidays if the railroads will be only able to keep up the movement.

It is only an estimate as to prices, but a report gains considerable currency that No. 2 foundry is selling at $9.50 per ton. If this be true, No. 3 foundry is selling between $9 and $9.50 and gray forge is about $8.50, the lowest prices that have existed since 1898.

No furnaces have been blown out in the last few days, but none of the furnaces in blast is being pushed for a big production. The railroad car situation is still a serious proposition, and none of the furnacemen is getting all the cars he can use. Some sales are still being made for iron to be shipped abroad. No definite information is given out as to foreign bound iron beyond the fact that there is some iron sold and being offered for sale in the foreign market at prices equal to those prevailing here.

In finished iron and steel circles in this section all is not as happy as it might be. The Republic Iron & Steel Co. has closed down its Birmingham rolling mills, the announcement being made that this is the result of lack of orders for the product. The Bessemer and Gate City mills are still in operation. The Birmingham mills gave employment to about 900 men in all.

Because of lack of orders for immediate delivery, the steel plant at Ensley, belonging to the Tennessee Coal, Iron & Railroad Company, has been shut down. It is not believed that the plant will resume operations again until after the first of the coming year, when work will be started on the order for 30,000 tons of steel rails for the Louisville & Nashville. No statements are being made as to the exact causes leading up to the shut-down beyond that made. This will throw out about 500 men temporarily. The closing down of the Birmingham rolling mills, belonging to the Republic Iron & Steel Company, threw out of employment nearly 1,000 more hands and reduces the home demand for pig iron. It is asserted, however, that the sales of pig iron at low prices prevailing now, will require the iron heretofore supplied the steel plant and the rolling mills named.

Chicago. Nov. 16.

(From Our Special Correspondent.)

There is little change in the pig iron market, which continues to be one of small sales, quick deliveries and prices below the cost of production of iron. Attempts have been made to secure a general reduction of the output of iron in the Chicago district, but the difficulty is, that there is no combination that would financially reimburse the owner of a single furnace who shut down. Owners of two or more furnaces could easily close one furnace each, of course. The probability of general curtailment of production therefore seems remote.

Southern is the chief seller on time contracts, though these are hardly time contracts measured by the standard of a year ago, when deliveries for six to eight months ahead were contracted for. Sixty to 90 days is about the limit now. The change is, of course, due to the different attitude of the buyer: he looks upon the market as a falling one and will not change his policy until the curtailment of production has caused a scarcity of iron. For northern furnaces the situation is somewhat better than for southern; their iron sells for $1 a ton more, through the need of it for mixtures and their local advantages. With the lower freight rate now in operation for southern, however, it is probable that northern and southern will draw closer together as to price, as indeed the tendency now is.

Sales of southern No. 2 have been made as low as $9, Birmingham, which means $12.85, Chicago, though quotations are generally given 50c. higher. Northern is bringing $14@$15, though some sales have probably been made for less than the minimum quoted.

Coke is demoralized; there has been an accumulation on track that has made holders tumble over themselves in their effort to sell it. Any quantity of good 78-hour coke can be bought for about $5. The market will probably settle back to normal conditions in a week or two as soon as shipments are restricted.

Cleveland. Nov. 17.

(From Our Special Correspondent.)

Iron Ore.—The movement of iron ore down the lakes will be completed before December, as the last shipments away from the head of the lakes will be made before the week is out. The late shipments have all been by contract tonnage, making a rate discussion of no avail. The movement from the lake docks to the furnaces is very slow and laggard, the demand being light. No talk is indulged in as to prices or conditions for next year, in which the only interest from now on will lie.

Pig Iron.—The prices of foundry iron in the South have sagged slightly and the market has picked up some. The buying for spot delivery continues heavy from the southern furnaces on the basis of $9.50@$10 Birmingham for No. 2. In some instances considerable contracts have been covered for first-quarter delivery of 1904 and in a few cases the consumers have been able to cover for the entire first half on the present basis of prices, although the furnaces take such contracts reluctantly. The northern furnaces have confined their sales to spot delivery in small lots, although some inquiries have been received for material entailing delivery through the first quarter of next year. The market has not quickened any, consumers still holding off waiting for the northern stacks to meet southern prices. Bessemer and basic have ceased to be active factors in the market and are not quoted, no sales having been made. Some of the furnaces of the north have decided to curtail production still more, the act being voluntary and without an agreement, as some of them will stay out of blast for a month longer than was anticipated when the agreement to curtail was made.

Finished Material.—There have been reports around that the price of bar iron has been reduced by the smaller mills in order to induce heavier buying. However, it is said that the market has responded so well to the prevailing prices that there is little reason to believe that any further reduction would bring out

any more trade, on which account the reports of cuts are taken with allowance. The market is represented by a quotation of 1.30c., Youngstown, with good buying. The steel bar situation has improved, spot buying being better and specifications against former contracts being rather heavier since the reduction in prices. The market is firm at 1.30c., Pittsburg, for bessemer and 1.40c., Pittsburg, for open-hearth. The buying of billets has been transferred from the smaller to the larger mills, with a slight increase in the tonnage caused by the reduction in prices. The small mills were well filled, during the time they sold under the association price, and are not in the market now for any considerable tonnage. The price holds at $23.50, Cleveland, for bessemer 4 x 4. The reduction in the price of sheets, which was announced from New York on Monday, had been expected. The quotation lately has been 2.75c. for No. 27, black sheets in car-lots at the mill; but the sales made have been at constantly lower prices, until the reduction was virtually $5 a ton. The understanding that this has been the cut made by the American Association merely, therefore, makes a public and general price, what has been done by most of the mills for some weeks. There has been a steady buying of plates and shapes for the past week. It is evident, however, that the needs of the consumers have merely been covered for the immediate present and that there has been no advance buying. The assurances which have been given that prices have held steady and are to remain as they now are, has given the consumer a little assurance; but trade conditions do not warrant any general buying. The market holds steady, but dull, at 1.60c., Pittsburg. There are a few inquiries for rails now and then without contracts. The price holds at $28, Pittsburg.

Old Material.—The market has been very dull and sagging. The accumulation of material and the light demand causes the prices to sag constantly.

New York. Nov. 18.

Pig Iron.—Business has not been large and prices remain about the same. We quote: No. IX foundry, $15.75; No. 2X, $15, while No. 2 plain can be had for 50c. less; gray forge, $14. For Southern iron on dock quotations are: No. 1 foundry, $14.25; No. 2, $13.50. Sales of gray forge are reported at $12 and even below. There are reports of cutting in prices, and probably lower figures could be made on a big order, if any such contract was open.

Bar Iron and Steel.—The market is a little steadier and more buying is reported at the lower figures made. Common bars are selling at 1.40c. in large lots, with steel at about the same.

Plates.—Demand is very light and is for small lots. Sheared plates are quoted as follows: Tank, ¼-in. and heavier, 1.78@1.83c.; flange, 1.95@2.05c.; marine, 2.10@2.15c. Buyers are holding back for the reductions, which, they are sure, will come.

Structural Material.—There is no improvement in demand. For large lots at tidewater, nominal quotations continue 1.75@2c. for beams, angles, channels and tees. Nothing is doing, however, as buyers look for reductions in prices.

Steel Rails.—The quotations remain $28 for standard sections, f. o. b. mills; light rails, $33@$36, according to weight. No business reported.

Philadelphia. Nov. 18.

(From Our Special Correspondent.)

After delaying the placing of orders for steel rails for several months in anticipation of a reduction in price from $28 per ton, quite a number of railroad companies have finally placed orders aggregating, according to to-day's reports, some 750,000 tons, at the full $28 price. The stubbornness of the railmakers in adhering to a price which affords them a high profit is due to well understood reasons. Last year the United States Steel Corporation made about 2,000,000 tons of rails and next year the product may be increased, and will be, if the plans of the railroad builders are carried out. There is a more settled condition in the steel industry to-day than for some months.

Pig Iron.—A conviction that prices are near bottom is manifested this week in the placing of large orders for southern pig iron at the minimum rates. The pig iron market will soon be strengthened through the loading up of the Alabama furnaces with all the business they can carry. With this element of disturbance removed, there is no reason for believing anything else than that, with the remarkable restriction at northern furnaces, pig iron prices will again advance. This probability is indicated by the receipt of inquiries this week for large quantities of foundry, forge and bessemer pig iron. Some of these inquiries will probably eventuate in orders. The furnaces which have gone out of blast in different sections of the country will probably remain out, until the fundamental conditions are radically changed.

Plates.—It is stated that a large order for plates has been received from Wales, which, if correct, is carrying coal to New Castle with a vengeance.

Bars.—In bar iron there is a moderate demand and with no present indications of an early improvement.

Structural Material.—In structural material nothing definite can be said until the larger consumers of such products can formulate their plans for the coming year. There is a better tone to-day than for some time, and it is believed in well-informed circles that the worst is over and that a gradually improving demand will manifest itself from now on.

Scrap.—Scrap iron is abundant and cheap, and it is probable that the larger consumers will now reach out and absorb most of the accumulations of scrap, at the present exceptionally attractive prices.

Pittsburg. Nov. 17.

(From Our Special Correspondent.)

Buyers of steel who were expecting reductions covering finished lines have so far been disappointed. The beam pool and the plate pool held meetings, discussed the situation and reaffirmed prices. It is believed by some that prices may yet be cut, and, as a result, buying is still being delayed. The market was not strengthened by the reductions made in billets and steel bars, but producers are all working harmoniously and the situation may clear shortly. Steel hoops have been cut $5 a ton and tin-plate has been reduced from $3.80 to $3.60 a box, but sales at these rates had been made for some time. There is no doubt now but that the United States Steel Corporation is determined to operate its plants throughout the winter, and if there is not enough of business in this country it will get trade abroad. No official information is given out regarding contracts, but it is understood that steel plates, sheets and tin-plates are to be exported. This is indicated by the notices of reductions in wages at all of the sheet and tinplate plants that are not being operated under an agreement with the Amalgamated Association of Iron, Steel & Tin Workers. It was understood that wages would not be distributed until the first of the year, but yesterday a 20 per cent. reduction for all tonnage men in the non-union sheet and tin-plate mills went into effect. At the Demmler works of the American Tin-Plate Co. the men went out on a strike when it became known that their pay had been reduced. The labor cost for export and rebate trade for the union mills has been provided for by the agreement by which the pay of all tin-plate workers who belong to the Amalgamated Association is reduced 3 per cent, and the amount paid into a fund from which the American Tin-Plate Co. draws 25 per cent of the labor cost on every box of tin-plate it sends abroad or devotes to the rebate trade. In order to facilitate the export business the railroads, it is understood, will agree to the proposition of the steel manufacturers for a special freight rate for all export steel that is to be shipped from the interior to the seaboard. No definite amount has been mentioned, but it is believed that with the reduced freight and the cutting down of the labor cost that the big steel interests of the country will be able to capture a large tonnage of foreign business. It was asserted to-day by a representative steel manufacturer that orders being booked for export, not only for European countries, but for South American republics, is rapidly increasing. Negotiations for some large contracts are now on, and, if closed, it is said the work will be done at the mills in the Pittsburg district. One indication that some new business has been booked is shown in the starting yesterday of five plate mills at the big Homestead works of the Carnegie Steel Co. They are the 10, 23, 33, 35 and 40-in. mills, which had been closed for three weeks and are now being operated in full. The only departments not running are the 28-in. and the converting mill. In order to curtail operating expenses the United States Steel Corporation is arranging to consolidate the American Sheet Steel and the American Tin-Plate companies about the first of the year. George G. McMurtry, president of the sheet company, has resigned, and it is understood that W. T. Graham, president of the tin-plate company, will be president of the consolidated interests. It is reported that all the general offices of the subsidiary companies of the big Corporation, except the Federal Steel Co., are to be removed to Pittsburg. The general offices of the Corporation, however, will remain in New York, as the officers have nothing to do with the operation of the industrial establishments.

Arrangements are being made for the holding of a special convention of representatives of the different sheet lodges of the Amalgamated Association to again discuss the question of removing the limit of output in the union sheet plants. It is likely that it will not be held until the return of President T. J. Shaffer, who is attending the annual convention of the American Federation of Labor, in session in Boston. The action will be taken at the request of the independent sheet manufacturers. It is generally believed that the limit will be removed, but the action will not likely have the effect of putting the independents on an equal basis with the non-union plants of the American Sheet Steel Co., as that concern has just made a reduction of 20 per cent in wages, and the independents will be forced to pay the Amalgamated scale. While bar iron has been selling as low as 1.30c., these sales have not so far seriously affected the wages of the union iron workers, whose scale is based on bar iron sales. The bi-monthly adjustment, which has just been made, showed that the average of sales for September and October was 1.50c., which fixes the puddling rate for November and December at $5.75 a ton, a reduction of 25c. a ton. The workers had expected a cut of 50c.

Pig Iron.—The pig iron market continues weak and prices are lower. The minimum rate for bessemer iron now being quoted by the Bessemer Furnace Association is $14.75, Valley furnaces, but a few small sales are said to have been made at $14.25, Valley. There has been a larger tonnage of foundry No. 2 sold during the week than for several weeks past, the price being $14.25 delivered at Pittsburg. Some lots of special brands have brought from $14.50 to $14.75. Some southern forge and founry iron is being sold in this market. The lowest price known to have been paid for No. 2 foundry was $9.50, Birmingham, or $13.85, Pittsburg. Sales of Southern forge at $12.50 delivered at Pittsburg are reported and Northern forge is quoted at $13.

Steel.—The price of bessemer and open-hearth billets of $23, f. o. b. Pittsburg, is strictly adhered to by all association mills, and the association is on a more solid basis than it has been for some time. Plates are still quoted at 1.60c. and steel bars are selling at 1.30c.

Sheets.—Sales of No. 28 gauge are being made at 2.50c. and galvanized sheets at 3.50c., the lowest prices that have prevailed for several years. The American Sheet Steel Co. has not announced any change from its price of 2.75c. for No. 28 gauge, but it is not believed that any sales have been made at that price for some time.

Ferro-Manganese.—The price of 80 per cent domestic remains at $48.

BY TELEGRAPH.

Pittsburg, November 19.—The American Sheet Steel Co. has cut quotations, as was expected. The new basis is 2.40c. for No. 28 gauge black sheets and 3.40c. for galvanized sheets These prices apply only to regular customers on large orders.

Cartagena, Spain. Oct. 31.

(Special Report of Barrington & Holt.)

Iron and Manganiferous Ores.—Since our last report exports from this port have been one cargo, 2,200 tons, manganiferous ore and one cargo, 2,000 tons, dry ore, both to Great Britain. There has been a firmer tone in the local market, and several new contracts are said to be pending for delivery over next year, the prices asked being higher than those quoted for prompt delivery.

Prices remain nominally at 6s. 9d.@7s. per ton, f. o. b. shipping port, for ordinary 50% ore; 7s. 3d.@7s. 9d. for special low phosphorus; 8s. 9d. for special ore; 9s. 3d. for 58% specular ore. Magnetic ore, 60% iron, is 11s. 6d. for lump and 9s. 6d. for smalls. Manganiferous ores range from 14s. 6d. for 20% manganese and 20 iron, to 9s. 9d. for 12 manganese and 35 iron.

Pyrites.—Iron pyrites, 43 per cent sulphur and 40 per cent iron, are quoted at 10s. 6d. per ton, f. o. b. Cartagena.

Other Exports.—Other exports included 250 tons copper to Marseilles, and 30 tons ochre to Newcastle.

CHEMICALS AND MINERALS.

(See also Prices-Current on page 800.)

New York, Nov. 18.

Where convenient consumers are placing contracts for future supplies, especially for the heavy chemicals. Domestic makers, whose books are already well filled with these orders, are intimating that prices may be advanced. That a higher market for domestic caustic soda and kindred chemicals is likely to rule in the near future is evidenced by the large contracts brought forward in anticipation of such a move. There can be little regret at this seeming retaliation on the part of manufacturers, since consumers have had the benefit of rather low prices for some time.

Brunner, Mond & Co., of Great Britain, who ship heavy chemicals to the United States, have declared a half-yearly dividend at the rate of 30% per annum, which is the same as was paid in 1902.

Cyanide.—With the exception of occasional imports of foreign cyanide, much of which is re-exported, trade conditions are practically unchanged, and the price remains at 20c. per lb., f. o. b. New York.

Bleaching Powder.—There has been further buying for 1904 delivery at quotations, but business on spot is exceptionally quiet. British and American prime brands hold at $1.25 per 100 lb. at seaboard, and German, $1.20.

Copper Sulphate.—Consumers are comparatively small buyers just now, having contracted for supplies some time in advance below current market quotation of $4.85 per 100 lb., f. o. b. works.

Acids.—Contract prices for next year's delivery for the more important commercial acids are practically unchanged as below. Of course there are some makers of sulphuric acid who, competing with the eastern combination, may quote less on a desirable order. There is also reason to believe that large fertilizer manufacturers are getting their sulphuric acid at advantageous prices. But the majority of consumers will doubtless have to pay the schedule. A few more 1904 orders for oxalic acid have been booked at $5 per 100 lb. for British and German brands, and $5.50 for Norwegian.

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

Muriatic, 18°	$1.50	Oxalic, com'l	$5.00@$5.50
Muriatic, 20°	1.66	Sulphuric, 50°, bulk, ton	13.50@14.50
Muriatic, 22°	1.75	Sulphuric, 60°	1.05
Nitric, 36°	4.37½	bulk, ton	18.00@20.00
Nitric, 38°	4.75	Sulphuric, 66°	1 20
Nitric, 40°	5.00	bulk, ton	21.00@23.00
Nitric, 42°	5.37½		

Brimstone.—Sellers look rather surprised when questioned about the demand, and not infrequently sigh at the quiet, which is emphasized by re-sales of best seconds from steamers due at $22.75@$23 per ton. Shipments are nominal at $22@$22.25. Best thirds can be had at 50c. less than seconds.

Pyrites.—A cargo of 3,238 metric tons Spanisb iron pyrites arrived at New York. Interest in tbe market is lax, as deliveries to consumers are mostly on standing contracts.

We quote: Domestic pyrites, $5 per ton for lump ore, f. o. b. Atlantic coast mines, and 10c. per unit for fines; sulphur content varies from 42@44%. Spanish pyrites, carrying from 46@52% sulphur, are quoted at 11@12c. per unit for lump, and 10@10½c. for fines, delivered at Atlantic ports.

Nitrate of Soda.—Importers continue to quote spot at $2.10 per 100 lb.; December to January arrivals, $2.07½; February to April, $2.05; May to June, $2.02½; July to December, 1904, $2.

The London Nitrate Co. has recommended a dividend of 4s. 3d ($1.02) on the preference shares, making 8s. 3d. ($1.98) for the year, and 5s. 9d. ($1.38) on the ordinary, making 9s. 9d. ($2.34) for the year. The Angela Co. has declared 5% as an interim dividend on account of tbe current year's profits.

The statistical position of nitrate of soda in Europe in October and the 10 months this year, is shown below, in long tons:

	October.	Jan.-Oct.
S. Am. exports to Europe	17,255	850,865
Imports	67,470	871,820
Deliveries	52,450	1,033,190
Loadings for Europe, Nov. 1	125,355	.....
Visible supply, Nov. 1	465,700	.....

A noteworthy change this year is an increase of 89,610 tons, or nearly 10 per cent, in the deliveries. The exports from South America to Europe in October are the largest reported this year, and the visible supply on November 1 is considerably more than was shown in the seven previous months.

Sulphate of Ammonia.—There is little domestic gas liquor to be had, and the price is nominal at $3 per 100 lb. Foreign is quiet at $3.05 for immediate shipment, and $3.07½ for futures.

Phosphates.—Superphosphate manufacturers abroad are apparently giving more attention to the regulation of their industry, so as to improve the conditions, than to the purchase of phosphates for future delivery. Consequently, the phosphate market here is quiet, and is likely to continue so for some time. Abroad, however, it is reported that foreign phosphate miners are in the unique position of having booked the greater part of their output for 1904 shipment. There have also been placed some 1905 contracts, especially for African phosphates. Abroad, as in the United States, miners expect higher prices, and consumers are beginning to realize this as they have been asked to pay an advance on new contracts. Viewed from another point, there is every reason to believe that tbe bigher cost of production, especially in regions furnishing tbe phosphates most needed in the manufacture of the better grades of superphosphates, will compel miners to ask more money. Another fact not to be overlooked is the gradual exhaustion of the high-grade deposits, owing to their increasing depth and difficulty of working and the absence of important new discoveries in recent years.

Exports of phosphates from Bone, Algeria, in September and the nine months tbis year, were as follows, in metric tons, of 2,204 lb.:

Company.	September.	Jan.-Sept.
Constantine	12.020	132.480
Dyr	2,200	54,862
Societe Francaise	2,542	19,383
Total	16,762	206,725

These shipments bave been made cbiefly to France and Germany.

Phosphates.	Per ton. f. or b	United Kingdom or European ports. Unit.	Long ton.
*Fla. hard rock (77@80%)	$7.25@$7.50	6¼@7¾d.	$10.53@11.70
*Fla. land peb. (68@73%)	3.75@ 4.00	5⅛@5½d.	7.70@ 8 05
†Tenn. (78@82%) export	4.00@ 4.25	6⅛@7d.	10.40@11.20
†Tenn. 78% domestic	3.75@ 4.00	.....	.....
†Tenn. 75% domestic	3.50	.....	.....
†Tenn. 73@74% domestic	2.95@ 3.20	.....	.....
†Tenn. 70@72% domestic	2.70@ 2.95	.....	.....
‡So. Car. land rock	....@ 3.25	.....	.....
‡So. Car. riv. rk. (55@63%)	2.75@ 3.00	4⅜ 5½d.	5.45@ 6.60
Algerian (63@70%)	.....	5⅛@6⅛d.	7.37@ 8.38
Algerian (58@63%)	.....	4¾@5¾d.	5.55@ 6.90
Gafsa (Tunis)	.....	5¼@6d.	6.30@ 7.20
Christmas Isl. (80 85%)	.....	7⅛@8¼d.	12.38@13.61
Ocean Isle (82@88%)	.....	8 @8½d.	13.60@14.45

*Fernandina, Tampa, Brunswick, Savannah or Port Inglis.
‡Mt. Pleasant. †On vessels, Ashley River.

Liverpool. Nov. 4.

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

Sulphate of copper continues to attract the principal attention, other lines of chemicals being mostly steady as regards prices, but without much activity.

Soda ash is firm. For tierces, either spot or 1904 delivery, nearest value is about as follows: Leblanc ash, 48 per cent, £5@£5 10s.; 58 per cent, £5 10s.@£6 per ton, net cash. Ammonia ash, 48 per cent, £4 5s.@£4 10s.; 58 per cent, £4 10s.@£4 15s. Bags 5s. per ton under price for tierces. Soda crystals are in fairly good demand, and for barrels the quotation for most markets, either spot or over 1904, is £3 7s. 6d. per ton, less 5 per cent, or 7s. less for bags, with special terms for a few favored markets. Caustic soda is held for full prices as follows: 60 per cent, £8 15s.; 70 per cent, £9 15s.; 74 per cent, £10 5s.; 76 per cent, £10 10s. per ton, net cash. Special quotations for export to the Continent and a few other quarters.

Bleaching powder is neglected on spot, and prices are nominal, at about £3 10s.@£4 per ton, net cash, for hardwood packages, as to market. For 1904 delivery, makers, in some cases are holding for 5s.@10s. per ton over figure at which they were prepared to book orders prior to the fixing up of the working arrangement.

Chlorate of potash is slow and easier at 2½d. per lb. net cash for English make.

Bicarb. soda is well maintained 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 easier, at about £12 7s. 6d. @£12 10s. per ton, less 2½ per cent for good gray 24@25 per cent in double bags, f. o. b. here, with a downward tendency.

Nitrate of soda, with larger supplies, is a shade easier for ordinary quality at £9 17s. 6d. per ton, less 2½ per cent for double bags, f. o. b. here; but refined is still in small compass and held for £10@£10 5s. per ton, as to quantity.

METAL MARKET.

New York, Nov. 18.

Gold and Silver Exports and Imports,

At all United States Ports in October and Year.

Metal	October.		Year.	
	1902.	1903.	1902.	1903.
Gold:				
Exports	$1,460,829	$352,177	$32,457,158	$41,889,028
Imports	11,118,448	5,015,656	36,024,938	36,656,328
Excess	I. $9,657,617	I. $4,663,479	I. $3,567,780	E. $5,232,700
Silver:				
Exports	4,382,586	3,145,532	39,963,105	28,053,967
Imports	2,798,736	2,733,655	21,502,580	19,334,924
Excess	E. $1,583,830	E. $411,877	E. $18,460,525	E. $8,719,033

These exports and imports cover the totals from all United States ports. The figures are furnished by the Bureau of Statistics of the Department of Commerce and Labor.

Gold and Silver Exports and Imports, New York.

For the week ending November 18, and for the years from January 1

Period.	Gold.		Silver.		Total Excess, Exports or Imports.
	Exports.	Imports.	Exports.	Imports.	
Week	$11,575	$1,727,498	$931,695	$2,245	I. $786,483
1903	31,631,185	9,132,655	28,656,983	3,193,009	E. 48,002,507
1902	35,011,792	3,552,868	23,415,858	1,083,909	E. 43,791,173
1901	41,447,975	4,441,323	27,967,469	3,351,796	E. 61,622,035

Gold imports are chiefly from Europe and will probably be large for some weeks to come.

Gold imports continue to be reported. So far this week about $2,500,000 has been taken in London for shipment to New York. These imports will bave a favorable effect upon the money market. Meantime, general business is ratber quiet.

Merchandise exports from tbe United States in October were valued by the Bureau of Statistics of the Department of Commerce and Labor at $160,370,059. This is the largest amount ever reported in one month, with tbe exception of October, 1900; it is $16,042,631 more than in October, 1902. For the 10 months ending October 31 tbe statement is as follows:

	1902.	1903.
Exports	$1,087,492,912	$1,149,694,933
Imports	789,573,713	840,730,880
Excess, exports	$297,919,199	$308,964,053
Excess of exports, silver	.....	8,719,043
Excess of exports, gold	.....	5,232,700
Apparent balance		$322,915,796

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

The statement of tbe New York banks—including the 56 banks represented in the Clearing House—for the week ending November 14, gives tbe following totals, comparison being made with tbe corresponding weeks of 1902 and 1901.

	1901.	1902.	1903.
Loans and discounts	$882,567,400	$870,424,200	$889,855,000
Deposits	946,084,300	878,219,400	853,415,100
Circulation	31,982,600	44,606,100	45,983,600
Specie	176,589,500	171,030,300	156,441,800
Legal tender	70,035,400	66,852,900	63,050,400
Total reserve	$246,624,900	$237,883,200	$219,492,200
Legal requirements	236,521,075	219,554,850	213,353,775
Balance surplus	$10,103,825	$18,328,350	$6,138,425

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

	1902.		1903.	
	Gold.	Silver.	Gold.	Silver.
N. Y. Ass'd	$171,030,300	.....	$156,441,800	.....
England	166,739,585	.....	160,821,835	.....
France	506,170,470	$220,803,685	478,951,870	$220,472,735
Germany	157,415,000	58,220,000	161,420,000	56,715,000
Spain	71,620,000	97,765,000	72,505,000	93,950,000
Netherlands	23,486,000	32,043,500	20,423.000	31,463,500
Belgium	15,810,000	7,905,000	16,450,000	8,225,000
Italy	82,395,000	10,194,000	103,630,000	12,055,000
Russia	370,635,000	32,700,000	390,040,000	33,965,000
Austria	231,055,000	60,785,000	232,240,000	60,330,000

The returns of the Associated Banks of New York are of date November 14, and the others November 12, as reported by the *Commercial and Financial Chronicle* cable. The New York banks do not report silver separately, but specie carried is cbifly gold. The Bank of England reports gold only.

Owing to purchases by the Indian Government, silver, the last few days, has been quite firm. The advance to 27⅛d. brought out considerable quantities, and the market has apparently been satisfied.

Tbe United States Assay Office in New York City reports receipts of 97,000 oz. silver for tbe week.

Sbipments of silver from London to the East for tbe year up to November 5 are reported by Messrs. Pixley & Abell's circular as follows:

	1902.	1903.	Changes.
India	£5,450,330	£5,394,130	D. £56,200
China	162,500	310,060	I. 147,559
Straits	648,200	721,879	I. 73,679
Total	£6,261,030	£6,426,069	I. £165,039

Receipts for the week were £161,000 in bar silver from New York, and £27,500 from Australia; also £104,000 in Mexican dollars from New York; total, £292,500. Shipments were £229,000 in bar silver and £59,500 in Mexican dollars to Bombay, and £8,000 in Mexican dollars to Hong Kong; total, £296,500.

Indian exchange is somewhat firmer, and tbe Council bills offered in London were all taken at an average of 16.03d. per rupee. The shipments of silver to India have been falling off, and tbe demand for bills is consequently somewhat stronger.

Tbe movement of gold and silver in France for the nine months ending September 30 is reported by the Ministry of Commerce as follows:

	1902.	1903.	Changes.
	Fr.	Fr.	Fr.
Gold:			
Imports	332,408,000	275,934,000	D. 56,474,000
Exports	48,603,000	73,991,000	I. 25,388,000
Excess, imports	283,805,000	201,943,000	D. 81,862,000
Silver:			
Imports	72,161,000	92,711,000	I. 20,550,000
Exports	83,139,000	61,386,000	D. 21,753,000
Excess	E. 10,978,000	I. 31,325,000	.....

Imports of copper and nickel coins, rated at their face, or coinage, value, were 76.000 fr., against 60.000 fr. in 1902. Exports were 512,000 fr., against 2,741,000 fr., last year.

Prices of Foreign Coins.

	Bid.	Asked.
Mexican dollars	$0.44¾	$0.47
Peruvian soles and Chinese pesos	.42	.45
Victoria sovereigns	4.85	4.88
Twenty francs	3.86	3.88
Spanish 25 pesetas	4.78	4.82

OTHER METALS.

Daily Prices of Metals in New York.

November	Sterling Exchange.	—Silver— N. Y. Cts.	London, Pence.	—Copper— Lake, Cts. per lb.	Electrolytic, Cts. per lb.	London, £ per ton.	Tin, Cts. per lb.	Lead, Cts. per lb.	—Spelter— N. Y., Cts. per lb.	St. Louis, Cts. per lb.
12	4.83	57½	26⅞	13 @13½	12¾ @12⅞	56	25	4.35 @4.40	5.17½	5.00
13	4.83½	57¾	26⅞	12¾ @13	12⅛ @12¾	55¾	25	4.35 @4.40	5.10	4.90
14	4.83¼	58¼	27⅛	12¾ @13	12⅛ @12¾	....	25	4.35 @4.40	5.05	4.90
16	4.83¼	58⅜	27⅛	12⅛ @13	12⅜ @12⅝	55⅛	25¼	4.05 @4.10	5.00	4.82½
17	4.8335	58⅜	27⅛	12⅛ @13	12⅜ @12⅝	55⅝	25⅜ 25¼	4.05 4.10	5.00	4.82½
18	4.8370	58⅜	27⅛	12⅛ @13	12⅜ @12⅝	55⅝	25⅜	4.05 @4 10	4.92½ @4.97½	4.75 @4.80

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 wire-bars: the price of electrolytic cathodes is usually 0.25c. lower than these figures

Copper.—During the week under review the market has again settled back into dullness. Home consumers are holding off with orders, as is usually the case at this time of the year. On the other hand, exports continue very heavy. Quotations are entirely nominal at 12½@13c. for Lake; 12⅜@12⅝c. for electrolytic copper, in ingots, cakes and wire bars, 12⅛@12⅜c. in cathodes; 12⅛@12⅜c. for casting copper.

The market for standard copper in London, which closed last week at £55 15s., opened on Monday at £55 10s., and the closing quotations on Wednesday are cabled as £55 12s. 6d.@£55 15s. for spot, £55, 5s.@£55 7s. 6d. for three months.

Statistics for the first half of November show a decrease in the visible supplies of 800 tons.

It is reported that the strike at the mines of the Rio Tinto Co. is practically at an end.

Refined and manufactured sorts we quote: English tough, £58 10s.@£59; best selected, £60@£60 10s.; strong sheets, £66@£66 10s.; India sheets, £63@£63 10s.; yellow metal, 6⅛d.@6¼d.

Exports and imports of copper at New York, Philadelphia and Baltimore, in the week of November 17, and for the year to date, were in long tons:

	Week.	Year.
Austria	140	4,960
Belgium	30	1,155
France	420	19,420
Germany	847	25,462
Holland	1,279	35,869
Italy	60	2,803
United Kingdom	312	15,127
Other countries	120	4,692
Total copper	3,208	109,489
Matte	....	286
Imports—		
Copper	170	23,530
Matte	....	984
Ore	....	39,059

Exports have been heavy. Of the imports 100 tons copper were from Great Britain and 70 tons from Mexico.

Tin.—Has been dull, without any special feature. The closing quotations are given as 25¼@25⅜c. for spot and futures.

The foreign market, which closed last week at £115 15s., opened on Monday at £116, and the closing quotations on Wednesday are cabled as £116 5s.@£116 7s. 6d. for spot, £117 7s. 6d.@£117 10s. for three months.

Lead.—The feature of the week has been the reduction in the prices of the American Smelting & Refining Co. amounting to $6 per ton. So far the cut has not stimulated inquiry to any appreciable extent, and the market remains very dull indeed. The closing quotations are 3.95@4.02½ St. Louis, 4.05@4.10 New York.

The foreign market remains easy, Spanish lead being quoted at £11@£11 1s. 3d., English lead £11 2s. 6d.@£11 3s. 9d.

Spanish Lead Market.—Messrs. Barrington & Holt write from Cartagena, Spain, under date of October 31, that the price of silver during the week has been 14.75 reales per oz. Exchange has gone down again, making it 33.25 pesetas to £1. Local quotation for pig lead on wharf has been 60.50 reales per quintal, which, on current exchange, is equal to £10 3s. 9d. per ton of 2,240 lb., f. o. b. Cartagena. Exports for the week were 100,000 kg. desilverized lead to Marseilles.

Spelter—Continues on its downward course and lower prices have again been accepted, although there is a somewhat better consumptive inquiry. The closing quotations are 4.75@4.80 St. Louis, 4.92½@4.97½ New York.

The foreign market is steady, good ordinaries being quoted at £20 15s., specials £21.

Spanish Zinc Ore Market.—Messrs. Barrington & Holt write from Cartagena, Spain, under date of October 31, that several sales of blende have taken place since the last report, local prices having hardened somewhat. One parcel of 30,000 quintals has been sold at 10 reales, basis of 30% zinc.

Antimony—Is dull and neglected. We quote: Cookson's, 6¾@7¼; Hallett's, 6¼@6⅝; U. S., 6@6¼; Italian, French and Japanese, 5¾@5⅞c.

Nickel.—The price is quoted by leading producers at 40c.@47c. per lb. for large quantities down to ton lots, according to size and terms of order. The price for smaller lots, according to quantity, runs as high as 60c. per lb.

Platinum.—Demand continues steady and the price remains at $19 per oz.

Messrs. Eimer & Amend, of New York, quote prices for platinum in manufactured forms as follows: Heavy sheet and rod, 72c. per gram; foil and wire, 75c. per gram; platinum crucibles and dishes, 77c. per gram; perforated wire, like cones, Gooch crucibles, etc., 82c. per gram.

Quicksilver.—The New York price is $46.50 per flask for large lots, while a slightly higher figure is quoted for smaller orders. The San Francisco quotations are lower at $44@$45 per flask for domestic orders and about $41.50 for export. The London price is £8 7s. 6d. per flask, with the same quotation asked by second hands.

Cadmium.—Herr Paul Speier, writing from Breslau, Germany, reports that the quotation is very firm. The price for metallic cadmium, 99.5% is 675 marks per 100 kg. delivered in Breslau.

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

Aluminum	Per lb.
No. 1, 99% ingots	33@37c.
No. 2, 90% ingots	31@34c.
Rolled Sheets	4c. up
Alum-bronze	20@23c.
Nickel-alum	33@39c.
Bismuth	$2.10
Chromium, pure (N. Y.)	80c.
Copper, red oxide	50c.
Ferro-Molybde'm (50%)	$1.25
Ferro-Titanium (10%)	90c.
Ferro-Titanium (20@25% N. Y.)	55c.

	Per lb
Ferro-Tungsten (37%)	38c.
Magnesium, pure (N. Y.)	60c.
Manganese	$2.75
Mangan'e Cop. (20% Mn)	32c.
Mangan'e Cop. (30% Mn)	38c.
Molybdenum (Best)	$1.82
Phosphorus, foreign	45c.
Phosphorus, American	70c.
Sodium metal	50c.
Tungsten (Best)	62c.

Variations in price depend chiefly on size of order.

Missouri Zinc Ore Market. Nov. 14.

(From Our Special Correspondent.)

Only one bin of zinc ore brought $38 per ton the past week, the market going to pieces the middle of the week, and declining from a $34 basis price to a $30 basis price, while at least one lot of ore is known to have been settled for on a basis of $28 per ton of 60% zinc. The Lanyon Zinc Co. and the Prime Western Spelter Co. are still purchasing very little ore, claiming their needs are unusually small, and the United Zinc & Chemical Co. took very little ore during the week. The Edgar Zinc Co. purchased a little heavier and the others are taking their customary allotments.

The price of lead ore remains strong and unchanged with a very active demand at $56 per ton, the fluctuations in the metal market having so far had no ill effect on the ore prices.

Following are the sales of zinc and lead ores from the various camps of the Joplin district for the week:

	Zinc, lb.	Lead, lb.	Value.
Joplin	2,199,440	300,620	$44,700
Webb City-Carterville	1,170,290	491,460	31,780
Galena-Empire	1,095,300	168,680	20,070
Duenweg	659,390	90,170	13,380
Alba and Neck	435,530	8,970	7,435
Granby	380,000	76,000	6,200
Aurora	500,030	.....	5,950
Carthage	349,660	.....	5,945
Spurgeon	190,100	95,460	5,235
Oronogo	283,560	4,500	4,810
Prosperity	161,310	64,570	4,510
Carl Junction	200,510	.....	3,310
Badger	282,500	2,760	3,130
Zincite	180,280	3,810	3,080
Diamond	67,930	5,910	1,250
Raymond	64,000	.....	990
Reeds	60,980	.....	975
Totals	8,280,810	1,312,860	162,810
46 weeks	426,820,280	51,034,330	$8,663,950

Zinc value, the week, $126,500; 46 weeks, $7,278,650. Lead value, the week, $36,310; 46 weeks, $1,377,300.

The curtailment of one week, had it been followed by a further shut-down, as originally intended, it is now believed would have kept the market steady, but the continued light purchasing of several of the largest users has permitted the reserve to increase about 2,000 tons the past two weeks. To this fact is attributed the big slump in ore prices. A call has been issued for another meeting of the zinc ore producers to be held next Wednesday night with a view to a shut down for Thanksgiving week. It may be decided to remain down for two weeks.

Average Prices of Metals per lb., New York.

Month.	Tin. 1903	Tin. 1902.	Lead. 1903.	Lead. 1902.	Spelter. 1903.	Spelter. 1902.
January	28.33	23.54	4.075	4.000	4.865	4.27
February	29.43	24.07	4.075	4.075	5.043	4.15
March	30.15	26.32	4.442	4.075	5.349	4.28
April	29.81	27.77	4.567	4.075	5.550	4.37
May	29.51	29.85	4 325	4.075	5.639	4.47
June	28.34	29.36	4.210	4.075	5.697	4.96
July	27.68	28.38	4.075	4.075	5.662	5.27
August	28.29	28.23	4.075	4.075	5.725	5.44
September	26.77	26.60	4.243	4.075	5.686	5.49
October	25.92	26.07	4 375	4.075	5.51	5.38
November	.....	25.68	.....	4.075	.....	5.18
December	.....	25.68	.....	4.075	.....	4.78
Year	.....	26.79	.....	4.069	.....	4.84

NOTE.—The average price of spelter in St. Louis for the month of January, 1903, was 4.689c. per lb.; for February, 4.681c.; for March, 5.174c.; for April, 5.375c.; for May, 5.469c.; for June, 5.537c.; for July, 5.507c; August, 5.55c, September 5.514c.; for October, 5.35c.

Average Prices of Copper.

Month.	New York. Electrolytic. 1903.	New York. Electrolytic. 1902.	New York. Lake. 1903.	New York. Lake. 1902.	London. Standard. 1903.	London. Standard. 1902.
January	12.159	11.053	12.361	11.322	53.52	48.43
February	12.778	12.173	12.901	12.378	57.34	55.16
March	14.416	11.882	14.572	12.188	63 85	53.39
April	14.454	11.618	14.642	11.886	61.72	52.79
May	14.435	11.856	14.618	12.226	61.73	54.06
June	13.942	12.110	14.212	12.360	57.30	53.03
July	13 094	11.771	13.341	11.923	58.64	52.89
August	12.962	11.404	13.159	11.649	58.44	51.96
September	13.205	11.480	13.345	11.760	56.82	52.68
October	12.801	11.449	12.954	11.722	55.60	52.18
November	.....	11.288	.....	11.553	.....	51.08
December	.....	11.430	.....	11.599	.....	50.95
Year	.....	11.626	.....	11.887	.....	52.46

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.	1903. London Pence.	1903. N. Y., Cents.	1902. London. Pence.	1902. N. Y., Cents.	1901. London, Pence.	1901. N. Y., Cents.
January	21.98	45.57	25.62	55.56	28.97	62.82
February	22.11	47.89	25.41	55.09	28.13	61.06
March	22.49	48.72	25.00	54.23	27.04	60.23
April	23.38	50.56	24.34	52.72	27.30	59.29
May	24.89	54.11	23.71	51.31	27.43	59.64
June	24.29	52.86	24.17	52.36	27.42	59.57
July	24.86	53.92	24.38	52.88	26.96	58.46
August	25.63	55.36	24.23	52.52	26.94	58.37
September	26.75	58.00	23.88	51.52	26.95	58.26
October	27.89	60.36	23.40	50.57	26.62	57.59
November	.....	.....	22.73	49.07	26.12	56.64
December	.....	.....	22.21	48.03	25.46	55.10
Year	.....	.....	24.09	52.16	27.11	58.95

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

DIVIDENDS.

Name of company.	Date.	Per share.	Total.	Total to date.
‡Anaconda Copper	Nov. 16	$0.50	$600,000	23,250,000
*Bartolome de Medina	Nov. 30	.69	1,380	78,458
*Fraternal, Mex.	Nov. 25	2.18	2,175	46,775
†General Chemical, com.	Dec. 1	1.25	92,629	1,300,537
*Homestake, S. D.	Nov. 25	.25	54,600	12,312,750
*Kendall, Mont.	Nov. 25	.05	25,000	280,000
‡Lehigh Coal & Nav.	Nov. 27	1.50	286,933	20,668,986
*Pacific Coast Borax	Nov. 28	1.00	19,000	1,526,500
*San Rafael, Avia'r, Mex.	Nov. 19	12.11	14,532	.....
*San Rafael, Avlada, Mex	Nov. 19	6.92	8,304	.....
*Soledad, Mex.	Nov. 19	4.32	4,152	256,456
*Sorpressa, Mex.	Nov. 19	4.32	4,152	200,066
*Sta. Maria de la Paz, Mex	Nov. 30	8.65	20,860	1,957,093
†Standard Oil	Dec. 15	12.00	11,640,000	206,715,000
†U. S. Steel, com.	Dec. 30	.50	2,541,513	53,350,978

*Monthly. †Quarterly. ‡Semi-annually.

ASSESSMENTS.

Name of Company.	Location.	No.	Delinq.	Sale.	Amt.
American Quartz	Cal.	..	Dec. 23	.....	$0.25
Belcher	Nev.	75	Nov. 17	Dec. 8	.10
Best & Belcher	Nev.	82	Nov. 6	Nov. 27	.10
Brunswick Con	Cal.	..	Nov. 27	.....	.03
Chollar	Nev.	64	Dec. 10	Dec. 31	.10
Confidence	Nov.	..	Nov. 25	.....	.20
Con. New York	Nev.	10	Dec. 1	Dec. 23	.10
Elephant	Utah	..	Dec. 1	Dec. 21	.01
Grizzly	Cal.	..	Nov. 30	.....	.10
Jubilee	Cal.	..	Dec. 7	.....	.05
Justice	Nev.	..	Nov. 17	Dec. 5	.10
Kentuck Con	Nev.	..	Nov. 4	Nov. 25	.03
Little Bell Con	Utah	1	Dec. 19	Jan. 5	.10
New Almaden Quicksilver	Mex.	..	Dec. 28	.....	.00½
Occidental Con.	Nev.	43	Nov. 6	Nov. 27	.05
Overman	Nev.	..	Dec. 15	.....	.10
Park City Superior	Utah	..	Dec. 7	Dec. 24	.00¼
Potosi	Nev.	68	Dec. 8	Dec. 29	.10
Savage	Nev.	111	Dec. 8	Dec. 29	.10
Seg. Belcher & Mides Con.	Nev.	33	Nov. 4	Nov. 24	.05
Sheep Ranch	Cal.	..	Dec. 7	.....	.75
Sierra Nevada	Nev.	131	Dec. 8	Dec. 28	.10
Silver Queen	Utah	1	Nov. 25	Dec. 15	.00¼
South Eureka	Cal.	..	Nov. 27	.....	.02

STOCK QUOTATIONS

NEW YORK.

Company and Location.	Par val	Shares Listed.	Nov. 11 H.	Nov. 11 L.	Nov. 12 H.	Nov. 12 L.	Nov. 13 H.	Nov. 13 L.	Nov. 14 H.	Nov. 14 L.	Nov. 16 H.	Nov. 16 L.	Nov. 17 H.	Nov. 17 L.	Sales.
Acacia Colo., g.	1	1,500,000													
Alamo, Utah	1	125,000									01½				500
Alice, Mont.	25	400,000					19								150
Amalgamated Mont c.	100	1,538,879	39½	37¼	38¼	37⅛	39¼	37½	39	37⅝	38¾	37⅝	38¾	37¼	172,680
Anaconda Mont., c.	25	1,200,000	65	63	66								67		340
Andes, Nev.	1	100,000			12										300
Belcher, Nev., s.	3	104,000	1.24	1.23											200
Best & Belcher, Nev., s	3	100,800													
Breece, Colo.	25	200,000									12				100
Brunswick, Con. Cal., g	5	100,000			.02				.02	.01½					700
Bullion, Nev., s.	1	100,000			.07										500
Caledonia, Nev., s	1	100,000					1.00								400
Challar, Nev., s., g.	2½	112,000					.11	.10			.12				300
Confidence, Nev.	3	24,960							.55						300
C. K. & N., Colo.	1	1,500,000													
Con. Cal. & Va., Nev., g. s	2½	216,000	1.05												300
Con. Imperial, Colo.	1	500,000	.03												500
Cripple Creek Con., g.	1	2,000,000			.03										1,000
Crown Point, Nev.	2½	100,000					.14								500
Daly, Utah, g. s. l.	20	150,000													
Elkton, Colo., g.	1	1,250,000	.39								39	.38	38		1,000
El Paso, Colo., g.	1	850,000			.50										1,000
Gold Dollar, Colo.	1	500,000					.03½								500
Golden Fleece, Colo., g	1	600,000													
Greene Con., Mex., c.	10	720,000	14¾	14½	14½	14	14⅝	14	14¾	14½	14⅝	14¾	15	14½	6,895
Homestake, S. D., g.	100	218,400													
Horn Silver, Utah	20	400,000					1.05								800
Iron Silver, Colo.	20	500,000													
Isabella, Colo., g.	1	400,000	.10½						10½				10		5,800
Leadville, Colo.	10	400,000									.04				500
Mexican, Nev., s.	3	100,800			.85				.80		.73		.70		500
Mollie Gibson, Colo., g	5	1,000,000													
Moon Anchor, Colo., g	5	400,000													
Occidental, Nev., s.	3	100,000													
Ontario, Utah	100	150,000					5.25								50
Ophir, Nev., s.	3	100,800	1.50				1.45	1.40	1.40				1.35		550
Overman, Nev.	2	115,200													
Portland, Colo., g.	1	3,000,000	1.05				1.08		1.10		1.07		1.07		600
Potosi, Nev. s.	1	112,000	.12				.09		.11				.11		800
Quicksilver, pf.	100	43,000					5 50								100
Savage, Nev.	3	112,000			.14		.16				.16		.15		1,100
Sierra-Nevada, Nev.	3	100,000			.30										500
Silver Hill, Nev.	1	100,000											.62		300
Standard, Cal. g.	10	178,304	2.25												100
Tenn., Tenn., c.	25	175,000	30		.30	.28½	.30¼	.28	.27¼		.27		.27¾	.27½	1,670
Union Con., Nev., g. s	1	100,000							.42						100
Union Copper, N. C.	25	750,000	¾		¾						.15⅞				200
United, Mont., com., c	100	300,000	16⅝	.15	15¾		.15⅞	.15¾					.15¾		1,100
White Knob, Idaho, c.	10	200,000													
Yellow Jacket, Nev., s	3	120,000													

c—Copper. g—Gold. l—Lead. s—Silver. Total sales, 202,075 shares. † Ex-dividend.

COLORADO SPRINGS (By Telegraph).

Name of Company.	Nov. 16. H.	Nov. 16. L.	Nov. 17. H.	Nov. 17. L.
Acacia	.06	.05¼	.06	.05
Am. Con.	.02	.01½	.02	.01¼
Anaconda	.11	.10½	.11	.10
Colo. City & Manitou.	.01¾	.01	.02	.01¾
Cripple Creek Con.	.03	.02¼	.03	.02
C. K. & N.	.20¼	.18	.20½	.18
Doctor-Jack Pot	.06¾	.05½	.06¾	.05
Elkton Con	.43	.40¼	.43	.40¾
El Paso	.50½	.49½	.50	.49½
Gold Dollar Con.	.03½	.03	.03	.02¼
Golden Cycle	.65	.63	.63½	.63
Golden Fleece	.15	.05	.15	.05
Gold Sovereign	.03	.02½	.03	.02½
Isabella	.09	.08¾	.09	.08

Name of Company.	Nov 16. H.	Nov 16. L.	Nov. 17. H.	Nov. 17. L.
Jack Pot	.06	.03	.06	.03
Keystone	.02½	.01¾	.02½	.01
Last Dollar	.50	.40	.50	.40
Lexington	.04	.03	.04	.03
Little Puck	.02½	.01⅞	.02½	.01¾
Mollie Gibson	.02¾	.02	.02¾	.02
Moon Anchor	.11	.09¾	.11	.09¾
New Haven	.02½	.02	.02½	.02
Old Gold	.09½	.09¼	.09½	.09¼
Pharmacist	.02¾	.02½	.02½	.02
Pinnacle	.03	.02¾	.03	.02¾
Portland	1.10	1.00	1.10	1.00
Vindicator	.85	.84	.85	.83
Work	.05	.01½	.05	.04

COLORADO SPRINGS, COLO.*

† Name of Company.	Par Val	Shares Listed.	Nov. 7 H.	Nov. 7 L.	Nov. 9 H.	Nov. 9 L.	Nov. 10 H.	Nov. 10 L.	Nov. 11 H.	Nov. 11 L.	Nov. 12 H.	Nov. 12 L.	Nov. 13 H.	Nov. 13 L.	Sales
Acacia	$1	1,500,000	.05½	.05⅜	.06	.05	.06	.05	.06	.05	.06½	.05¼	.07	.05	2,000
American Con.	1	2,000,000	.02		.02		.02		.02		.02		.02		
Anaconda	5	1,000,000	.12½	.11	.11¾	.10½	.12	.10½	.12	.10½	.12	.11	.12	.10	
Colo. City & Manitou.	1	1,000,000	.01¾		.02	.01	.01¾	.01	.02		.02		.01¾	.01	2,000
C. K. & N.	1	1,250,000	.21	.20½	.20½	.20¼	.20¾	.20	.21	.20	20		.21	.20	7,000
Cripple Creek Con.	1	2,000,000	.04	.03	.03½	.03	.03½	.03	.03½	.02½	03		.03¼		5,000
Des Moines	1	750,000	.02		.02	.01	.02	.01	.02	.01	.02	.01	.02	.01½	
Doctor Jack Pot	1	2,900,000	.06½		.08	.04	.06½	.04	.06¾	.05	.06¾	.05¼	.06¼	.05	6,000
Elkton Con.	1	1,250,000	.44	.41	.43	.40	.41	.40	.43	.40	.40		.40		3,200
El Paso	1	900,000	.53	.51¾	.50½		.52	.50		.50	.49¾	.50½			12,722
Findley	1	1,250,000													
Gold Dollar Con.	1	500,000	.03½	.02¾	.03½	.02½	.03¼	.02¾	.03½	.02⅞	.03¼	.02¾	.03¼	.02¾	9,000
Gold Sovereign	1	1,000,000	.03½	.02½	.03	.02½	.03¼		.03	.02½	.03	.02½	.03	.02½	
Golden Cycle	1	2,000,000	.65	.63	.65	.63	.65	.63	.65	.63	.65	.63	.65	.63	
Golden Fleece	1	600,000	.04		.06		.06		.06		.06		.06		
Gould	1	1,250,000	.0015		.005				.01		.01		.008		8,000
Hart	1	1,000,000					.05								
Isabella	1	3,000,000	.10¾	.09½	.10	.09½	.10	.08¾	.09½	.08½	.09½	.08¾	.09	.08	9,500
Jack Pot	1	1,250,000	.05		.04		.05½	.03	.06		.06		.06		1,000
Keystone	1	1,500,000	.02½	.01¾	.02½	.01¾	.02	.02	.02¼		.02½	.01			
Last Dollar	1	1,500,000	.50		.50		.49		.49		.49		.49		
Lexington	1	1,500,000	.03½		.03		.03	.01¾	.04	.03¼	.04	.03	.04		
Little Puck	1	2,000,000	.02½	.02	.02½	.01¾	.02½	.01⅝	.02¼	.01¾	.02½	.01⅝	.02½	.01¾	
Mollie Gibson	5	1,000,000	.04⅜		.04⅜		.05		.05		.05		.03		
Moon-Anchor	5	400,000	.11	.09	.10	.09	.11	.09½	.11	.09	.11	.10½	.11	.09	
New Haven	1	1,500,000	.02½		.02		.02¼		.02¼		.02		.02		
Old Gold	1	1,800,000	.09¾	.09½	.09½	.09¼	.09½	.09¼	.09½	.09¼	.09½	.09⅛	.09⅜	.01½	12,000
Pharmacist, Con.	1	1,500,000	.02⅝	.02½	.02¾	.02	.03	.02	.03	.02	.02½	.02½	.02½	.02½	
Pinnacle	1	2,000,000	.03		.03		.03		.03		.03		.03		
Portland	1	3,000,000	.99	1.07	1.10	.90	1.10		1.05	1.00	1.05	1.00	1.10	1 00	100
Vindicator Con.	1	1,500,000	.85		.85						.85		.80		
Work	1	1,500,000	.04¾	.04	.04¾	.04	.04		.05		.04¾	.04	.04¾	.03½	500

Colo. Springs Mining Stock Exchange. †All gold mines in Colorado. Total sales. 78,022 shares.

SAN FRANCISCO (By Telegraph).

Name of Company.	Shares Issued.	November. 16.	November. 17.
Belcher	104,000	.18	.16
Best & Belcher	100,800	1.30	1.30
Caledonia	100,000	.88	.89
Challenge Con.	50,000	.17	.16
Choilar	112,000	.09	.08
Confidence	24,960	.60	.57
Con. California & Virginia	216,000	.97	.96
Con. Imperial	500,000	.03	.02
Crown Point	100,000	.12	.11
Gould & Curry	108,000	.21	.20
Hale & Norcross	112,000	.48	.42

Name of Company.	Shares Issued.	November. 16.	November. 17.
Justice	105,000	.10	.10
Mexican	100,800	.69	.64
Occidental Con.	100,000	.25	.24
Ophir	100,800	1.40	1.35
Overman	115,200	.15	.14
Potosi	112,000	.10	.09
Savage	112,000	.13	.13
Sierra Nevada	100,000	.28	.26
Union Con.	100,000	.39	.36
Utah Con.	100,000	.11	.11
Yellow Jacket	120,000	.32	.31

COAL, IRON AND INDUSTRIAL STOCKS.

Name of Company.	Par val.	Shares Issued.	Nov. 11 H.	Nov. 11 L.	Nov. 12 H.	Nov. 12 L.	Nov. 13 H.	Nov. 13 L.	Nov. 14 H.	Nov. 14 L.	Nov. 16 H.	Nov. 16 L.	Nov. 17 H.	Nov. 17 L.	Sales
Allis-Chalmers	$100	200,000													
Allis-Cham's, pf	100	162,500													
Am. Agr. Chem	100	172,156													
Am. Agr. Chem. pf	100	181,350													
Am. Sm. & Ref.	100	500,000	42½	42			42½	42⅜	42½	42⅜	42½	42¼	43	42⅞	2,310
Am. Sm. & Ref., pf	100	500,000					86¾	86½	86⅜		87		87¼	87	1,600
Am. Steel Fdy	100	200,000													
Am. S. & Fdy., pf	100	200,000					43				40				200
Col. Fuel & I., Colo.	100	239,310	29	28½	28	25¾	27	26½	27½	27	28	26½	29		2,552
Col. & H. C. & I., Colo.	100	69,244	9½								87¾	88¾	10		300
Crucible Steel	100	250,000	3⅞	3½	4	3⅞	4		3⅞		3⅞		3¾		1,805
Crucible Steel, pf.	100	250,000	29¾	29½	29¾	29¼	29½	29¼					29½	29¾	1,147
Mong. R. Coal, Pa.	50	200,000			28										150
Mong. R. Coal, pf, Pa.	50	97,300									27		27		60
National Lead	100	149,054			11½		12		11	10⅝	11	10½	11¾	11½	1,900
National Lead, pf	100	149,040			80		76								225
Phila. Nat. Gas	100	308,542			36		35½	35¼							105
Phila. Nat. Gas, pf	100	212,873													
Pittsburg Coal, Pa.	100	300,307	19		18½		18¾	18¾					18¾		350
Pittsburg Coal, pf	100	297,012	60		60	59½	60	59½	60	59½	60	59½	60		2,224
Republic I. & S.	100	273,560	7	6½	6¾	6½	6¾				7		7	6½	1,500
Republic I. & S., pf	100	204,189	49¼	48½	49	48¼	49½	48½	49½		49½		50	49¼	5,235
Sloss-Shef S. & I., Ala.	100	75,000	24½	24					23						285
Sloss-Shef S. & I. pf, Ala	100	66,085					68		68¾		70				167
Standard Oil	100	970,000	656	650	655¼	649¼	656	650			655		670	675	235
Tenn. C. I. & R. R.	100	225,000	27¾	26⅝	27½	26½			28½	27¾	27¾	27	28¾	27½	7,040
U. S. Red. & Ref.	100	59,188													
U. S. Red & Ref., pf.	100	39,458													
‡U. S. Steel Corp.	100	5,084,952	10⅝	10½	10⅝	10¼	10⅞	10½	11⅛	10⅜	11	10⅝	11⅛	10⅜	81,975
U. S. Steel Corp. pf.	100	5,103,141	52¼	50⅝	52¼	50⅜	52⅞	51⅝	52⅞	51¾	52	51	52	50⅝	339,286
Va.-Car Chem.	100	279,844	19		19	18½	19		19¾	19¼					1,520
Va.-Car Chem., pf.	100	120,000													100
Va. I., Coal & Coke	100	86,416					20								50

†Ex-dividend Total sales, 451,433 shares.

BOSTON, MASS.

Name of Company.	Par val	Shares listed	Nov. 11 H.	Nov. 11 L.	Nov. 12 H.	Nov. 12 L.	Nov. 13 H.	Nov. 13 L.	Nov. 14 H.	Nov. 14 L.	Nov. 16 H.	Nov. 16 L.	Nov. 17 H.	Nov. 17 L.	Sales.
Adventure Con., c.	$25	100,000	4½				4				4				85
Alloues, c.	25	99,511	4¾	4½	4¼		4¼		4¼		4½				410
Amalgamated, c.	100	1,538,879	40	37¼	38¼	37½	39¼	37⅝	38⅜	37¾	38⅝	37¾	38¾	38	19,110
Am. Gold Dredging	5	90,000													
Am. Zinc, Lead & Sm.	25	60,000	9		8¾		9		9¾	9¼	10	9½	9¾		1,455
Anaconda, c. s.	25	1,200,000													
Arcadian, c.	25	150,000					87½				1		87⅜		170
Arnold, c.	25	60,000													
Atlantic, c.	25	100,000	8		8						8	7			165
Bingham Con. g. s.	50	150,000			21¾		21¾		22	21	22				345
Bonanza Dev. g.	10	300,000	45												5
Breece, s. l.	25	100,000													
British Columbia, c.	5	256,800													
Calumet & Hecla, c.	25	100,000			440	437	435		430		430		430		43
Centennial, c.	25	90,000	18¼	16	16	15½	15⅝	15⅜	14¼	15	15	14¼	15	14¼	1,925
Central Oil	25	60,050	6¾												50
Con. Mercur, g.	5	1,000,000	.90		.90	.87½	.81	.35	.60		.70		.60		3,024
Copper Range Con.	100	379,846	45⅞	43⅝	44⅜	43½	44½	43¾	44¾	44	44½	43⅝	44⅜	43⅝	15,536
†Daly West, g. s. l.	20	180,000	37¼	37	37	36	36	35	34½	34	34	30⅜	34	31⅜	2,413
Dominion Coal.	100	150,000			73½						74		76	74¾	370
Dominion Coal, pf.	100	30,000													
Dominion I. & S.	100	100,000	8¾		8		8¾	8	8¾	8½	9		9½	9	1,480
Elm River, c.	12	100,000	2¾												25
Franklin, c.	25	100,000			7½		7½				8		8		325
Granby Con. g. s. c.	10	1,336,303			4 7/16		4¾	4⅜	4½		4¼	4 7/16	4½		1,120
Guanajuato Con. g.	5	385,000					1								35
Isle Royal Con., c.	25	385,000	6½												10
Mass Con., c.	25	100,000									4⅞		4¾	4¼	75
Mayflower, c.	25	100,000													
Michigan, c.	25	100,000					6½	6							11
Mohawk, c.	25	100,000	37	36			36		36		35½	35	36	35½	805
Mont. Coal & Coke	25	200,000					3	2½	3¼	3	4	3⅛			1,925
Mont'l & Boston, c.	5	570,000					.60		.60				62½		950
New Odria, g.	5	100,000	9¼								10	9¾	10		1,170
Nova Scotia St. & C.	100	37,823													
Nova Scotia St. & C., pf.	100	10,300													
Old Colony, c.	25	100,000					75								38
Old Dominion, c.	25	150,000	10	9¾			9¾	9¼	9		9	8¾	9		580
Osceola, c.	25	98,150	56½	55½	55		56	55	56½	56	55½		55½		784
Parrot, s. c.	10	229,850	17½		17½		18						18		250
Phœnix Con, c.	25	100,000					4½	3½							100
Quincy, c.	25	100,000					85		85		85				14
Rhode Island, c.	25	100,000					1.25	.75							37
Santa Fe, g. c.	10	250,000							1¾	1½					110
Shannon, c.	10	298,916	8¾	8½	8⅝	8½	8½		8½		8½	8¼	8½		1,470
Tamarack, c.	25	60,000	87		86	85	88	85	88	85					175
Tecumseh, c.	25	80,000					25								100
Tennessee, c.	25	175,000													
Trinity, c.	25	160,000	5¾	5	5						5¼	5			212
United c.	100	450,000													
United States, g.	10	300,000	17¾	17	17⅜	17⅛	17½	17⅛	17⅜	17¼	17		17⅛		1,525
U. S. Coal & Oil	25	240,000			9	8¾	9	8¾		8¼			9	8½	660
Utah Con., g. c.	5	221,086	27½	27	27¾	27	27½	27	27¼	26¾		27	27½	27¼	2,414
Victoria, c.	25	100,000					2¾	2½							205
Winona, c.	25	100,000	8		7¼	7⅝	8	7⅝	7¾		8½	8⅛	7⅝		585
Wolverine, c.	25	60,000	65		65	64½			65				66		230
Wyandot, c.	25	100,000	1				1	.75	1¼	1					1,710

†Ex-dividend. ‡Assessment Paid. Total sales, 61,652 shares. c—Copper. g—Gold. l—Lead. q—Quicksilver. s—Silver.

SAN FRANCISCO.*

Name of Company.	Location.	Capitalization.	Nov. 6 H.	Nov. 6 L.	Nov. 7 H.	Nov. 7 L.	Nov. 9 H.	Nov. 9 L.	Nov. 10 H.	Nov. 10 L.	Nov. 11 H.	Nov. 11 L.	Nov. 12 H.	Nov. 12 L.	Sales
Bunker Hill	Cal.	200,000													
Central Eureka g.	Cal.	400,000											s1	82	600
Dutch M. & M. Co.	Cal.	125,000											40	38	300
Esperanza g.	Nev.	1,000,000	.02				.02				.02		.02		9,500
Golconda Con. g.	Ore.	3,000,000	.19								.19				1,000
Gold Mt. Con. g.	Nev.	750,000													
Hannapah g.	Nev.	1,000,000			.10										500
Lightner Mg. Co.	Cal.	125,000													
MacNamara g.	Nev.	500,000			13						.13	.12			600
Montana-Tonopah, g.	Nev.	1,000,000	.92	.91	.92		.95	.92	.96	.94	.98	.97	1.00	.99	6,000
N. Y. Tonopah, g.	Nev.	1,090,000													
Paymaster	Nev.	750,000					.12	.11			.11		11		2,600
Pine Grove, g.	Nev.	1,000,000													
Rescue, g.	Nev.	1,000,000	.05		.05		.05	.04			.06	.04	.05	.04	6,550
South Eureka	Cal.	300,000													
Tonopah-Belmont, g.	Nev.	2,000,000	.99				.99		1.00	.98	.99	.98			1,200
Tonopah & Cal., g.	Nev.	2,000,000			.23		.23						.22	.21	800
Tonapah & Gt. West'n	Nev.	750,000													
Tonopah, g	Nev.	1,000,000													
Tonopah North Star, g	Nev.	750,000	.31	.30	.32	.31	.32		.31		.31		.31		5,800
Tonopah & Salt Lake.	Nev.	300,000													
Tonopah Midway	Nev.	750,000					.37		.35				.35		600

†Ex-Dividend g—Gold. *San Francisco and Tonopah Mining Exchange. Total sales, 36,050 shares.

STOCK QUOTATIONS

MEXICO.* Nov. 6

Name of Company.	Shares Issued.	Last div'd	Prices. Bid.	Prices. Ask.
Durango:				
Ca. Min. de Penoles..	2,500	$50.00	$3,800	$4,100
San Andres de la Sierra	200	.....	10,000	.....
Guanajuato:				
Angustias, Pozos....	2,400	5.00	60	70
Cinco Senores y An., aviadores.....	2,000	15.00	95	110
Cinco Senores y An., aviada	400	10.00	80	90
Providencia, San Juan de la Luz.....	6,000	2.00	90	95
Queensland y Australia.....	300	.....	70	80
Guerrero:				
Delfina, 1st serie.....	2,500	.....	35	40
Delfina, 2nd serie....	2,500	.....	30	40
Garduno y Anexas...	7,200	.....	40	50
Hidalgo:				
Amistad y Condordia	9,600	8.87	81	83
Carmen, aviada.....	1,100	.....	140	160
Guadalupe Fresnillo Mill	1,000	.....	140	250
Guadalupe Fresnillo Mine.....	1,400	.....	70	80
La Blanca, aviadora.	1,538	.....	.....	.....
La Blanca, aviada....	768	.....	.....	.....
La Reina y An., aviadora.....	5,600	.....	16	20
Luz de Maravillas, aviadas.....	1,100	.....	.....	20
Maravillas y An., aviador.....	1,680	.....	120	140
Maravillas el Lobo ..	1,000	.....	130	180
Palma y An., aviador.....	1,800	.....	.....	12
Real del Monte.....	2,554	10.00	.....	.....
Refugio, aviada.....	12,800	.....	7	8
Santa Anay An., aviadora.....	1,800	.....	30	40
Santa Anay An., aviada.....	600	.....	25	30
Sta. Gertrudis y An., aviadas.....	9,600	.....	10	12
Sta. Gertrudis y An., aviadora.....	28,800	1.00	84	86
Santo Tomas Apostol aviadoras.....	5,100	.....	2	3
San Felipe de Jesus, aviadora	3,600	.....	23	25
San Felipe de Jesus, aviada	1,200	.....	6	10
San Rafael y An., Trompillo.	1,200	12.00	1,630	1,650
San Rafael y An., aviada.....	1,200	4.00	625	650
Soledad, aviada.....	960	5.00	720	730
Sorpresa, aviada....	960	5.00	340	380
.....	.....	.....	.....	.....

Name of Company.	Shares Issued.	Last div'd	Prices. Bid.	Prices. Ask.
Mexico:				
Alacran.....	2,400	.....	2	60
Aldebarren.....	2,000	.....	80	85
Buen Despacho.....	3,000	.....	50	57
Dos Estrellas.....	3,000	30.00	2,080	21,00
La Esperanza (El Oro.).....	3,000	10.00	1,500	1,500
La Reformia, aviadores.....	2,000	.....	50	60
Providencia, pagadoras.....	1,600	.....	.....	.....
Providencia, liberadas.....	900	.....	.....	.....
Santa Ana, Esperanza.....	2,400	.....	90	.....
Michoacan:				
Luz de Borda, aviadora.....	3,000	.....	135	145
Luz de Borda, aviado.....	1,000	.....	50	60
Nuevo Leon:				
La Fraternal.....	1,000	.....	575	625
Norias de Bajan.....	1,000	.....	800	850
Santiago y An., Tlal..	4,000	.....	.....	.....
San Luis Potosi:				
Concepcion y An.....	3,000	.....	80	90
El Barreno, aviadora.	2,000	2.00	58	60
Sta. Maria de la Paz..	2,400	20.00	710	725
San Diegoy Annexas.	2,400	4.00	6	10
Zacatecas:				
Asturiana y An.....	2,500	.....	80	85
Candelaria y Pinos..	2,500	10.00	140	165
Cubiertas.....	2,400	.....	.....	.....
Esperanza y An.....	2,400	.....	15	25
Lourdes.....	2,500	.....	15	25
Luz de Minillas, pagadoras.....	2,000	.....	15	30
Nueva Quebradilla, aviadoras.....	2,400	.....	95	100
Nueva Quebradilla, aviadas.....	600	.....	70	80
San Carlos y Annexas	2,500	20.00	160	165
Sta. Maria de Gaud..	2,500	10.00	55	60
Miscellaneous:				
Bartolome de Medina	2,000	1.50	70	75
Guadalupe Hacienda	20,000	6.00	.....	.....
La Luz Hac. (Pachuca.).	3,750	.....	.....	.....
La Reina (Chihuahua.)	192	.....	.....	.....
Naica (Chihuahua.)..	100	.....	11,000	13,000
Natividad (Oaxaca) aviadora.....	1,800	10.00	1,000	1,040
Natividad (Oaxaca) aviadas.	600	4.00	.....	.....
San Francisco Hac...	6,000	1.00	70	75
Santa Ana Huantla Morelos.....	4,000	.....	.....	.....
Union Hacienda.....	3,000	5.00	200	220

*Values are in Mexican currency.

TORONTO, ONT. Nov. 14

Name of Company.	Par val	Prices. High.	Prices. Low.	Sales.
Black Tail, g.....	$1	.04	.02	.....
Cariboo-McKinney, g.	1	.10	.....	.....
Cariboo Hydraulic, g.	1	.75	.....	.....
Center Star, g. s....	1	.23	.19	3,000
Crows Nest, Coal & C.	100	3.00	1.95	.....
Dominion Coal, com..	100	2¼	.01	.....
Dominion S. & I.....	100	.....	.....	.....
Fairview, g. s.....	1	.05	.02¾	7,000
Giant, g. s.....	1	.03	.01½	.....
Deer Trail, g. s.....	1	.02½	.01	.....
Iron Mask, g. s.....	1	.06	.....	.....
Morrison, g. s.....	1	.04	.02	.....
.....	.....	.....	.....	.....

Name of Company.	Par val	Prices. High.	Prices. Low.	Sales.
Granby Smelter.....	$10	4.50	3.70	.....
Mountain Lion, g....	1	.28	.20	.....
North Star, g. s.....	1	.13	.06	.....
Nova Scotia Steel, com	100	.11	.....	40
Payne, s. l.....	1	.15	.09	.....
Rambler Cariboo, g..	1	.40	.30	.....
Republic, g.....	1	.03	.01	.....
St. Eugene, g. s.....	1	.48	.37	.....
Virtue, g. s.....	1	.07	.04½	.....
War Eagle Con., g. s..	1	.12	.08	.....
Sullivan, g. s.....	1	.06	.04	.....
Winnipeg, g. s..	1	.06	.04	.....
Wonderful, g. s.....	1	.04	.....	.....

g—Gold. s—Silver. Total Sales, 10,040.

SALT LAKE CITY.* Nov. 7

Name of Company	Par Val	Shares.	High	Low	Sales.
Ajax.....	10	300,000	.04	.03	1,300
Butler Liberal.....	1	500,000	.16	.15	8,500
Carisa	1	300,000	.10¾	.10½	700
Century.....	1	150,000	.....	.....	.....
Con. Mercur...	5	1,000,000	.98¾	.92	6,300
Comstock.....			.18	.18	400
Daly-Judge	20	300,000	11.75	11.00	2,655
Daly West.....	20	180,000	38.00	37.25	445
Emerald					
Grand Central..	1	250,000	4.37½	4.37½	1,000
Ingot.....	½	500,000	.02½	.02	2,200
Keystone.....	1	500,000	.25	.24	1,000
La Reine.....	1	800,000	.02¾	.02¼	5,000
Little Chief....	10	400,000	.04	.04	1,000
L. Mammoth...	1	150,000	.32½	.32½	100
Manhattan.....	10	1,000,000	.00¾	.00½	6,000

Name of Company	Par Val	Shares	High	Low	Sales.
May Day.....	¼	400,000	.08½	.08	6,050
Mammoth	25	400,000	.....	.....	.....
M. Washington	½	300,000	.01½	.01½	1,000
Naildriver	2	300,000	.....	.....	.....
N. Y. Bonanza.	1	300,000	.24	.19	14,000
Northern Light	5	400,000	.....	.....	.....
Sacramento....	5	1,000,000	.25⅛	.25	3,700
Silver Shield...	20	800,000	.08	.08	50
So. Swansea....	1	300,000	.....	.....	.....
Star Con.....	1	400,000	.32¾	.31	12,000
Tetro.....	1	300,000	.34½	.33¼	500
Uncle Sam Con.	1	500,000	.22½	.22	2,000
Utah.....			.59	.59	2,100
Victor Con.....	1	500,000	.....	.....	.....
Wabash	1	500,000	.07	.07	1,100
Yankee Cons...	1	500,000	.43	.42	1,100

*By our Special Correspondent. All mines are in Utah. Total sales, 78,100 shares.

PHILADELPHIA, PA * Nov. 11 to Nov. 17.

Name and Location of Co.	Par val.	Nov. 11 H.	Nov. 11 L.	Nov. 12. H.	Nov. 12. L.	Nov. 13. H.	Nov. 13. L.	Nov. 14. H.	Nov. 14. L.	Nov. 16. H.	Nov. 16. L.	Nov. 17. H.	Nov. 17. L.	Sales
Am. Alkali, Mich	$50	.....	.....	.....	.....	.....	.....	.....	.....	.....	.....	.....	.....	.....
Am. Cement....	10	.....	.....	.....	.....	.....	.....	.....	.....	7	.....	6⅝	.....	13
Cambria Iron, Pa	50	.....	.....	.....	.....	.....	.....	.....	.....	46	.....	.....	.....	10
Cambria St , Pa	50	18⅛	17⅞	18	17¼	17¼	.....	17¾	.....	17⅝	17¼	17⅝	17⅜	4,651
Penn. Steel, pfd	100	.....	.....	.....	.....	.....	.....	.....	.....	.....	.....	73	.....	101
Susq. I & S., Pa	5	.....	.....	.....	.....	.....	.....	.....	.....	.....	.....	.....	.....	.....
United Gas Imp.	50	79½	79¼	79	78	78½	78	78⅛	78	78	77⅜	78¾	78	2,794
Warwick I. & S.	10	2¾	2⅛	2⅛	2⅞	2¾	.....	.....	.....	3	.....	2⅞	.....	655
Diamond Steel.	50	.....	.....	⅜	.....	.....	.....	.....	.....	1¼	1⅛	.....	.....	233
Lehigh Navig'n	50	.....	.....	.....	.....	.....	.....	.....	.....	.....	.....	.....	.....	.....
Philadelphia....	50	36	35⅝	35⅝	35⅛	36	35⅝	35¾	35½	36	35½	36½	35¾	2,921
U. S. Steel.....	100	10¼	10¼	10½	10¼	10⅝	10¼	11	10¼	11	10⅛	11¼	10⅝	10,015
U. S. Steel. pf..	100	52	50⅞	52	51⅛	52⅛	51⅞	52¾	52	51⅞	51½	51⅞	50¾	12,032

Total sales 33,425.

LONDON. Nov. 6

Name and Country of Company.	Shares Issued.	Par value. £. s. d.	Latest dividend. Amt. s. d.	Latest dividend. Date.	Quotations. Buyers. £ s. d.	Quotations. Sellers. £ s. d.
American:						
Alaska-Treadwell, Alaska, g.....	200,000	5 0 0	1 6	Oct., 1903	3 17 6	4 2 6
Anaconda, Montana, c. s	1,200,000	5 0 0	2 0	Nov., 1903	3 2 6	3 5 0
Camp Bird, Colorado, g.....	820,000	1 0 0	9	Nov., 1903	1 5 0	1 7 6
Copiapo, Chile, c.....	112,500	2 0 0	6 10	May, 1903	1 5 0	1 10 0
De Lamar, Idaho, g. s.....	80,000	1 0 0	2 0	Oct., 1903	12 6	15 0
El Oro, Mexico, g. s.....	1,080,000	1 0 0	1 6	July, 1903	1 6 3	1 6 9
Frontino & Bolivia, Colombia, g. s...	128,862	1 0 0	3 0	July, 1901	6 9	11 3
Le Roi, British Columbia, g. s.....	200,000	5 0 0	5 0	Nov., 1899	15 0	17 6
Le Roi No. 2, British Columbia, g.....	120,000	5 0 0	5 0	May, 1902	16 3	16 9
Montana, Montana, g. s.....	657,128	1 0 0	6	April 1899	1 6	2 0
Standard, Arizona, c.....	500,000	4 0	2½	Sept., 1903	3 6	4 6
Stratton's Independence, Colorado, g	1,000,007	1 0 0	1 0	Aug., 1903	5 0	5 6
St. John del Rey, Brazil, g.....	546,295	1 0 0	6	June, 1903	15 0	16 3
Tomboy, Colorado, g.....	300,000	1 0 0	1 0	June, 1902	1 10 0	1 15 0
Utah Consolidated, Utah, c. g.....	300,000	1 0 0	6 3	July, 1903	5 15 0	6 0 0
Ymir, British Columbia, g.....	200,000	1 0 0	1 0	Mar., 1902	5 0	7 6
European:						
Linares, Spain, l.....	15,000	3 0 0	1 0	Mar., 1903	2 10 0	3 10 0
Mason & Barry, Portugal, c.....	185,172	1 0 0	11 0	May, 1903	3 7 6	3 12 6
*Rio Tinto, Spain, c.....	325,000	5 0 0	32 6	Nov., 1903	48 15 0	49 0 0
*Rio Tinto, pref., Spain, c.....	325,000	5 0 0	2 6	Nov., 1903	6 0 0	6 5 0
Tharsis, Spain, c.....	625,000	2 0 0	6 0	May, 1903	4 0 0	4 5 0
West Australian:						
Associated, g..	495,388	1 0 0	2 0	July, 1903	2 13 9	2 16 3
Cosmopolitan Proprietary, g.....	400,000	1 0 0	1 0	May, 1903	15 6	16 6
Golden Horse Shoe, g.....	300,000	5 0 0	6 0	Nov., 1903	9 10 0	9 12 6
Great Boulder Proprietary, g.....	1,750,000	2 0	9	Sept. 1903	1 6 3	1 6 9
*Great Fingall Consolidated, g.....	250,000	1 0 0	6 0	Oct., 1903	9 1 3	9 3 9
*Ivanhoe g.....	200,000	5 0 0	5 0	Oct., 1903	8 16 9	9 1 3
Kalgurli, g.....	120,000	1 0 0	2 6	Oct., 1903	4 12 6	4 15 0
Lake View Consols, g.....	250,000	1 0 0	rts.	Aug., 1902	1 12 6	1 15 0
Oroya-Brownhill, g.....	450,000	1 0 0	2 0	Sept., 1903	3 12 6	3 13 9
Miscellaneous:						
Brilliant Central, Queensland, g.....	100,000	1 0 0	.. 9	Sept., 1903	3 5 0	3 10 0
Brisels, Tasmania, t.....	600,000	1 0 0	... ...		4 3	4 9
Broken Hill Proprietary, N. S. W., s. l	960,000	6 0	1 0	Aug., 1903	1 9 0	1 10 0
Mt. Lyell, Tasmania, c.....	275,000	3 0 0	4 3	Sept., 1903	2 10 0	2 12 6
Mt. Morgan, Queensland, g.....	1,000,000	1 0 0	3	Nov., 1903	2 16 3	2 16 9
Waihi, New Zealand, g.....	497,412	1 0 0	2 6	June, 1903	5 0 0	5 2 6
Indian:						
Champion Reef, g..	473,000	10 0	5 6	Aug.. 1903	7 15 0	7 17 6
Mysore, g.....	596,043	10 0	4 0	Nov., 1903	6 15 0	6 17 6
Nundydroog, g.....	484,000	10 0	1 6	Nov., 1903	2 2 6	2 5 0
Ooregum, g.....	343,000	10 0	1 9	Aug., 1903	1 1 3	1 3 9
Ooregum, pref .,g.....	240,000	10 0	1 9	Aug., 1903	1 12 6	1 15 0
South African:						
Angelo, g.....	800,000	1 0 0	6 0	Aug., 1903	6 10 0	6 15 0
Bonanza, g.....	200,000	1 0 0	10 0	Aug., 1903	2 2 6	2 5 0
British South Africa.....	4,436,019	1 0 0	rts.	May, 1899	2 1 3	2 2 6
Cape Copper, c.....	300,000	2 0 0	1 0	July, 1903	3 1 3	3 3 9
Cape Copper, pref., c.....	75,000	2 0 0	1 0	July, 1903	2 15 0	3 0 0
City & Suburban, g.....	340,000	4 0 0	4 0	Aug., 1903	5 17 6	6 2 6
Consolidated Gold-Fields.....	2,000,000	1 0 0	... ...		5 6 3	5 6 9
Crown Reef, g.....	120,000	1 0 0	20 0	Oct., 1903	17 5 0	17 15 0
De Beers Con., d.....	800,000	2 10 0	10 0	Aug., 1903	19 0 0	19 2 6
De Beers Con., deferred, d.....	1,000,000	2 10 0	15 0	Aug., 1903	20 0 0	20 2 6
East Rand Proprietary, g.....	990,000	1 0 0	5 0	Aug., 1903	6 16 3	6 16 9
†Ferreira, g.....	90,000	1 0 0	15 0	Aug., 1903	19 5 0	19 15 0
Geldenhuis Estate, g.	200,000	1 0 0	6 0	Aug., 1903	5 17 6	6 2 6
Geduld, g.....	400,000	1 0 0	rts.	Mar., 1902	5 18 9	6 1 3
Henry Nourse, g	125,000	1 0 0	10 0	Aug., 1903	7 17 6	6 2 6
Jubilee, g.....	50,000	1 0 0	5 0	July, 1903	4 15 0	5 0 0
Jumpers, g.....	100,000	1 0 0	5 0	Aug., 1899	3 0 0	3 5 0
Langlaagte Estate, g	470,000	1 0 0	3 0	Aug., 1903	3 10 0	3 17 6
May Consolidated, g	288,750	1 0 0	3 0	Aug., 1903	4 0 0	4 2 6
Meyer & Charlton, g	100,000	1 0 0	3 0	Aug., 1903	5 5 0	5 10 0
Modderfontein, g.....	290,000	1 0 0	rts.	Apr., 1902	8 7 6	8 10 0
Namaqua, c.....	94,331	2 0 0	2 0	June, 1903	3 5 0	3 10 0
New Jagersfontein, d.....	200,000	5 0 0	10 0	Nov., 1903	23 10 0	23 0 0
New Primrose, g.....	325,000	1 0 0	2 0	Aug., 1903	3 12 6	3 15 0
Rand Mines, g.....	1,796,956	1 0	4 0	Aug., 1902	9 2 6	9 5 0
Robinson, g.....	750,000	5 0 0	5 6	Aug., 1903	9 12 6	9 17 6
Robinson Deep, g.....	950,000	1 0 0	2 0	Aug., 1903	5 0 0	5 2 6
Rose Deep, g.....	425,000	1 0 0	2 0	Aug., 1903	7 15 6	8 0 0
Salisbury, g.....	100,000	1 0 0	2 0	Mar , 1899	1 10 0	1 15 0
Sheba, g.....	1,075,000	1 0 0	6	July, 1599	12 6	13 9
Village Main Reef, g.....	400,000	1 0 0	4 0	June, 1903	7 7 6	7 12 6
Wemmer, g.....	80,000	1 0 0	10 0	July, 1903	10 0 0	10 10 0

c—Copper. d—Diamonds. g—Gold. l—Lead. s—Silver. t—Tin. *Ex-dividend. †Ex-rights.

LONDON (By Cable.)*

Name of Company.	Nov. 11. £. s. d.	Nov. 18. £. s. d.	Name of Company.	Nov. 11. £. s. d.	Nov. 18. £. s. d.
Anaconda.....	3 5 0	3 5 0	Johannesburg Invest....	2 16 3	2 17 6
British South Africa.....	2 3 9	2 3 9	Modderfontein.....	8 7 6	6 7 6
Camp Bird.....	1 7 6	1 6 7½	Rand Mines.....	9 5 0	9 11 3
Con. Gold Fields.....	5 10 0	5 17 6	Rio Tinto	49 0 0	48 6 9
De Beers Con. def...	20 3 9	20 6 9	Simmer & Jack.....	1 6 0	1 6 9
East Rand.....	8 17 6	8 15 0	Tomboy.....	1 7 6	1 6 9
El Oro, Mex.....	1 7 6	1 7 6	.....	.....	.....

*Furnished by Wm. P. Bonbright & Co., 15 Wall St., New York.

PARIS. Nov. 5

Name of Company.	Country.	Product.	Capital Stock. Francs.	Par value. Fr.	Latest divs. Fr.	Prices. Opening. Fr.	Prices. Closing. Fr.
Alameda.....	California	Oil.....	1,000,000	1	9.50	5.50	5.50
Anzin	France	Coal	.....	.....	290.00	5,775.00	5,558.00
Boleo.....	Lower Cal..	Copper.....	12,000,000	500	62.50	1,575.00	1,630.00
Canadian-American	Canada.....	Coal.....	.....	20	.....	27.00	27.00
Champ d'Or.....	S. Africa.....	Gold.....	3,375,000	25	3.75	19.25	20.00
Courrieres	France	Coal	600,000	300	110.00	2,930.00	2,911.00
Fraser River.....	Brit. Col'mb..	Gold.....	250,000	25	.....	5.50	5.50
Huanchaca.....	Bolivia.....	Silver.....	40,000,000	125	5.00	80.75	83.00
Laurium.....	Greece.....	Zinc, Lead....	16,300,000	500	25.00	355.00	358.00
Malfidano.....	Italy	Zinc	12,500,000	500	50.00	571.00	575.00
Metaux. Cie. Fran. de....	France	Metal dealers.	25,000,000	500	22.50	506.00	507.00
Mokta-el-Hadid.....	Algeria	Iron	16,312,000	500	40.00	840.00	830.00
Nickel.....	N. Caled'nia..	Nickel.....	15,000,000	250	22.50	485.00	484.00
Sedalia & California.....	California.....	Oil.....	1,000,000	1	.....	5.50	5.00
Vielle Montagne.....	Belgium.....	Zinc.....	9,000,000	30	30.00	683.00	685.00
Wyoming	California.....	Oil	.....	25	.....	309.00	310.00

ST. LOUIS, MO.* Nov. 14.

Name.	Par Val.	Shares.	Prices. Bid.	Prices. Ask.	Name.	Par Val.	Shares.	Prices. Bid.	Prices. Ask.
Am.-Nettie, Colo....	$10	300,000	$0.10	$0.50	Columbia Lead, Mo.	$10	50,000	$2.50	$3.50
Catherine Lead, Mo.	10	50,000	1.50	2.25	Con. Coal, Ill.....	100	50,000	16.00	22.00
Central Coal & C....	100	51,250	52.00	54.00	Doe Run Lead Co..	100	15,000	110.00	115.00
Central C. & C., pf..	100	18,750	68.00	70.00	Granite Bimet. Mt..	10	100,000	.52	.70
Central Lead, Mo...	100	10,000	110.00	120.00	St. Joe Lead, Mo,...	10	600,000	14.00	16.00

*By our Special Correspondent.

CHEMICALS, MINERALS, RARE EARTHS, ETC.—CURRENT WHOLESALE PRICES.

(See also Market Reviews.)

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
Mont. car-lots, f.o.b. Chicago	"	.07@.07½
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@.05
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, 30%	"	.03
48%	"	.05
60%	"	.11
Sulphurous, liquid anhy. f.o.b. Bound Brook, N.J.	"	.06
ALCOHOL—Grain	gal.	2.45@2.47
Refined wood, 95@97%	"	.50@.55
Purified	"	1.25@1.30

ALUM—Lump	100 lbs.	1.75
Ground	"	1.85
Porous	"	1.00
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, com'l	"	1.25@1.50

AMMONIA—		
Aqua, 16°	lb.	.03
18°	"	.03¼
20°	"	.03¾
26°	"	.03¾

AMMONIUM—		
Carbonate, lump	"	.07½
Powdered	"	.08¼
Muriate	"	.05⅝
Lump	"	.09
Nitrate, white pure (99%)	"	.12
Phosphate, com'l	"	.09
Pure	"	.12

ANTIMONY—Glass	"	.30@.40
Needle, lump	"	.05½@.06
Powdered, ordinary	"	.05¾@.07¾
Oxide, com'l white, 95%	"	.09½
Com'l white, 95%	"	.12
Com'l gray	"	.07
Sulphuret, com'l	"	.16

ARSENIC—White powd.	"	.03¼@.03½
Red	"	.06⅜@.06½

ASPHALTUM—		
Ventura, Cal.	sb. ton	32.00
Cuban	lb.	.01½@.03½
Egyptian, crude	"	.05⅛@.06
Trinidad, refined	sb. ton	35.00
San Valentino (Italian)	lg. ton	16.00
Seyssel (French), mastic	sb. ton	21 00
Gilsonite, Utah, ordinary	lb.	.03
Select	"	.03¾

BARIUM—		
Carb. Lump, 80@90%	sb. ton	25.00@27.00
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	"	.05⅞

BARIUM	Cust. Meas.	Price.
Sulphate (Blanc Fixe)	lb.	$0.02

BARYTES—		
Am. Crude, No. 1	sh. ton	9.50
Crude, No. 2	"	8.00
Crude, No. 3	"	7.00
Floated	"	18.50
Foreign gray	"	13.50
Snow white	"	17.00
Floated	"	18.00

BAUXITE—Ga. or Ala. Mines:		
First grade	lg. ton	5.50
Second grade	"	4.75

BISMUTH—Subnitrate	lb.	2.00
Subcarbonate	"	2.25

BITUMEN—"B"	"	.03½
"A"	"	.05

BONE ASH	"	.02¼@.02½
BORAX	"	.07¼@.07½
BROMINE—Bulk	"	.48
CADMIUM—Metallic	"	1.40
Sulphate	100 lbs.	2.00@2.50

CALCIUM—Acetate, gray	"	1.40
" brown	"	.90
Carbide, ton lots f.o.b. Niagara Falls, N. Y., for Jersey City, N. J.	sh. ton	70.00
Carbonate, ppt	lb.	.05
Chloride	100 lbs.	.70@.90

CEMENT—		
Portland, Am., 400 lbs.	bbl.	1.50@1.75
Foreign	"	1.75@2.25
"Rosendale," 300 lbs.	"	.85
Slag cement	"	1.25@1.50

CERESINE—		
Orange and Yellow	lb.	.13
White	"	.14

CHALK—Lump, bulk	sb. ton	3.00
Ppt. per quality	lb.	.04@.05¼

CHLORINE—Liquid	"	.30
Water	"	.10

CHROME ORE		
(50% ch.) ex-ship N. Y.	lg. ton	24.75
Bricks f.o.b. Pittsburg	M	175.00

CLAY, CHINA—Am. com., ex-dock, N. Y.	lg. ton	8.25
Am. best, ex-dock, N. Y.	"	9.25
English, common	"	10.50
Best grade	"	16.25
Fire Clay, ordinary	sb. 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—Bulk	100 lbs.	.47½
In bbls	"	.52½

COPPER—Carbonate	lb.	.18@.19
Chloride	"	.25
Nitrate, crystals	"	.35
Oxide, com'l	"	.19

CRYOLITE	"	.06½

EXPLOSIVES—		
Blasting powder, A	25-lb. keg	.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)	"	.16¼
(60% nitro-glycerine)	"	.18
(75% nitro-glycerine)	"	.21
Glycerine for nitro (32-2-10° Be.)	"	.12½@.12⅝

FELDSPAR—Ground	sh. ton	8.00@9.00

FLINT PEBBLES—Dan. Best.	lg. ton	14.75
Frenchb, Best	"	11.75

FLOURSPAR—		
Am. lump, 1st grade	sb. ton	14.40
2d grade	"	13.90
Gravel and crusbed, 1st gr.	"	13.40
2d grade	"	12.40
Ground, 1st grade	"	17.90
Ground, 2d grade	"	16.50
Foreign, lump	"	8.00@12.00
Ground	"	11.50@14.00

FULLER'S EARTH—Lump.	100 lbs.	.80
Powdered	"	.85

GRAPHITE—Am. f.o.b. Providence, R. I., lump	sh. ton	$8.00
Pulverized	"	30.00
Am. pulv., other than R. I., f. o. b., New York	"	45.00
Best flake	"	150.00
German, com. 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
Englisb and Frencb	"	14.00@16.00

INFUSORIAL EARTH—Gr'd.		
American best	"	20.00
French	"	37.50
German	"	40.00

IODINE—Crude	100 lbs.	2.45

IRON—Muriate	lb.	.05
Nitrate, com'l	"	.01¾
True	"	.04
Oxide, pure copperas color	"	.05@.10
Purple-brown	"	.02
Venetian red	"	.01@.01½
Scale	"	.01@.03

KAOLIN—(See China Clay.)		

KRYOLITH—(See Cryolite.)		

LEAD—Acetate, white	"	.08¼@.08½
Brown	"	.06¼@.06½
Nitrate, com'l	"	.06½
" gran	"	.08¼

LIME—Com., abt. 250 lbs.	bbl.	.82
Finisbing	"	1.02

MAGNESITE—Greece.		
Crude (95%)	lg. ton	5.00@5.50
Calcined	sb. ton	15.50
Bricks, best imp., f.o.b. N.Y.	M.	155.00
" domes., per qual., f.o.b. Pittsburg	"	160.00@200.00

MAGNESIUM—		
Carbonate, ligbt, fine pd.	lb.	.05
Blocks	"	.07@.09
Cbloride, com'l	"	.01¾
Fused	"	.20
Nitrate	"	.60
Sulpbate	100 lbs.	.75@.95

MANGANESE—		
Crude powd.		
70@75% binoxide	lb.	.01¼@ 01½
75@85% binoxide	"	.01½@.02¼
85@90% binoxide	"	.02¼@.03¼
90@95% binoxide	"	.03¼@.05½
Carbonate	"	.16@.20
Chloride	"	.04
Ore, Foreign	unit	.22@.24
Domestic, 1st quality	"	.30

MARBLE—Flour	sh. ton	6.00@7.00

MERCURY—Bichloride	lb.	.77

MICA—N. Y. gr'nd, coarse	sb. ton	33.00@38.00
Fine	lb.	.00⅞@.02

Sbeets are sold as to size and quality

MINERAL WOOL—		
Slag, ordinary	sb. ton	19.00
Selected	"	25.00
Rock, ordinary	"	32 00
Selected	"	40.00

NICKEL Oxide, No. 1	lb.	1.00
No. 2	"	.60
Sulpbate	"	.20@.21

OILS—Black, reduced 29 gr.:		
25@30, cold test	gal.	.13@.13½
15, cold test	"	.14@.14½
Zero	"	.18½@.19
Summer	"	.13@.13½
Cylinder, dark steam ref.	"	.14½@.15½
Dark, filtered	"	.18½@.19
Light, filtered	"	.20½@.21
Extra cold test	"	.25@.31
Gasoline, 86 @90°	"	.17@.22
Naphtba, crude, 68°@72°	bbl.	12.40
"Stove"	gal.	.15
Linseed, domestic raw	"	.36@.37
Boiled	"	.39
Calcutta, raw	"	.65

OZOKERITE	lb.	.11½

PAINTS AND COLORS—		
Chrome green, common	"	.03
Pure	"	.16
Yellow, common	"	.10¼
Best	"	.14
Lampblack, com'l		.04½
Refined		.07
Litbarge, Am. pow'd	"	.05½@.06
English flake	"	.08¼@.08½
Glassmakers'	"	.06½@.08¾

PAINTS AND COLORS—	Cust. Meas.	Price
Metallic, brown	sh. ton	$19.00
Red	"	15 00
Ocher, Am. common	"	9.25@10.00
Best	"	21.25@25.00
Dutcb, washed	lb.	.04¾
Frencb, washed	"	.01½@.01⅝
Orange mineral, Am.	"	.08
Foreign, as to make	"	.06¾@.11½
Paris green, pure, bulk	"	.11½
Red lead, American	"	.06¼@.06½
Foreign	"	.06½@.07¾
Turpentine, spirits	gal.	.59½@.60
White lead, Am., dry	lb.	.05 @.05¼
American, in oil	"	.06 @.07
Foreign, in oil	"	.07 @.09
Zinc, white, Am., ex. dry	"	.04⅝@.04¾
Foreign, red seal, dry	"	.06@.08¼
Green seal, dry	"	.06¾@.10½

POTASH—		
Caustic, ordinary	"	.04½@.04⅞
Elect. (90%)	"	.06¼

POTASSIUM—		
Bicarbonate cryst	"	.08¼
Powdered or gran	"	.14
Bicbromate, Am	"	.08½@.08¾
Scotcb	"	.08½@.09
Bromide	"	@.30
Carbonate (80@85%)	"	.03¼@.04¾
Cblorate, powd	"	.06¾@.07¼
Crystals	"	.06½@.07
Cbromate	"	.35
Cyanide (98@99%)	"	.20
Kainit	lg. ton	9.30
Manure salt, 20%	100 lbs.	.66
D'le Manure Salt, 48@53%	"	1.12
Muriate, 80@85%	"	1.83
95%	"	1.86
Permanganate	lb.	.09½@.09⅝
Prussiate, yellow	"	.14½@.14¾
Red	"	.36
Sulpbate, 90%	100 lbs.	2.11
96%	"	2.14
Sylvanit	unit	.41

QUARTZ—(See Silica).		

SALT—N. Y. com. fine 280 lbs	bbl.	.72@1.18
N. Y. agricultural	sh. ton	4.40

SALTPETRE—Crude	100 lbs.	3.35@3.40
Refined	"	4.00@4.50

SILICA—Best foreign	lg. ton	10.00@11.00
Ground quartz, ord.	sb. ton	6.00@8.00
Best	"	12.00@13.00
Lump quartz	"	2.50@4.00
Glass sand	"	2.75

SILVER—Cbloride	oz.	.65
Nitrate Crystals	"	.37½
Oxide	"	.85@1.10

SODIUM—		
Bicarb., ord., bulk f.o b. wk's.	100 lbs.	1.25
Extra domes., f.o.b. w'ks.	"	3.50
Foreign, f.o.b. N. Y.	"	1.75
Bicbromate	lb.	.06¼
Carbonated ash, bigb test, in bags, f.o.b. works	100 lbs.	.77½@.82½
Foreign, f ob. N. Y.	"	.90@.92½
Caustic, 70@75%, f.o.b. w'ks.	"	1.75@1.80
" 60%	"	1.85@1.90
Foreign, f.o.b N. Y.	"	1.50@2.00
Cblorate, com'l	"	.06¾@.07
Hyposulpbite, Am.	"	1.60@1.65
German	"	1.70@1.90
Nitrate	"	2.07½@2.10
Sbipments	"	2@2.05
Peroxide	lb.	.45
Pbospbate	"	.02½@.02¾
Prussiate	"	.10¾
Sal soda, f.o.b. works	100 lbs.	.60
Foreign, f.o.b. N. Y.	"	.67½
Silicate, conc	lb.	.05
Com'l	"	.01
Sulpbate, com'l	100 lbs.	.82½
Sulpbide	lb.	.01¼
Sulpbite crystals		.02½

SULPHUR—Roll	100 lbs.	1.85
Flour	"	1.90
Flowers, sublimed	"	2.25

TALC—N. C., 1st grade	sh.ton	20.00
N. Y., Fibrous, best	"	10.28
French, best	100 lbs.	2.00
Italian, best	"	2.25

TAR—Regular	bbl.	2.70
Oil, bbl	"	4.70

TIN—Crystals, bbl	lb.	.20
Oxide	"	.35

URANIUM—Oxide	"	2.25@3.00

ZINC—Metallic, cb. pure	"	.07@.09¼
Carbonate, ppt	"	.09
Chloride solution, com'l	"	.02¾
Chloride granular	"	.15
Dust	"	.04¾@.04⅞
Sulpbate	"	.02½@.02⅝

THE RARE EARTHS.

BORON—Nitrate	lb.	$1.50
CALCIUM—Tungstate (Scbeelite)	"	.60
CERIUM—Nitrate	"	10.00
DIDYMIUM—Nitrate	"	35.00
ERBIUM—Nitrate	"	40.00
GLUCINUM—Nitrate	"	20.00
LANTHANUM—Nitrate	"	30.00
LITHIUM—Carbonate	"	1.35
LITHIUM—Nitrate	oz.	.60
STRONTIUM—Nitrate	lb.	.07¾@.08¼
THORIUM—Nitrate 49@50%	"	4.50
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.