

# The Engineering and Mining Journal

WITH WHICH IS CONSOLIDATED "MINING AND METALLURGY."

VOL. LXXIII.

NEW YORK, SATURDAY, JANUARY 18, 1902.

No. 3.

## THE ENGINEERING AND MINING JOURNAL.

(Incorporated.)

253 BROADWAY, NEW YORK.

TELEPHONE. 3095 CORTLANDT. P. O. BOX, 1835.  
CABLE ADDRESS, "MINGERING, N. Y."

W. J. JOHNSTON, President. F. J. PRATT, Treasurer.  
LUCIUS S. BIGELOW, Vice-Prest., and Gen'l Mgr.

CHICAGO (Tel., 73 Harrison)	737 Monadnock Building
DENVER	206 Boston Building
SALT LAKE CITY	Dooly Building
SAN FRANCISCO	Mills Building
VANCOUVER, B. C.,	Molsons Bank Building
LONDON, ENG.,	20 Bucklersbury, 368

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

### SUBSCRIPTIONS

Single Copies, 15 Cents.

United States, Canada, Mexico, yearly, 52 copies, in advance, \$5.00

Other countries in Postal Union, \$7.00

By Bank Draft, P. O. Order or Express on N. Y.

English Subscriptions Payable at London Office, £1 8s 9d

### CHANGE OF ADDRESS

Please give your old as well as your new address

### NOTICE TO DISCONTINUE

Should be WRITTEN to the New York Office in every instance

### ADVERTISING COPY

Should be at New York Office by 11 A. M. Tuesday of issue week

Copyright, 1902, by ENGINEERING AND MINING JOURNAL  
Entered at New York Post Office as Second Class Matter

### CONTENTS.

Editorial Notes.....	97
Cornellville Coke in 1901.....	98
Market Conditions.....	98
The Le Roi Mine, B. C.....	98
United States Mining Syndicate in Peru.....	99
*Oil and Gas in the Kansas-Indian Territory and Texas Fields.....	100
The Fourteenth Annual Meeting of the Geological Society of America..... <i>Edmund O. Hovey</i>	101
*Gold Mining in Egypt..... <i>Charles J. Alford</i>	103
Recent Progress in the Study of Ore Deposits..... <i>T. A. Rickard</i>	106
*The Gem-Jessie Copper and Silver Group at Butte.....	107
Gold in Hydraulic Tailings at Junction City, California.....	108
Recent Decisions Affecting the Mining Industry.....	108
Abstracts of Official Reports.....	108
Books Received.....	109
New Publications.....	109
Correspondence.....	109
Questions and Answers.....	111
Electrolytic Cyanide Vat.....	112
*Patents.....	112

\*Illustrated.

### DEPARTMENTS

Assessments.....	121
Chemicals, New York, Liverpool.....	124
Coins, Foreign.....	125
Dividends.....	121
Financial Notes.....	124
Imports and Exports of Metals and Minerals.....	125
Industrial Notes.....	114
Markets: Coal, United States and Foreign.....	122
Iron and Steel.....	123
Metals: Gold, Silver, Copper, Tin, Lead, Spelter, Antimony, Platinum, Quicksilver, etc.....	124
Minerals: New York, Liverpool.....	124
Mining News: United States and Foreign.....	114
Mining Stocks: United States and Foreign.....	121
Obituary.....	114
Personal.....	114
Prices Current of Chemicals, Minerals, etc.....	128
Schools, Technical.....	114
Societies.....	114
Stock Market Review: New York; Salt Lake, San Francisco, London, Paris.....	121
Stock Quotations.....	126, 127
Trade Catalogues.....	115

WHILE WE usually avoid references to business in this column, we make an exception now, to note that during December, 1901, a greater number of new subscriptions to the ENGINEERING AND MINING JOURNAL was received than before in one month in the history of the paper. This is significant and is also encouraging to the publishers. We hope to keep and pass the record thus established and to increase the value of the JOURNAL constantly to its widening circle of subscribers and advertisers.

THE EXCITEMENT of two years ago over gold mining propositions in the Dutch East Indies has largely subsided, but some solid results have followed. In several places in Sumatra and Borneo gold mining operations are being conducted with fair prospects of success. At Redjang Lebong, in Sumatra, a considerable production is reported, and the company is extending its operations. In Borneo several companies are putting in machinery, and development is also going on in Celebes. We note that machinery of American types seems to be in favor, though several of the mines are in charge of Australian engineers.

THE OPENING of a new group of mines in the Butte District is a matter of considerable interest. The district has been so largely and actively worked and so closely covered with claims that there seemed to be hardly any opportunity for a new group of mines outside of the Washoe property, which is supposed to be held in reserve by its owners. The new group, which is described elsewhere, seems to be a promising one, with many indications to warrant its owners in going on. We are informed that the larger proprietors of the mines or group referred to do not expect to have copper for sale, but intend to use the metal from these mines in the manufacturing establishments which they own or control.

EGYPT, which in all probability is the oldest mining country in the world, may take its place again as a producer of gold after an intermission of many centuries. Recent explorations in the desert section along the borders of the Red Sea have shown the existence of very ancient workings, and also the probability that some of these may be reopened with profit. Several English companies have been organized to exploit these mines, and their value will be thoroughly tested. An interesting article in another page describes the preliminary explorations, and shows what are the possibilities of the future. It is not unlikely that before long some of the mines which supplied gold to the treasury of the Pharaohs may be shipping bullion to London.

THE COMPOSITE nature of the working force in the anthracite coal mines of Pennsylvania is shown by the fact that under a recent act of the legislature copies of the anthracite mine laws of the State have been distributed free to all employees in the region. To reach all the men it was found necessary to translate these laws into seven different languages—German, Lithuanian, Slav, Magyar, Russian, Polish and Italian. The immigrants from central and southern Europe

have almost entirely replaced the American, Irish and Welsh miners who worked in the anthracite country less than a generation ago. The same conditions prevail almost to an equal degree in the bituminous coal mines of Western Pennsylvania. It is to this mixture of languages, the mine inspectors claim, that many accidents are due, the men failing to understand orders and directions promptly.

THE CABLE report that Mr. Whitaker Wright was under examination in the liquidation proceedings against his companies, recalls the fact that it is just three weeks over a year since the failure of the London & Globe Company upset the London Stock Exchange. The time which has passed shows how slowly legal proceedings move, and how settlement and reorganization can be delayed. It is only a few weeks, indeed, since the London & Globe was turned over to the courts, most of the intervening time having been wasted in vain attempts to reorganize the company and raise new capital, without having recourse to proceedings in litigation. The official liquidator—or receiver, as we should call him here—seems disposed to examine thoroughly into the company's affairs, and has already obtained a good deal of insight into the methods of the former managers. Some of this is of a nature to surprise stockholders who took shares as an investment, and have suffered accordingly. It is probable, however, that the larger part of the stock was bought for speculation rather than investment, and most of the money lost was by those who intended to sell their stock rather than to hold it—and held on just a little bit too long.

THE WAR in the Transvaal still drags on, but there are at least some signs of an approaching conclusion, and mining matters are assuming a more hopeful position. The number of companies allowed to work is being gradually increased and the return of mine employes to Johannesburg is reported as giving that town once more some appearance of activity. There was a considerable increase in the gold production from Witwatersrand mines in November, and a still larger gain was made in December, though the actual figures have not yet come to hand. The output, however, is still little more than 10 per cent of the amount turned out in the months preceding the opening of the war. The preparations now being made in the way of unwatering mines and repairing machinery promise a rapid increase as fast as the military restrictions are removed. It is quite natural that the companies should be eager to resume work and to begin once more to earn something on the capital which has been idle for over two years past. This locking up for over two years of the enormous amount invested in Transvaal mines has had a most injurious effect on British business; and its restoration to activity is very likely to be followed by something like a boom. The improved conditions are shown by the fact that preparations are being made to reopen the Sheba Mine, the first mine outside the Witwatersrand where there has been any attempt to do any work since 1898.

COPPER production, as stated by Mr. John Stanton, who acts as statistician for the companies, showed a further drop in December. The total re-

ported for that month from mines in the United States was only 19,803 tons, which is the smallest output for any month in 1901; it was 1,925 tons less than in November, and 2,321 tons less than in December, 1900. The falling off was due in large part to stoppages in the Butte District, as we have already noted. This small output in December and November has resulted in a decrease for the first time in years, the total reported by Mr. Stanton for the year 1901 being 265,255 long tons of fine copper; which is less than the report for 1900 by 3,632 tons. This decrease was all in the last quarter of the year, the production in 1901 having been practically the same as in 1900 up to the end of October.

The foreign reporting mines, which include all the important European mines, increased their production last year. Their total for 1901 was 91,785 tons, which was 1,454 tons more than in 1900. This increase seems to have been quite generally distributed among the reporting mines.

There was a large increase in copper exports from the United States in December, and the shipments for that month exceeded those of any other in 1901. Even with this increase, however, the total for last year was only 90,366 tons, showing a decrease of 69,198 tons, or 43 per cent, as compared with 1900. In other words, we exported in 1901 only 34 per cent of our copper production, while the proportion in 1900 was 59 per cent.



#### CONNELLSVILLE COKE IN 1901.

The *Connellsville Courier* of January 10 contains that paper's annual review of the Connellsville coke trade for last year. The *Courier's* estimates are carefully made and are accepted as trustworthy by all familiar with the industry. According to the reports to the *Courier*, the production of coke in the Connellsville region in 1901 exceeded that of 1900 by 25 per cent and attained the enormous total of 12,609,949 short tons. There was a reaction, however, from the high prices of the preceding year, and the total value of the product in 1901 was nearly \$3,000,000 less than that of 1900, the figures being respectively, 1900, \$27,448,832, and 1901, \$24,589,400. The average price per ton declined from \$2.70 to \$1.95. During nine months of 1901 the production continued at an average of over 1,000,000 tons per month. March made the record of the year, the shipments in that month amounting to over 1,150,000 short tons. The three months in which the shipments fell below 1,000,000 tons were January, February and December. December's production would have been on a par with that of the heavier producing months but for the congested condition of the railroad traffic and the inability of operators to secure cars. There had been no falling off in the demand for coke, but on the other hand a number of furnaces were compelled during December to close down for want of it.

Something over 25 per cent of the total Connellsville product is consumed in the vicinity of Pittsburg, while a little more than half is shipped to points west of Pittsburg. A feature of the Connellsville coke trade last year was the increased output per oven. This is shown by the fact that while the production increased fully 25 per cent, the number of ovens in blast in 1901 was only 5 per cent more than the number in blast in 1900.



#### MARKET CONDITIONS.

While the iron trade continues extremely active, a slight halt in production must be noted, chiefly due to the railroad and other troubles to which we have

already referred. The production of pig iron, as measured by the capacity of the furnaces in blast, dropped from about 325,000 tons weekly on December 1 to 299,000 tons on January 1. This loss was largely the result of the enforced banking or blowing out of furnaces which could not secure their supplies of ore and coke in time. As noted elsewhere, the car supply is now improving, and it is quite possible that the loss which is shown in the furnace production will be made up before February 1. Purchases of pig iron in the Pittsburg and other markets continue heavy, and buyers are now contracting for the second half of the year on a scale which shows little apprehension for the future.

In finished iron and steel fewer heavy contracts are noted, although the volume of small orders continues large, especially for structural material. The wire people have been holding a conference, the first result of which appears in an increase in the price of nails.

The anthracite coal trade shows no special change; the demand is excellent and the supply of coal going forward is only fair. In the Northwest buying has been very brisk and the movement from the docks is active. In Chicago territory trade as a result of the milder weather is quieter. The tributary districts taking dock coal, however, report a good demand. All-rail coal is in better supply and the market for it is less active. The total amount of anthracite coal on dock at Chicago on January 1 is reported as 170,000 tons larger than on January 1, 1901, and 57,000 tons less than on January 1, 1900. At eastern points coal is wanted and all-rail trade is in good shape. At all points along the Atlantic seaboard the market for anthracite is still strong and prices very firm, particularly for the steam sizes.

In the Atlantic seaboard bituminous trade conditions improve slowly. Though demand is normally rather small at this season of the year, consumers at Long Island points are still in more or less distress for coal in spite of the efforts of producers at relief. The car shortage, or lack of motive power, which has been the controlling factor in market conditions for several months, shows some improvement, but is not yet sufficient to satisfy producers. There is still a good demand for coal at points beyond Cape Cod, and in the all-rail trade. At New York harbor demand is easier and speculative prices for coal at the shipping ports have fallen.

The Western coal trade is improving with the better conditions on the railroads. The main point of interest in this trade at present is the approaching meetings at which the mining rate for the year beginning with April will be fixed. The United Mine Workers in the Pittsburg District have resolved to ask for an increase of 6½ cents a day in the mining scale. The operators will doubtless, as usual, oppose any increase and the result will be a compromise rate.

The copper market continues demoralized. Further cutting in prices is reported, but buyers continue to hold back, purchasing only for their immediate needs. As noted elsewhere, the statistical report for December shows a further fall in copper production in the United States. The starting up of the Boston & Montana works at Butte will doubtless make some change in this condition in the present month. Meantime, matters continue too uncertain to afford any satisfactory basis for the trade.

In other metals there is but little change to be noted. Business in lead continues fair, and that in spelter very satisfactory. Silver prices are somewhat firmer, chiefly on account of increased buying for the East. The demand for silver for India continues good, and orders from China are on the increase.

#### THE LE ROI MINE.

We have heretofore frequently referred to the Le Roi Mine, which has been considered one of the most important mines of the Rossland District, and, indeed, of all British Columbia. The unfortunate complications in which the company became involved while under the control of Whitaker Wright and his associates have already thrown more or less discredit upon the company's operations, to which it is not necessary to refer here at length, since they have already been sufficiently discussed. It will be remembered that when the company recently passed out of the Wright control and new directors were chosen, Mr. R. J. Frecheville, a well known mining engineer, was commissioned by the new board to make a full examination of the property and to report on its present condition, and, so far as possible, on its future. He was given full authority to make such changes as appeared necessary in the former management of the mine, and also undertook a full examination of the old accounts. Mr. Frecheville went out to British Columbia on October last and at once took possession. One of the first decisions was to remove Mr. Bernard McDonald, who had been general manager of the property, and to undertake the duties of the position himself for the time being, although later Mr. J. H. Mackenzie was appointed manager. His preliminary report on the mine has now been issued by the company and the stockholders are able for the first time in several years to have some estimate of the present and prospective value of their property.

In the first place, the report finds that the profits obtained from the Le Roi Mine during the period from February 15, 1899, to June 30, 1901, amounted to \$1,096,285. With the exception of about \$160,000, which is represented by cash and stores on hand, this sum has gone into the mine and plant, the larger part of it being used in new machinery and equipment, a comparatively small amount for mine development, and \$300,000 for the purchase of outside interests in the Northport Smelter, where the ore from the mine is treated. There are, however, two items suggestive of the methods of the former managers; these together amount to \$118,660, and are made up of cash advanced to the Le Roi No. 2 and to the Rossland Great Western companies, which were also under the control of the Whitaker-Wright management. Nothing is said about any security for these claims, although they appear in the list of assets. The company's stock of ores, matte and other material on hand is valued at \$999,107, but all of this is pledged as security for loans amounting to \$974,750 obtained from the Bank of Montreal. The surplus on hand November 30, when the accounts were finally closed before making up the report, was only about \$40,000, and this may be taken to represent all the assets of the company outside of the mine and smelter.

For the year ending June 30 last the total quantity of ore taken out of the Le Roi is given at 202,583 tons, all of which was shipped to Northport. The average gross value of this ore was \$13.16 per ton, including copper, gold and silver values. A careful analysis of the working costs shows that during the same year the average expenses were \$4.14 for mining, \$0.51 for freight from mine to smelter, \$4.83 for smelting ore, and \$1.23 for shipping and refining the matte. This makes a total working cost of \$10.72 per ton, and an approximate profit of \$2.44 per ton. Mr. Frecheville, however, characterizes the past management as loose and extravagant, and believes that great reductions can be made in the costs of both mining and smelting. The total, he thinks, ought not to exceed \$9 per ton. This reduction will, in fact, be necessary if the mine is to be operated hereafter at a profit, since the average grade of the ore shipped in the year under consideration was



\$13.16; for the last five months of that year it was only \$11.80, indicating that the best of the resources had been selected, so far as possible, and shipped. The ore mined since January 1 of the present year has averaged about \$11.60. The Le Roi ore, as is well known, is of comparatively low grade, the report giving the average of a large number of samples taken in the mine at 0.35 ounce gold, 0.6 silver and 1.33 per cent copper.

In addition to the smelting ore which has been shipped there is at the mine a considerable accumulation of low grade ore, bearing from \$5 to \$7 a ton, on the dump at the mine. This quantity is being increased monthly and its value has been somewhat reduced and rendered uncertain by the fact that it is largely mixed with waste rock which has been from time to time dumped with it instead of being kept separate. Last year some 10,000 tons were sold to the Trail Smelter to be used as a flux for lead ores, but the quantity which can be sold in the future is doubtful. It is recommended that some plan for the treatment of this low grade ore be adopted and experiments are now in progress.

As to the property itself, Mr. Frecheville says that of the two claims and three fractional claims owned by the company, the developments made are wholly on the Le Roi claim, which is 1,500 feet long on the strike of the veins. This claim was located and is now held under the old British Columbia law, which was similar to the United States law, and under which the vein can be followed down indefinitely without reference to the side lines of the claim. Outside of the Le Roi proper very little ore-bearing ground has been found, although some exploration work has been done. The mine itself has been opened by two shafts, one of which is down to the 900-ft. level, while the other has reached the 1,050-ft. level. The first mentioned shaft is not now used and will probably never be used again, as from its location and the present condition it would not be of advantage to use it as a working shaft. The second shaft is a five-compartment, inclined shaft, and is a good piece of work, although it is believed to be unnecessarily large. So far as explored, the ore body is about 745 feet long at the 500-ft. level, increasing to about 900 feet at the lower levels, but apparently diminishing somewhat in value with depth, although the report does not expressly state this.

Of the very important question of the quantity and value of the ore reserves, Mr. Frecheville says that no proper assay records had ever been kept, and that the information given him was misleading, so that he found it necessary not only to take a very large number of samples, but to prepare a complete set of assay plans. This work necessarily occupied a great deal of time. His conclusion is that down to the 500-ft. level the ore has been largely worked out, a few small blocks remaining which amount altogether to about 80,000 tons, having an average value of \$10, or a little over. Between the 500 and 600-ft. levels there are some 27,000 tons of a higher value, apparently about \$13; but in many places the ground is badly caved, and it is doubtful whether this ore can be mined except at a loss. From the 600-ft. level down to the 900-ft. level he estimates about 425,000 tons of a value not far from \$11. On what is known as the South Vein there is about 72,000 tons of ore, varying in value from \$6.40 to \$9.30. His total estimate is 604,840 tons of ore, and an average assay value of \$10.36. From this, however, there should be deducted, say, 121,000 tons, or about 20 per cent, for waste and low grade ore, leaving a balance of about 484,000 tons of shipping ore, estimated to contain a value of \$5,626,000, or about \$11.75 per ton. On the basis of the costs the past year this would leave the very small profit of about

\$1 per ton, and the prospect would not be very brilliant unless the reductions in costs which the report assumes can be made.

In passing, the report refers to some useless work which has been done: thus, for instance, at the 900-ft. level, a cross-cut was driven for 870 feet and paid for by the Le Roi Company, but the sole purpose of this work seems to have been to develop the Le Roi No. 2, which was afterwards floated as a separate company.

The mine equipment is generally good, the mine shaft being supplied with a massive head gear 85 feet high, with first-class crushing, conveying, assorting and sampling machinery, all driven by electric power, while there is also an aerial tramway leading to the ore bins. On the railroad there are two hoisting engines of modern type with boilers, air compressor plant and other accessories. The plant is good, but Mr. Frecheville believes that it is out of proportion to the capacity of the mine, that there is much unnecessary machinery, the money for which might much better have been employed for other purposes. Some instances of this extravagance are found in the fact that a fine engine and an electric generator which were purchased have never been used; while in addition to the compressed air pumping plant, which has proved quite sufficient, two large electric pumps and motors were purchased, but have never been used. In the same way, new skips were bought for the old shaft which were not and never will be needed; while cages for the new shaft were bought and brought to the mine, but they have proved unacceptable and were thrown aside.

The ore from the Le Roi is treated by the Northport Smelting and Refining Company, which is at Northport, on the Washington side of the International Line, and is nominally a separate company, the stock in which is the property of the Le Roi Mining Company. These works have five water-jacket copper matting furnaces and three calcining furnaces, with other machinery. Another copper matting furnace is ready for erection and when completed will give the plant a capacity of about 1,500 tons of ore per day. The records kept at the smelter have been very imperfect and it is difficult to arrive at any exact figure as to profits made. There seems also to have been carelessness in sampling and assaying, so that it was at times difficult to say what results were being obtained or how the smelter was working. The metallurgical work, Mr. Frecheville thinks, has been very bad: the ore has been smelted by using a strong blast and a high percentage of coke, but doubtless at much extra cost and with a great loss in flue dust—just how much will probably never be known. Several instances are given to show the careless management; and the same extravagance in purchasing unnecessary machinery was shown here as at the mine. Mr. Frecheville has placed in charge a new manager, Mr. Oscar Szontagh, a well known metallurgist, who has already made considerable improvement, reducing the smelting cost and obviating much loss in handling and in flue dust. He has also reduced the consumption of coke considerably without lessening the quantity of ore smelted. As the coke used has cost \$10 per ton, delivered, any reduction in quantity means a considerable saving. When the Great Northern Company completes its branch into the Crow's Nest Coal-field, the cost of coke will be considerably reduced.

The report discusses somewhat plainly the vexed question of the miners' strike at Rossland. Mr. Frecheville believes that this was due in large part to the injudicious action of the late manager of the smelting works where the strike first commenced. He is of opinion also that in the present condition of affairs it is necessary to fight out the matter and

to refuse concessions to the Miners' Union. At the present time nearly enough men have been secured to carry on operations, and to give up at the present time would mean a complete surrender of the management to the Miners' Union, with the probability that new and unreasonable demands would constantly be coming up.

The future of the mine depends largely on the results to be obtained by development work to greater depth. As will be noted above, the ore reserves already in sight will supply about three years' work at the same rate as was reported last year. Beyond that much will be determined by the developments made in sinking the shaft from 1,050 to 1,200 feet, which is now in progress. The stockholders, therefore, have some hope of a future, though they will hardly be comforted by Mr. Frecheville's conclusion that with a careful and judicious management they might have received dividends from the time of the organization of the present company. In more judicious hands and with careful management we believe that the Le Roi can maintain its place as an important mine.



#### UNITED STATES MINING SYNDICATE IN PERU.

Mr. Neill, secretary of the United States legation at Lima, under date of November 25, 1901, reports the formation of an American syndicate, with headquarters in New York City, for the purchase and working of copper and other mines in Cerro de Pasco, Peru. He submits the following statistics regarding this district:

Cerro de Pasco is situated 14,300 feet above the sea level at a distance of about 220 miles from the Port of Callao. The ores of this district contain gold, silver, lead, and copper. The amount of silver coined, smelted, and exported from Peru, from 1786 to 1850, was 285,613,796 ounces, of which 161,451,731 ounces were from Cerro de Pasco alone. The exportation of copper ores from Cerro de Pasco in the year 1900 was 11,944.2 metric tons, besides 5,138 tons of copper bars.

The construction of a railroad from Oroya to Cerro de Pasco would be a most remunerative investment, as the proposed freight of 24 soles (\$11.66) per ton, instead of the 70 or 80 soles (\$34 or \$39) now paid for the same amount on the backs of llamas, would allow a quantity of ore to be exported which is at present impossible. There are coal mines at a distance of 22 to 31 miles from Cerro de Pasco, and a narrow-gauge railway is about to be constructed, which will allow this mining district to obtain coal at about \$3.88 per ton, instead of paying, as at present, \$24.85 per ton. Up to the present time, the American syndicate owns five-sixths of this district, having acquired 480 mines.

It is reported that another syndicate is being formed for the purpose of securing and working the rich copper mines in the Yauli District, 120 miles from the port of Callao, at 13,400 feet above the level of the sea. These mines are in the immediate vicinity of one of the stations on the Trans-Andine Railroad, begun a quarter of a century ago.

**MINING ACTIVITY IN ALGERIA.**—A recent British consular report regarding the mineral industry of Algeria says that much is heard about the reopening of the Filfila iron mines, and a firm has applied for the concession to build a railroad from the mines to the port. Permission was granted, but the work has not yet commenced. Exploitation of one of the mines will probably begin shortly. The extension of the phosphate business has not progressed as it should, owing to the governmental decree against British capital. The powerful company working the four beds of Tocqueville, Aür Kissa, Dyr and Kollif, will use every means to prevent others from operating in their country.

### OIL AND GAS IN THE KANSAS-INDIAN TERRITORY AND TEXAS FIELDS.

The United States Geological Survey has just issued a bulletin on the Kansas-Indian Territory and Texas oil and gas fields by George I. Adams. The bulletin is divided into two parts; the first discusses the occurrences of oil and gas in the formations of the Western Interior and Northern Texas coal fields, and the second those in the Upper Cretaceous and Tertiary formation of the Western Gulf coast. With the exception of the locality of Beaumont, Texas, the development of the oil and gas resources in these fields has been a steady growth. The remarkable strikes at Beaumont during the last year, however, have attained a sudden prominence and hold a conspicuous place in the history of the petroleum industry. During the present activity in these oil fields there has been a demand for information concerning the geological structure, and the conditions of occurrence of the oil along the Gulf coast, and it was to meet this that the Geological Survey has issued this bulletin.

**The Coal Measures Field.**—The gas and oil of the Coal Measure field is found in commercial quantities in southeastern Kansas and northern Indian Territory at localities shown on the accompanying sketch map, which is adapted from the report. The most important portion of the gas field is at Iola, Kansas, where the gas is used in extensive lead and zinc smelters, cement works, brick-kilns and factories, in addition to supplying light and fuel for domestic purposes. The oil industry centers in Neodesha, to which point the supply is shipped, or piped and refined. Outside of the towns adjacent to the refinery, Bartlesville in the Indian Territory, furnishes a commercial quantity. Both oil and gas in valuable amounts are found at a number of localities which are mentioned in detail in the report.

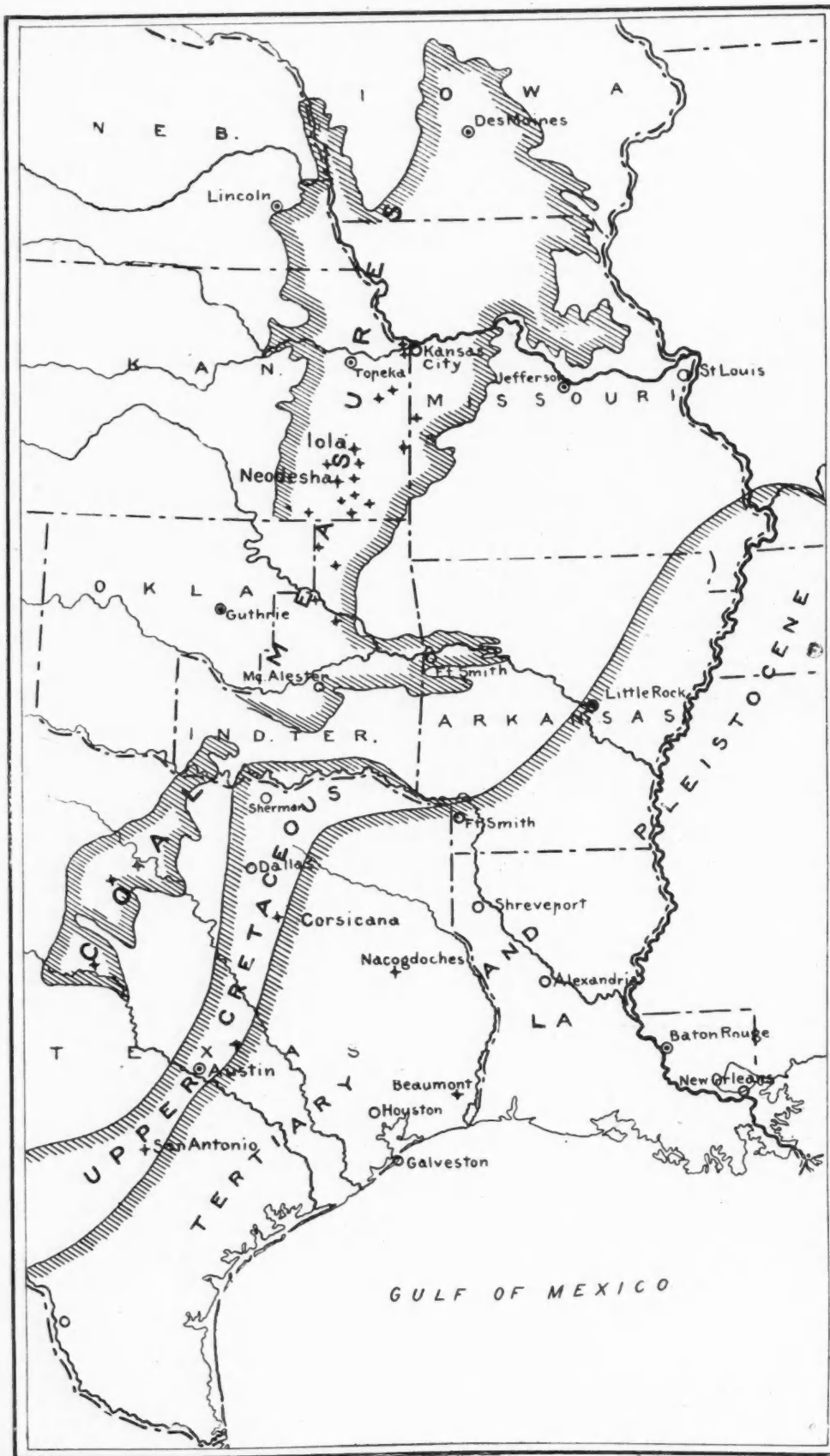
Thus far Iowa has not produced any oil or gas with the exception of small flows of gas from the glacial deposits, and these are of sporadic occurrence. In Missouri the productive localities are along the western border adjacent to the Kansas field. In Kansas they extend from the vicinity of Kansas City to the southern border of the State. This belt continues in the Indian Territory to the Arkansas River. In central Indian Territory and western Arkansas some prospecting has been done which has met with encouraging results. In the Texas Coal Measures thus far only limited amounts of oil and gas have been found, but they appear to justify further prospecting.

The structure of the productive field as is shown by a special geologic map and sections, is of the simplest type. The formations have a gentle and quite uniform dip to the northwest. Along the eastern border where the beds outcrop, there are seeps of maltha and small pockets of gas. The valuable deposits are found in the imbedded portions of the formations, which, to the westward are covered by the overlying rocks, and occur in sandstone of apparently limited extent, which are sealed in by shales. Thus far anticlinal or terrace structures have not been demonstrated to govern the position of productive localities, although there are no doubt slight variations in the general deformation of the field. In central Indian Territory and Arkansas the rocks have a folded structure, and prospecting there should be carried on with this fact clearly in view. In the northern Texas Coal Measures the structure is in general similar to the Kansas-Indian Territory field, but has not been studied in detail.

**The Upper Cretaceous Field.**—The principal occurrences of oil and gas in the Upper Cretaceous rocks of Texas are at the localities of San Antonio, Elgin, and Corsicana, and at the latter place gas is found and utilized. The Corsicana oil-field is of commercial importance and a refinery is located there. The formations in which these deposits are situated have the form of rock sheets dipping toward the Gulf coast. They outcrop in a

belt extending from Arkansas through the Black Prairies of Texas to the Mexican border, showing considerable variation in their lateral extent. To the southeast of their outcrop they are buried by Tertiary and Pleistocene deposits, and although they probably extend for some distance with uni-

found dip about 50 feet to the mile toward the southeast, and are enclosed in blue clay shales which serve to seal in their contents. There are two divisions of the field which represent different productive horizons. The oil in these divisions differs somewhat in gravity. The product of the



SKETCH MAP OF THE KANSAS, INDIAN TERRITORY AND TEXAS OIL-FIELDS.

form relations, they are known from their appearance in outlying areas within the Tertiary, to have suffered considerable disturbance in the Gulf region. The Corsicana field is on the border of the outcrop of the Cretaceous beds and has a regular structure. The sands in which the oil and gas are

Corsicana field is refined and sold in the adjacent markets. The gas is utilized for domestic purposes and by small industries.

**The Tertiary Fields.**—The Tertiary formations which border the Gulf coast, consist largely of unconsolidated sediments and are difficult to study



because of their consequent meager outcrops and their lithographic similarity. The low relief of the country and the mantle of surficial deposits, renders difficult the solution of problems connected with the occurrence of oil and gas. The general relations of the Tertiary formations are pointed out in the report and it is shown that they form an overlapping series lying discordantly upon the Cretaceous floor and with the youngest deposit adjacent to the coast. There is very little definite information concerning the details of their underground relations. The source of such information are the records of artesian wells and prospect holes, and it is necessary in studying these to have



A GUSHER IN THE BEAUMONT FIELD.

the fossils which are obtained in the cutting. These are seldom preserved, and in some cases are not found present in sufficient numbers to determine the age of the beds.

Occurrences of oil and gas have been reported from nearly every formation in the Tertiary and in widely scattered localities. The surface indications of oil are seeps of maltha or heavy oil and are found where the productive horizons outcrop. The valuable deposits occur where the oil-bearing formations are overlain by a sufficient thickness of sediments to seal in the oil, and surface indications of these reservoirs are usually lacking. In the case of finding oil at a depth in the Texas field, it may be generally assumed that the strata which contains it outcrops at a considerable distance inland. This is due to the general southward dip,

The local structures of the field are not readily apparent. A short synopsis of the theories, both fanciful and scientific, which have been advanced concerning the nature of the deposits at Beaumont, is given in the bulletin, and the statement is made that it appears that the sand which contains the oil is a local bed somewhat in the nature of a beach deposit or sand spit, occurring between beds of clay, and now deeply buried by subsequent formations.

The production of oil in the Tertiary fields of Texas is limited to a few small wells at Nacogdoches, which produce a heavy grade of oil used for lubricating purposes, and to the supply from the Beaumont field. The first well at Beaumont was struck on January 10, 1901. On June 15th, there were eleven producing wells adjacent to the first strike. It is pointed out in the report that the area of the productive field at Beaumont is limited to Spindletop Heights. This fact has been recognized by those promoting the oil industry and has led to the subdivision of the tract into small lots, and the location of many wells over the common reservoir. There are at the present time over one hundred wells, all situated within an area of about one-half of a square mile. The production of the first well was estimated at 70,000 barrels per day, which is indeed phenomenal. The wells when completed have been shut in as soon as possible, and the oil stored in tanks. The actual production of the wells has accordingly been equal only to the commercial demand. The Beaumont petroleum contains some sulphur and only a small per cent of volatile oils. It is therefore not refined, but goes on the market as a fuel oil.

Naturally there is considerable interest in the question of the actual amount of oil in the Beaumont field. If all the wells now completed were allowed to flow, it would be but a question of a very short time until their production would perceptibly diminish. This should not be lost sight of in connection with the fact that the estimated possible and actual production has been steadily increasing, with the development of the field and the adapting of furnaces to the use of oil as a fuel.

In addition to the general information which is contained in the bulletin, there are valuable geological maps and data of a scientific nature. An interesting question which is discussed, is the association of petroleum, sulphur, gypsum, and rock salt in the formation along the Gulf coast of Texas and Louisiana.

At present prospecting is being carried on at a number of places adjacent to the coast, and it is not improbable that new localities may be developed and further deposits of oil found in the same general horizons as those now known.

**QUARRIES IN ITALY.**—In the province of Florence, Italy, there are 202 stone quarries in actual work; 4 of these are serpentine, 5 calcareous stone, 2 grind-stone, 5 fireproof stone, 3 calcareous tuff, 170 arenaria—a hard, gray stone for olive presses—11 building stone, and 2 majolica earth. Serpentine and arenaria are used for architectural purposes, calcareous stone for street paving, and tuff for common building purposes.

**A NEW ACETYLENE GAS GENERATOR.**—The London *Engineer* says that a new acetylene gas generator has been invented at Trollhatan, Sweden. The falling of the carbide into the water is automatically regulated by a rubber ball, which, as soon as it is filled with gas, closes the valve between the carbide and the water. When the volume of gas decreases, the ball contracts, and the feed valve again permits the carbide to drop. The gas is stored partly in the ball and partly in the space between the funnel-shaped carbide magazine and the water. If much gas is generated, the water is pressed through valves into the water jacket in the sides of the apparatus, thus furnishing more room for the gas.

#### THE FOURTEENTH ANNUAL MEETING OF THE GEOLOGICAL SOCIETY OF AMERICA.

By EDMUND O. HOVEY.

The fourteenth annual meeting of the Geological Society of America was held in Sibley Hall of the University of Rochester, N. Y., from Tuesday, December 31, 1901, to Thursday, January 2, 1902, under the presidency of Mr. Charles D. Walcott, Director of the United States Geological Survey. The meeting was well attended, especially in view of the fact that the place of assembly was a distance from the great centers of geological activity, and the interest in the sessions was well sustained to the end of the programme. Thirty-six papers were presented to the society at this time, ten of which were read by title only, on account of the absence of their authors, but the remainder were delivered in full and were actively discussed. Several papers of interest to mining men were on the preliminary programme, but some of them were read only by title.

The chief interest of one of these meetings centers about the address of the president. Dr. Walcott chose for his theme "The Outlook of the Geologist in America," and gave the society a brief resumé of the work which has been accomplished in geology in this country, that which is now under way by professional workers in the science, the problems which await the student in the several lines of investigation in geology, and the means at hand for carrying on the work. He said, in part:

"I am often asked by young men, 'What are the prospects for me if I take up geology as a profession? Is there work to be done and money to pay for it?' These questions have led me to think and to institute inquiries among active workers in American geology. I shall try briefly and, consequently, inadequately, to characterize the scope and quantity of this work.

"Let us first note what has been done during the year just closed. I shall attempt to include only what may be called professional work, the work of geological surveys and museums, and of men whose researches are sustained, in whole or in part, by the funds of educational and other institutions.

"Foremost among the organizations and institutions which have sustained professional work are the national and State geological surveys. The United States geological survey, including in its purview the whole country, gave continuous employment to thirty-six geologists and paleontologists, and availed itself temporarily of the services of about fifty geologists, paleontologists and mining engineers. For the services and direct expenses of these officers and collaborators, it expended the sum of \$175,000.

"A still larger sum was devoted to accessory work of various kinds, to the chemical analysis of rocks, to chemical and physical researches bearing on geologic problems, to the making of topographic maps on which to delineate geologic boundaries, to clerical and other aid connected with the indoor work and business management of the organization and to the publication of reports and maps.

"The organization was also charged with the administration of investigations not regarded as auxiliary to geologic work, but, rather, as involving the practical application of geologic data, the chief of which being inquiries as to water supply with reference to irrigation and other utilities and the survey of the forest lands with reference to their protection and management.

"During the year 1901 the geological survey of Canada had thirty geologists in charge of parties or pursuing investigations independently of each other in the field. Geologic reconnaissance and surveys were made into several of the little-known areas of the dominion, and geologic studies of the occurrence of coal, copper and the precious metals and other economic resources were presented in the different districts.

"The State of New York, in continuation of the great scientific survey which gave to American geology its stratigraphic and faunal standards, maintains a bureau of paleontologic work and another for

geologic, and makes provision also for the preparation of a topographic map suitable for the refined delineation of geologic boundaries."

Mr. Walcott then went on to state in some detail the geological work which is being done by geologists in the employ of the different States, universities and colleges. Some idea of the immense activity along these lines may be gained from the fact that 21,600 pages on American geology were printed in 1899. Of this great number, 12,000 were published by State and national surveys, 1,700 by geologic journals, 2,000 by other journals, 500 by the Geological Society of America, and 5,400 by other associations and institutions. His remarks on the subject of economic geology will be of especial interest to the readers of the *ENGINEERING AND MINING JOURNAL*.

The value of geological training in economic work is so obvious as to scarcely need mention, yet only recently has this fact been generally recognized by the large mining interests, and the economic field open to the geologist is almost a virgin one, when the magnitude of the mineral industries is considered. Formerly the technical training of the engineer was supposed to meet all requirements. Nowadays the larger interests are not without a "mining geologist," who is consulted on the larger affairs pertaining to the mines, while the technical engineering work, measuring drifts, surveying the properties, etc., is done by the "mining engineer," who receives smaller pay and has less power than the mining geologist.

The iron ore industry is one of the greatest of our mineral industries. Largely because of our tremendous advantage in the raw supply, the United States is already leading the world. While many of the major problems in the geology of iron ore have been settled, there still remain to be solved problems pertaining to the distribution, structure, origin and chemistry of the ores which will be of great importance to the industry. Among these are the laws controlling the distribution of phosphorus in ores, the element which gives more trouble than any other in furnace practice, the laws governing the "texture" of the ores and the distribution of the low grade ores known to occur in many parts of the United States.

The development of the fuel resources of the country is perhaps the most important problem of the present day. In the investigation of any coal field the geologist is confronted by three problems which must be solved to make his report of definite value:

1. The determination of the character and thickness of the coal beds and of their position in the geologic column.
2. The determination of the geologic structure of the field, or, in other words, the "lay" of the coal.
3. The areal distribution of the coal.

In the Appalachian coal fields, in Pennsylvania and Ohio, the general succession of coal beds, their character and areal distribution are fairly well known. The same may be said of Maryland and of parts of West Virginia, but in the latter State there are large areas in which the coal beds are not well determined. In Virginia they are largely unknown, and in Tennessee there are large areas in which such information is either lacking or unreliable. In Georgia and Alabama the succession is supposed to be pretty well known, but there is some doubt also about some areas in these States.

In regard to the second problem, there is much less information available than there is regarding the first. In a broad way the structure of the Appalachian field is known, but for practical purposes much more detailed information is necessary. Mr. Walcott regards this as one of the most important factors in the future work of the geologist in the Appalachian, and in fact in every coal field. The structure should be determined with such accuracy that all minor structural features could be shown, not only as to their geographical extent, but also as to the amount of vertical disturbances. With this

problem solved, the exploitation of a field may be carried on in the most economical manner, and thousands of dollars of wasted energy expended in the haulage of coal or pumping of water, may be avoided.

In the coal fields of the Mississippi Valley the problems are the correlation of the coal seams and the extent and distribution of the coal-bearing strata. In Indiana, Illinois and Kentucky, the solution of these problems is complicated by the known unconformity which occurs at the base of the Coal Measures. In the southern part of the field, in Indiana and Kentucky, it is further complicated by normal faulting. The coal areas of the Indian Territory and Arkansas have been developed within recent years, and important stratigraphic problems have been found in the region. Ten thousand feet of Coal Measure strata have been uplifted with the Ouachita range, which are older than the lowest Coal Measures of the northern extension of this coal field. Has the remarkable thinning of the strata definite relations to similar phenomena in related strata between the northern and southern Appalachian fields? The extent and location of the land areas from which these sediments were derived are unknown.

The coal fields of the Rocky Mountain region occupy two belts, one along the eastern base and the other, and less extensive, along the western base of the Rocky Mountain uplift from Montana to New Mexico. Between these two belts, in the Park region, are numerous isolated coal basins. In all these areas the coals are generally bituminous. Eastward from the Rocky Mountains coal-bearing strata underlie large areas of the Plains region in Montana, Wyoming and the Dakotas. In these fields the coals are chiefly lignites and are important only as a source of fuel for local use. It has been roughly estimated that the anthracite-bituminous areas of the Rocky Mountain region extend over an area of 43,000 square miles and the lignite areas of the Plains region, one of 56,000 square miles.

But little is known of the geological relations of the coal-bearing strata, which are mostly of Cretaceous age, or the probable extent of the workable coals or the structure of these areas. Nearly all the problems which are to be considered in the investigation of this subject are unsolved.

The coals of the Pacific States occur in strata of Tertiary age. They are in great part of a lignitic character. Some of the coals are coking coals, others are excellent steam coals, and still others are adapted only for near-by consumption. Washington ranks first as a coal producer, while California and Oregon are unimportant factors. It is estimated that at present nearly a million tons of coal annually reach the San Francisco market from these States. The coal fields, so far as they have yet been traced, are limited in extent and are widely separated. In Washington the coal occurs in a series of sandstones and shales of Eocene age, which have a total thickness of 10,000 feet. In California and Oregon the coal-bearing strata are also of Eocene age, but the thickness of the series is 1,000 feet or less. Comparatively little detailed geologic work has been done in these areas. The extension of the coal-bearing series into regions other than those where they are now being worked, and the correlation of workable seams are the most important problems for the future.

The problems which are characteristic everywhere regarding the occurrence of oil and gas are: the variations in character and thickness of the oil and gas-bearing beds, and their geological structure. Detailed studies are now in progress in Ohio to test the correctness of the anticlinal theory of the occurrence of oil in this region. In Michigan and Kansas the oil-fields are being studied by the State geological surveys. In Texas the oil and gas-bearing beds occur in formation ranging from the Devonian to and including the Tertiary. The important problems relating to the distribution, thickness and character of the Tertiary and Cretaceous sediments and the geologic structure are all yet to be determined. In Wyoming the oil and gas bearing beds have about the same geologic range as those in Texas, and prac-

tically the same problems are awaiting solution. In California oil, gas and asphaltum occur at various localities in the Coast Ranges and in the foot hills of the Sierras in Kern County. The geological formations yielding oil range from the Pleistocene to the lower Cretaceous. The distribution of the oil bearing strata and the detailed structure of the region which would serve to indicate the lines along which remunerative wells may be found are the prominent problems.

In studying the problems connected with the occurrence of metallic ore deposits, the determination of their continuation in depth is of general interest. The popular conception that the source of the material being at great depth, the ores should become richer as you approach that source, is untenable. Definite results of recent studies of ore deposition show that this theory is without foundation, and that the reverse is generally true below moderate depths. The cause of this phenomenon is being sought, and has already been practically established. The terrestrial chemistry of ore deposits is one of the most important problems and requires investigation in many regions. The geological conditions under which ores were originally deposited, whether they are all forms of concentration by aqueous solution, or in part concentration from eruptive magmas, are all subjects for continued study. The most important factor in this, as in every investigation, is, that it should not be subordinated to preconceived ideas. Every fact should be noted, even though no explanation of it is afforded. These statements are especially true with regard to a study of the occurrence of the precious metals and copper.

In closing, Mr. Walcott discussed the training of the men who will probably reap the largest results from the great opportunities in geology that will be offered during the century. The practical economic geologist will undoubtedly receive the largest financial returns, but in this field, the well-balanced man with the broadest, most thorough training will win out as competition becomes more and more keen. In the more purely scientific lines, a broad, general culture should be the ground work for special geologic training.

A few months' business training will be almost invaluable to any student who aspires to be more than a directed assistant throughout his career. Business method and habit must underlie all successful administrative work, whether it be of a small party or a great survey. It is needless to say that, as in modern business life, character of the highest standard is essential to permanent success and reputation. To the well-balanced, well-trained student the outlook in geology in America is most encouraging. It is far more so than when Mr. Walcott himself began work with an honored leader in American geology, James Hall, a quarter of a century ago.

In a paper on the "Geological Horizon of the Kanawha Black Flint," I. C. White, of Morgantown, W. Va., stated that the formation had been first described by W. B. Rogers, though Franklin Platt was the first one to apply a local name to the 600 feet of beds below the Pittsburg coal horizon, which are often called the "Barren Measures." Platt's name for the beds was the "Conemaugh series." Dr. David White has attacked the problem of the stratigraphy of the Conemaugh beds from the standpoint of palaeobotany, and has reached very different results from those of the author of the present paper. Dr. White says that the series cannot be higher than the lower Kittanning coal, while Dr. White puts it even above the Allegheny series. Last summer Dr. White began at the Pennsylvania line and traced the beds southward and southwestward through West Virginia, making hundreds of sections and establishing his previous determinations, Dr. White lays down as principals: (A) That some coal beds can be traced or identified for long distances. (B) That where palaeobotany and stratigraphy disagree, the former must yield to the latter. (C) Plants cannot be depended upon for determination of widely separated coal beds—aside from the aid of stratigraphic evidence—principally because of the fact that only



a very small percentage of the whole number of plants or species of plants can have been preserved as fossils.

An interesting paper on the "Correlation of the Coal Measures of Maryland," was presented by Wm. B. Clark and G. C. Martin, Baltimore, Md. In this paper the authors show the equivalency of the coal seams of Maryland with those of adjacent regions in Pennsylvania and West Virginia. The determination of this equivalency is based not only on the parallelism of lithologic sequence over wide areas as shown both by the structure of the seams themselves and of the intervening beds, but also on the fossiliferous zones which have been found at numerous points throughout this district. The similarity of the chemical composition in each vein over wide areas is also strikingly shown.

A. P. Coleman, of Toronto, Canada, in a careful paper on the "Rock Basins at the Helen Mine, Michigan," said in abstract: Two small lakes or ponds, each a quarter of a mile long and two-thirds as wide, just west of the Helen iron mine near Michigan, on the north shore of Lake Superior, present very interesting examples of rock basins. Unlike most of the smaller rock basin lakes of Canada they are not of glacial origin and probably were not even scoured out by the ice, since they are narrowly enclosed by steep, rocky ridges rising about 150 feet to the north and south and 450 feet toward the east. The shape of the valley is somewhat like that of an arm chair with its back to the east, the two ponds, called Boyer and Sayers lakes, occupying the narrow seat. They had a depth of from 125 to 150 feet in the beginning, but Boyer Lake, the higher one, is now partially pumped out to facilitate mining operations. From Boyer to Sayers Lake the fall is 25 feet; and from Sayers to Talbot Lake, which is beyond the high rock walls of the valley, there is a drop of 75 feet. The valley of the two ponds is cut from rocks belonging to the iron range, chiefly siderite and granular silica banded with magnetite or heavily charged pyrite, and the lowest point of the rim of each consists of siliceous siderite containing much pyrite. The side walls of the valley are of greenish schists. The hollowing of the basins must have been due to solution, perhaps of parts of the iron range rocks which had been shattered; and the deposit of the large ore body at the eastern end of Boyer Lake, where a high hill consisting largely of impure siderite drops steeply down to the basin, probably has a bearing on their formation, the decomposition of pyrite perhaps furnishing the solvent.

"The Walls of the Colorado Cañon," was the subject of a paper by W. M. Davis, Cambridge, Mass. The general profile of the cañon walls depends on rock structure, and not on a pause in the elevation of the plateaus. The variation of profile from the narrow cañon in the Uinkaret plateau to the wide cañon in the eastern Kaibab is due to variation in the character of the strata. The pattern of spurs and recesses varies with the stage of dissection. The pattern commonly seen in the Red-wall cliffs is repeated in the Tonto cliffs where the latter are much worn. The pattern usually seen in the Tonto is repeated in the Red-wall where it is less worn. Brief mention was made of details connected with the unconformities seen in the cañon walls.

The remaining papers on the programme which were read were the following: by H. M. Ami, on the Ordovician succession in eastern Ontario; by H. W. Shimer and A. W. Grabau, on the stratigraphic and faunal succession in the Hamilton group of Thetford, Ontario; by A. W. Grabau, on the Traverse group of Michigan; by T. C. Hopkins, on the Lower Carboniferous area in Indiana; by W. B. Clark and A. Bibbins, on the areal distribution of the Potomac group in Maryland; by N. H. Winchell, on the regeneration of elastic feldspar; by Israel C. Russell, on the geology of the Snake River plains in Idaho; two by Bailey Willis, one on the structure of the Front Range, northern Rocky Mountains, Montana, and the other on the physiography of the northern Rocky Mountains; by Alfred C. Lane, on the variation of the geothermal gradient in Michigan; two

by G. Frederick Wright, one on the origin and distribution of the Loess in northern China and Central Asia, and the other on the age of Lake Baikal; by T. C. Hopkins and Martin Smallwood, on some anticlinal folds; two by T. O. Chamberlin, one on the distribution of the internal heat of the earth, and the other on the question, "Has the Rate of Rotation of the Earth Changed Appreciably During Geological History?"; two by A. F. Foerste, one on the use of the terms Linden and Clifton, and the other on some additional observations regarding the Cincinnati anticline; by E. O. Hovey, on the catalogue of type and figured specimens in the geological department of the American Museum of Natural History; by H. M. Ami, on middle carboniferous strata in Nova Scotia and New Brunswick; and by J. M. Clarke, on the Marcellus fauna of central New York.

Three new Fellows were elected at this meeting, namely, E. C. Case, of Milwaukee; A. G. Leonard, of Des Moines, and C. H. Warren, of Boston. The newly elected officers for the ensuing year are, president, N. H. Winchell, Minneapolis, Minn.; first vice-president, S. F. Emmons, Washington, D. C.; second vice-president, J. C. Branner, Stanford University, Cal. The next meeting of the society will be held during the last week in June, in connection with the American Association for the Advancement of Science at Pittsburg, Pa.

#### GOLD MINING IN EGYPT\*

By CHARLES J. ALFORD.

The history of gold mining, indeed of all mining, in ancient Egypt is lost in antiquity. Vague rumors of ancient workings and of the ruins of mining towns in the eastern mountains have long been known, and some of the few travelers who have crossed the desert from the Nile to the Red Sea have mentioned them in a cursory manner; but nothing definite has been written or known about them until, in the winter of 1899-1900, an expedition was sent out under the superintendence of the author of this paper, by the Victoria Investment Corporation of London, with the express purpose of searching for, and reporting on, these ancient mines. The substance of this paper is, to a large extent, taken from the report on this expedition, with a description of subsequent explorations, bringing the subject up to date.

Prof. A. H. Sayce, the well-known Egyptologist, is of opinion that the Eastern Desert, between the Nile and the Red Sea, supplied gold, not only to Egypt, but to Assyria, Babylon, Persia and the other countries of Western Asia. The ancient records, as now interpreted, indicate that mining was carried on as early as 2500 B. C., and there was still some mining done as late as the times of the Ptolemies.

The ancient mining districts have been visited by very few persons in recent years, and those who have been there have given generally very meagre descriptions of the mines. Mr. E. A. Floyer visited some of the districts in 1887 and 1891, and his works and maps are valuable contributions to the subject; but his researches were topographical rather than geological. The geological survey of Egypt is also making progress in the northern districts, and some of the memoirs and maps will shortly be published.

To the eastward of the belt of cultivation along the Nile is a sandy waste, part of which can be seen from the river; but this in no way represents the whole country between the Nile and the Red Sea. At Keneh, in latitude 26° N., the sandy zone, which forms the true desert, is but 20 miles wide, while in the latitude of Assouan it is fully 150. To the east of this, and bordering the coast of the Red Sea, is a chain of lofty and rugged mountains, 50 miles wide, several of whose peaks attain an altitude of 8,000 feet above the sea, and the general altitude of the divide of the watersheds is from 1,500 to 2,000 feet. It is this belt of mountainous country that forms the mining district.

The most striking physical features of the country

\*Abstract of paper read before the Institution of Mining and Metallurgy in London, October, 1901.

are the usually dry water courses, known as "wadies." These take their rise in the mountains, and run down on either side to the Red Sea or to the Nile. In its upper part a wady usually resembles an ordinary torrent bed, but gradually develops into a long, flat, winding water course, with cliffs of rocks on either hand, sometimes 200 feet in height, and a bed of sand and pebbles, in which all the lithological constituents of the neighborhood are represented. At times, during the copious rains which fall in the mountains in the spring and autumn, these wadies are converted into rushing rivers, which carve out great holes in their beds and banks, and leave their marks on every side. Usually, however, they are only good, hard, sandy roads, with some small trees and plants, which form meagre but useful grazing for camels. Towards the Nile, on the west, and the Red Sea, on the east, the wadies gradually lose themselves in the sands of the lower deserts, and probably little, if any, of the water which they bring down ever reaches the river or the sea on the surface.

The crystalline rocks, which constitute the mountain districts to the east, are of the oldest geological series met with in Egypt. The larger mountain masses are usually formed of a hornblende granite, with pink orthoclase, which gives the whole a strikingly red appearance when seen from a distance. Surrounding these, in the lower ranges, and covering very extensive areas, is a rather fine-grained gray granite, passing in places into gneiss, and that into mica schist, traversed by dikes and intrusions of greenstone, felsite, porphyry, and a very fine-grained white, elvan granite. It is in these rocks that most of the auriferous quartz veins were found to occur, and the more the granite was cut up by the intrusive rocks the more frequent and more promising the quartz veins appeared to be. In some districts masses of crystalline schists were found to occur; but the numerous rock specimens collected by the expedition have not yet been accurately determined, and until that is done it is useless to attempt to describe these rocks in detail.

Overlying the crystalline rocks, on either side of the mountains, is the very large and geologically important formation known as Nubian sandstone, which appears to have been laid down on the eroded surface of the older rocks. This sandstone usually appears in well-defined strata of red, brown and gray quartzose rocks, in many respects resembling the Old Red of Western England. Some parts are heavily charged with oxides of iron and manganese, and nodules of hard siliceous hematite are of frequent occurrence. The whole mass, both sand grains and cementing material, is entirely siliceous, with the exception of a few small local veins of sulphate of baryta, and a little gypsum. Excepting only some fragments of silicified wood, found near the Wady Allowi, on the route westward from Assouan, no organic remains or fossils of any kind were found in these rocks. The strata are usually horizontal or nearly so, but the general dip is towards the north in common with all the stratified rocks of the country. At the base of the sandstone beds occur local deposits of a rough quartzose conglomerate, with beds of variegated sands and sandy clays. Immediately overlying the crystalline rocks in several places are large lenticular deposits of a very hard, dark-colored conglomerate, formed entirely of pebbles of these crystalline rocks, the pebbles varying in size up to large boulders. This beautiful rock is the ancient ornamental breccia of the Romans, and was largely worked by them in the quarries of Hammamat, on the Keneh-Kosseir road, where a very extensive mass of it occurs. It is of much more frequent occurrence in the northern than in the southern districts, but the overlying Nubian sandstone attains an immense development towards the south, and it is impossible to say what it may cover.

Above the Nubian sandstone, and apparently unconformable to it, occur beds of Cretaceous origin, which are best seen at the surface about the neighborhood of Edfu and Rhodesia in the Nile Valley, and extend to the northeastward of Keneh, skirting the

lower parts of the escarpments of the Tertiary strata. It is in the lower beds of this series that deposits of coal or carbonaceous matter of some kind, are reported to have been detected, but this most important matter requires verification. Above the sandstone are to be seen, first, a series of ferruginous sandy shales passing into black shales with carbonaceous matter and impressions of leaves, and it appears to be in further local developments of these beds that the coal deposits should be looked for. Above these are some calcareous sandstones with fragments of fossil wood, and beds of hard limestone with fossil Mollusca, also local beds containing phosphates and

The want of timber and fuel in the country is more serious than the present scarcity of water, but as both of these will have to be supplied from the outside, the question really resolves itself into one of transport. In the absence of cheap coal, petroleum will probably commend itself as a fuel for small engines. The cost of English coal at Luxor on the Nile is now \$8.50 per ton, and it could probably be put down at the Fatira Mines at \$11. Camel carriage of any material will cost about 2 cents per mile per load of 300 to 400 pounds, and camels are readily obtainable. The mines on the coast would have a great advantage in being supplied by sea from Suez, which

Keneh-Kosseir road the country is occupied by the Maaza and Bili tribes, Bedouins, who number about 9,000 persons. These northern tribes, from their more frequent intercourse with civilization, have become more tractable, and are easier to deal with than their brethren of the southern districts. The Bedouin, as a rule, are a truculent and unruly people, very poor, shiftless, and improvident, living a wandering life in the desert, where their only occupation is the breeding of camels and a few sheep, and the manufacture of a little charcoal. They have the greatest aversion to any kind of manual work. The Fellaheen, or working men of the Nile Valley, are industrious, hard-working and civil, comparing favorably with any European laborers; but they can hardly be called intelligent, and have little or no initiative power. They are, when properly superintended, excellent laborers; their wages are from 4 to 8 piasters (20 to 40 cents) per day. Skilled miners would have to be brought from Europe, and for these I should strongly recommend Italians, who are much more suitable to the country in every respect than British workmen. Native blacksmiths and carpenters of fair ability can be got in the country at wages varying from 10 to 15 piasters (50 to 75 cents) per day. In the initiatory prospecting work, these wages have generally to be supplemented by rations of flour and lentils.

The climate of Egypt generally, and of the eastern desert in particular, is one of the finest in the world, the only drawback being the excessive heat of the summer months, but at all times the air is dry, and malarial diseases are unknown. During the winter months the cool bracing air of the desert, with the constant sunshine, form a climate which cannot be surpassed. In October, November, February and March the eastern mountains are sometimes visited



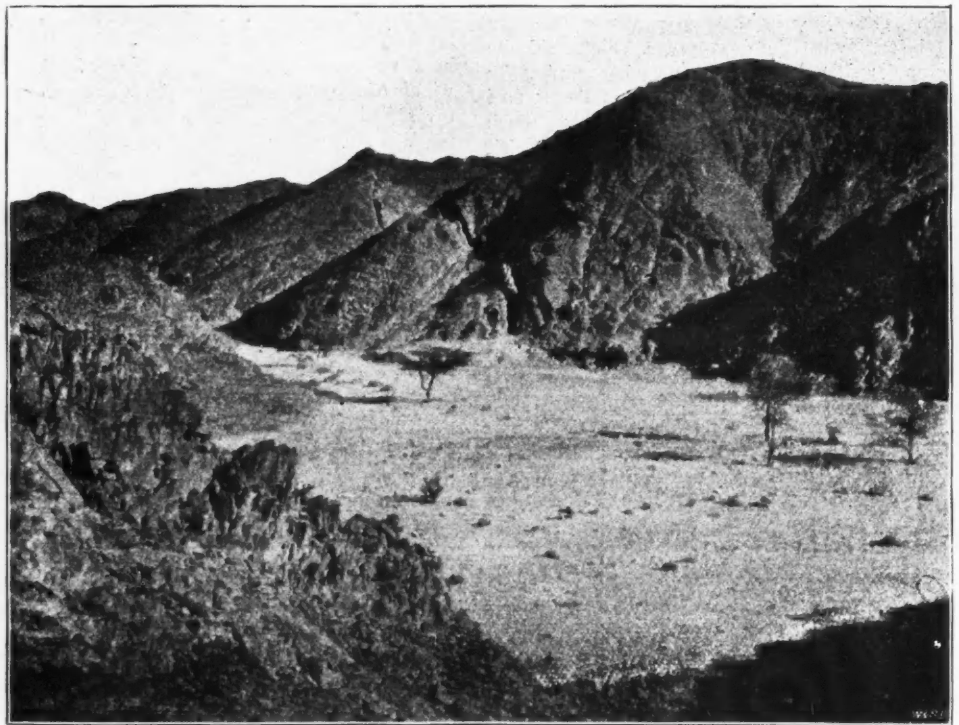
ANCIENT EGYPTIAN GOLD MILLS.

fish remains. The cretaceous limestones occur at a short distance eastward of Keneh and Luxor, and also as an outlier on the crystalline rocks, eastward towards the Red Sea, but they do not appear to extend south of a line drawn in a northeasterly direction from Edfu to Kosseir.

The Tertiary nummulitic limestone and other rocks overlying the Cretaceous strata are not largely represented in the district under consideration, nor do they form a factor of any importance for the purpose of this paper.

The question of the water supply of these eastern regions of Egypt has always been looked upon as very serious, and the present scarcity as an almost insuperable obstacle to mining, or, indeed, any work in the country. To this the writer does not assent. Under present circumstances water is certainly scarce, especially in the lower districts on the sandstone strata, but in the eastern mountains there are few, if any, districts where a supply could not be got with a little work. The so-called wells of the Bedouin are nothing but holes grubbed with the hands in the sand of the wady beds; and as these stand for months untouched and unvisited, the water stagnates, and sometimes absorbs saline matter from the surrounding sands, and the holes become blocked with sand and debris. The "gults," or natural rock reservoirs, are no better, as most of them dry up shortly after rain has fallen, and others stagnate and become foul. The Bedouin has the greatest aversion to showing anyone the water holes, and, whenever possible, says there are none, believing that nothing but the reputed want of water keeps all the nations of the earth from his beloved deserts, and, unfortunately, the presence of strangers has hitherto meant to him nothing but oppression and extortion.

All through the country, at the ancient mining sites and at all the old roadside stations, are abundant evidences of former water supply, in the form of cemented tanks, reservoirs and catchment arrangements, and many well-made masonry wells, all now completely choked with sand—indeed, many bear traces of intentional destruction. The first work towards reopening the mines must be to put some of these in order and provide an adequate water supply, and it will not be difficult or very expensive.



ANCIENT MINE WORKINGS AT BEBACH, EGYPT.

is not more than 48 hours steamer run from any port on the coast of the district. A railway has been projected and surveyed between Keneh and Kosseir, which would pass close to some of the mines, but the scheme is at present in abeyance. These questions apply rather to the future than to the present, as the first exploration and development of the mines will require no machinery and very little timber, and the carriage of the necessary stores and tools will not be a serious matter.

The eastern desert is inhabited in the south by two tribes of Bedouin Arabs, the Bisharin and the Ababdeh, who are said to number in all about 8,000 persons, and occupy the country from Suakin northwards to the Keneh-Kosseir road. North of the

by violent rainstorms, which turn the wadies into torrents for a short time, but do not extend far into the desert to the southeast, where rain is almost unknown. After the rains vegetation springs up rapidly in the wadies, and as rapidly dies off before the burning summer sun.

Animal life in the eastern desert is very scarce. Of insects there are a few ants, and some beetles, while the Egyptian fly is by no means so common as in other parts of the country. The only creatures which may be called dangerous are a few small vipers, and some scorpions and stinging spiders, generally found amongst the rock fragments in the wadies. Game is represented by the ibex, or mountain sheep, and a small species of gazelle, which are



occasionally met with among the mountains, but do not appear to be plentiful anywhere. Generally life is scarce in the desert.

At present, while the water supply is so small, and there is consequently no food for horses, mules, or oxen, the only means of traveling across the desert is by camels, which can be readily hired from the Bedouins at a week or two of notice. The hire of a camel, including food and attendance, is about 12 to 20 piasters—60 cents to \$1—per day, according to circumstances, and the attendants should certainly not be less than one man to every two camels. A camel can carry a load of about 400 pounds, at the rate of 20 miles per day for 8 or 9 consecutive days, after which a few days' rest is necessary. It requires water about every 5 days, but can go without for double that time at a pinch. For a party of Europeans, carrying water, provisions, and tents, six camels per traveler is none too large a provision.

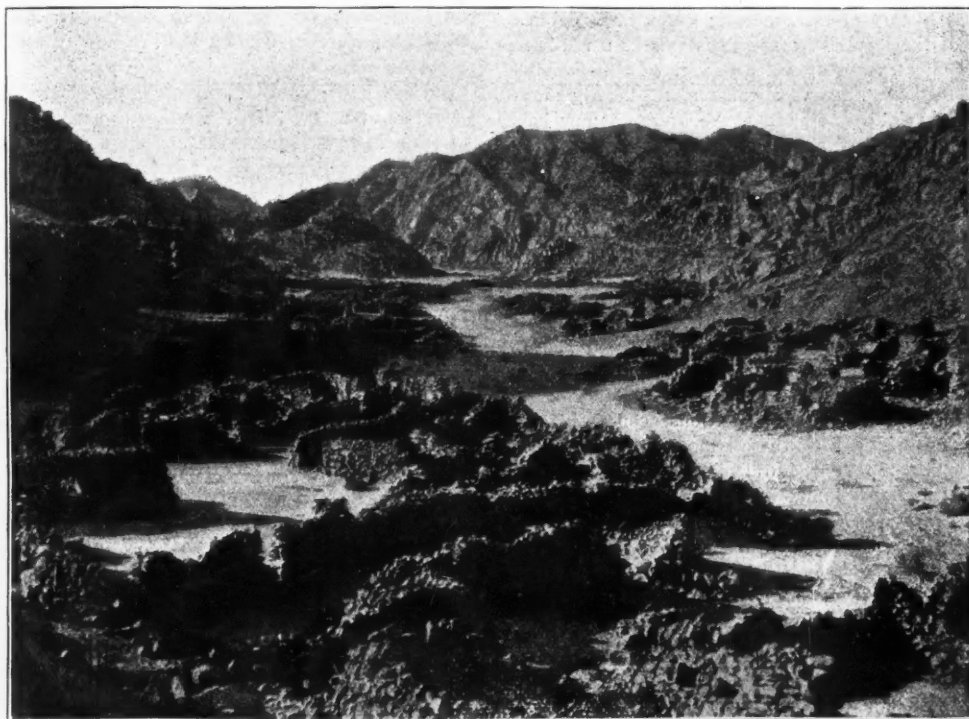
The difficulties in crossing the desert are entirely owing to the present inadequate water supply. In ancient times camels were unknown, and there is evidence that traffic was carried on with oxen, mules

form a considerable town, with an outside wall, large enough to accommodate 1,000 men or more; and in other cases the huts lie scattered in groups of two or three along the sides of the wady near the mine workings. In several places, as at Fatira, long lines of stones appear to represent walls between which prisoners may have been confined, and the ruins of what have probably been watch towers at either end point to the same conclusion. Nothing now remains of any of these but the fallen stones of the walls marking out the ground plan, and in many cases this is much obscured by a covering of drift sand. The ancient mine workings were, in all cases, found to have been from the outcrops of the veins, and to have followed the ore-shoots downwards in an irregular manner. In no case was it found that any attempt had been made to get at the vein by means of a cross-cut tunnel from the wady below, although the configuration of the ground lends itself admirably in many cases to this method of working. Everywhere the old workings were found filled and choked with sand, so that the ancient working faces and bottoms could never be reached; consequently no remains of ancient

right to locate and hold, on certain specified terms, any mines found therein, a system admirably adapted to the country, in which the presence of the independent strolling prospector would be particularly undesirable. Several other prospecting areas have been granted, and within a few months exploration work will be commenced by the Egypt & Sudan Mining Syndicate, and probably others also.

At Um Rus, on the western coast of the Red Sea, about 240 miles south of Suez, the exploration of one of the ancient gold mines was commenced last December, by the Egyptian Mines Exploration Company, under the superintendence of the author of this paper, and so far the results have been decidedly encouraging. The mine is about 4 miles from the Red Sea, where there is good natural harbor named Imbarak, in which any moderate-sized vessel can anchor and lie in perfect safety. At this point, over an area of about 3 square miles, occur a large number of quartz veins outcropping in a country of gray granite much intersected by dikes of greenstone, porphyry and felsite. Nearly all of these veins have been more or less worked in ancient times, and some of them to very considerable depths. In the Wady Imbarak, south of the mine, are the ruins of a large ancient mining settlement, and remains of huts are scattered all over the neighborhood. The country is very rough and mountainous, and intersected by numerous wadies, which, when the heavy rain storms break in the mountains, bring down large volumes of water. Across one of the smaller wadies a dam is now being constructed to conserve a supply of water for the mine. The exploration work was commenced on one of the largest of the ancient workings where two veins of quartz outcrop in the cliff on the north side of a wady. These had been both very extensively worked by the ancients who appear to have had a clear idea of the nature of ore-shoots, as they worked certain zones of the veins—in one case a length of 700 feet—entirely out, leaving hardly a trace of quartz in their old stopes, while other and less rich portions of the veins were left untouched. It is noticeable that whenever a piece of quartz can be found in any of these old stopes it generally shows a good result in gold, while the untouched portions of the veins are generally poor. In view of this the scheme of exploration is to get below the level of the old workings, and then to drive underneath them and thus to get into the ore-shoots worked by the ancients. A shaft is now down on the vein at this point for 130 feet, and has not yet bottomed the old workings. Several cross-cuts are also being driven with a view of getting under other ancient workings from which also rich specimens of gold-bearing quartz have been obtained. The veins outcrop along the face of the cliff above the wady, and dip at an angle of 45° to the northwest. Their thickness varies generally from about 1 foot to 3 feet, but in places they are much larger, and there is a constant, though variable, yield of gold which is always free-milling. The quartz is hard, and white to gray in color, in places carrying a little pyrites, but neither at Um Rus or any other place in the district has anything else been found in it. In most places the veins have a fairly good gouge, separating easily from the country, and frequently they are found to follow along the sides of porphyry and other dikes.

Experience has shown that the natives take very readily to the mining work, and when treated judiciously, with no violence, are tractable and willing. It has been found best, as far as possible, to do away with the old system of the country under which laborers were engaged in gangs from the village sheik, and paid through him with large deductions, and to take on the men at the mines as they come and pay each individual man his own wages. The men like it best, and though many work but a few weeks at a time and then go back to their families, they soon return to work, and are more useful each time. There has been so far no lack of water, indeed at times there has been far too much of it, and by constructing dams to retain the rainfall, reopening old wells and sinking new ones in suitable places in the wadies, a supply can almost always be obtained. In



RUINS OF AN ANCIENT EGYPTIAN MINING TOWN.

or horses, and there is no reason why these should not be again employed in many districts where a water supply could be obtained, and with it some cultivation of the necessary food. In most parts the sand and pebbles of the wady beds form convenient roads for wheeled vehicles, or could be made into such with a little clearing.

The foregoing description of the country between the Nile and the Red Sea, between latitudes 23° and 27° N., results from the report on the country made by the writer on behalf of the Victoria Investment Corporation, having for its object the locating of some of the long-lost ancient mining sites, in view of subsequent exploration. A number of these were discovered in the mountainous districts formed by the crystalline rocks which have been described, and were found to be generally much of the same character, but varying greatly in size. In all cases they are somewhat irregular groupings of small huts, sometimes circular and sometimes square or oblong in shape, built of rough, unhewn stones. The walls are usually single; but, in some cases, as at Um Rus, there are ruins of huts built with double walls, the interstices being filled in with small pebbles and rubble. The huts vary much in size, but appear to have been very generally from 50 to 100 square feet in area. At times they are grouped together and

mining tools were found. The only vestiges of the early mining appliances to be seen were the old quartz mills and rubbing stones, of which many specimens, in various states of preservation, remain among the ruins. Of these there appear to have been two classes—one an elliptical rubbing stone, on which the quartz was probably reduced to a coarse powder by attrition with a stone rolling pin, and another, in the form of a mill, with an upper and lower grinding stone, as shown in the accompanying photograph. The quartz was probably first broken and coarsely pulverized upon the elliptical stone, and afterwards reduced to a fine powder in the circular mill, and the gold then extracted by washing. It is probable that a further exploration among the ruins and in the old mine workings may result in the discovery of interesting relics of the ancient workers.

During the last 12 months the work of exploring the country and the ancient mines has been pushed on energetically by the Egyptian Mines Exploration Company in the district above described, while the Egyptian Development Syndicate has commenced work in the peninsula of Sinai, but the latter appears at present to be confining its operations to a search for turquoise rather than gold. These companies are working on large prospecting areas granted to them for a time by the Egyptian Government, with the

places, however, the well and mine water is distinctly brackish, but never appears to contain anything more deleterious than a trace of salt and sometimes of sulphate of soda.

Perhaps the most serious question in connection with Egyptian mining at present is the cost of fuel. A very fair charcoal is made in the country by the Arabs, but the supply is limited. English coal at Suez costs \$11 per ton, and on the Nile at Kenh \$8.50. It is possible that if a large demand were created Indian coal could be put down at Red Sea ports at less prices than these, or the use of petroleum might be cheaper; but as the high price of European coal at Suez is largely caused by the heavy canal dues, all fuel coming from that direction would be equally affected.

The exposure of the crystalline rocks in which the ancient gold mines of Egypt were worked, and in which search for deposits of metalliferous minerals may be undertaken with prospects of success, commences about Jebel Zeit, at the south end of the Gulf of Suez, and extends, in varying width, along the coast line of the Red Sea, with few and slight interruptions for 700 miles, until it joins the mountains of Abyssinia. At Um Rus the mountain chain of crystalline rocks is about 60 miles in width from east to west, while 100 miles south it decreases to about 30 miles; then, in latitude 22° N., the boundary line between Egypt and the Sudan, it extends from the coast westward for fully 200 miles, and, with occasional covers of sand, all the way to the Nile. The country to be explored is very great, but it has many advantages compared with its difficulties, one of the greatest of these being the unvariable healthfulness of its climate.

#### RECENT PROGRESS IN THE STUDY OF ORE DEPOSITS

By T. A. RICKARD.

Mining owes much to geology. This debt will, let us hope, be increased, for it is an honorable obligation. Science justifies herself to the commercial world by the practical aid which she gives to industry. Even those who delve underground for the metals upon which modern civilization depends are not without the realization that light has come to them in dark places.

Geology was not always a friend to mining. In its infancy it made wild statements which only perplexed an exceedingly venerable industry. Even to this day, in certain quarters, there is an unspoken idea that the young science stoops to commercialism when she concerns herself with matters which have to do with mining. A notable example can be instanced. The Geological Society of England was founded by the fathers of modern geology, by men whose names are household words, and among its records will be found the first presentment of the very foundations of the science to which the society is dedicated. I desire to emphasize the historical position and the splendid work, continuing to this day, done by the men who compose that honorable society, which represents all that is best in English geology, but the emphasis will also accentuate the extraordinary fact that, whether as a body or individually, English geologists have severely abstained from developing that part of their science which touches most directly upon mining, namely, the study of ore deposits. In striking contrast to this neglect of a most useful line of inquiry is the attitude adopted by the geologists of the United States, and more particularly by the organized corps of the Geological Survey. From its very inception, under Mr. Clarence King, the Survey has given the warm grasp of friendship to the miner, and during the past 25 years the distinguished scientific men who have done its work have contributed, not merely a few suggestions or iridescent generalizations, but the results of practical research of the most useful kind, which have formed the basis for a systematic study of ore occurrence.

Besides its own contributions on a subject of im-

mediate economic importance, the Survey, by its publications, has given an impetus to the investigations of mining engineers and others who have collected data for the common fund of ascertained fact. The American Institute of Mining Engineers has served as a link to bring together the official and the professional mining geologists, the meeting of men working toward a common purpose by diverse paths having been facilitated by the fact that the distinguished secretary of the Institute was once a government official himself, and is now the dean of the mining engineering profession.

The results of this co-operation are manifest. The literature of that branch of geology which deals with the genesis, structure and occurrence of ore deposits is, in its modern aspect, distinctively American, and this can be said without underestimating the inspiration given to the study of these problems by the writings of such men as Posepny, Vogt, Beck, De Launay and other European scientists.

During the past five years the study of ore deposits, in this country, at least, has received a marked impetus on three notable occasions. These three impulses toward advancement are associated with the names of Emmons, Posepny and Van Hise. In the history of the economic geology the publication of the Leadville monograph\* marks a red-letter day. Of all reports on the geology of a mining district this one has had a value more directly measurable in dollars and cents. Whatever it may have cost, it is not too much to say that the work of Mr. Emmons and his assistants gave to Leadville an underground chart which has led to the discovery of bodies of ore, valued at millions of dollars. And apart from its immediate aid to the mine-captains of one district it proved a most illuminating guide to the men who opened up the Aspen, Rico and Ten Mile districts. As a geological report, made by a national survey, it marks a striking advance, in its detailed deciphering of the underground structure of a very complicated region; for however interesting and suggestive the questions concerning the origin of ores may be, there is no doubt but that the unraveling of the structural relations of ore deposits affords the more immediate aid to the miner, and in this respect the Leadville monograph is without a peer, before or since the date of its first distribution to the public.

Following up the Leadville monograph, Mr. Emmons studied the neighboring mining localities, and this resulted in the publication of several contributions to the science of ore deposits. Among these papers may be instanced the essay entitled "The Structural Relations of Ore Deposits,"† because it has proved extremely suggestive to the younger men who were at that time beginning to interest themselves in this respect of geological research.

The Leadville work gave a local application to those views upon the origin of ore deposits which were, at that time, in course of ventilation in Europe, by Professor Sandberger. "Lateral secretion" under various forms and disguises became a dominant note in the writings of the years between 1885 and 1893. It was a narrow interpretation of a very wide phenomenon and, while the chemical side of the conception had a very evident fascination for the scientist, it did not recommend itself to those who spend much time underground. However, the objections which this theory presented to mining engineers led to the gathering of a good many new facts which paved the way for the favorable reception of Posepny's treatise,‡ in 1893. It is an interesting coincidence that three different members of the Institute, in the course of papers descriptive of districts which they had severally studied, expressed disagreement with the then generally accepted lateral secretion theory. Each thought his attack was no better than a forlorn hope. It was a gratifying sur-

\*Monograph. By United States Geological Survey.

†Vol. XVI., *Transactions of the American Institute of Mining Engineers.*

‡"The Genesis of Ore Deposits." Vol. XXIII., *Transactions American Institute of Mining Engineers.*

prise to find afterward that the most important contribution of that year was a very telling criticism of Sandberger's views by so distinguished an authority as Posepny. But Posepny did not only destroy, he also built up, and if his structure bore signs of an extreme style of intellectual architecture, it was none the less a distinct improvement upon the makeshift which it replaced. It is true he set his advocacy of ascending solutions against the lateral secretion theory of Sandberger, but that was the less important part of his contribution to science; he brought out the essential difference between the waters above the so-called water-level and those which circulate below that horizon, and he drew particular attention to the distinctive features of the former, which he then first called by the term now generally in use—namely, the vadose circulation. While the immediate result of his famous treatise was to stir up anew the controversy between those who variously advocated the agency of "lateral," "ascending" or "descending" waters as primarily responsible for the deposition of ores, a much better result ensued, since from the discussion of the general subject it became more and more evident that the word "circulation" was the key to the enigma, and that narrow instance upon any one branch of that circulation was incompetent to explain the striking diversities of ore occurrence.

During the seven years which followed 1893 the pendulum swung steadily away from the lateral secretion theory—that is, the conception of ore deposits as being derived from the wall-rocks of veins through the solvent agency of laterally moving waters—and the new ideas which Posepny had contributed led to the overhauling of old evidence with a particular regard to the distinction between the circulation of water in the vadose zone as contrasted with the deeper horizon. It became generally accepted that a large number of ore deposits, more especially those containing the precious metals in a matrix of quartz, had been laid down by ascending waters, and that enrichment took place, not from the wall-rock into the vein fracture, but by impregnation from the fracture outward into the encasing rock. During seven years those of us who direct mining operations had an opportunity to chew the cud of philosophic reflection and to test the theories which had been thus far developed, by observation underground. It may be considered fair to say that then, as before, we had the same objection to the wholesale absorption of the latest scientific dictum, in that we found it too narrow to cover the multitudinous varieties of ore occurrence which were encountered in our work from year to year.

Then, quite unexpectedly, a new philosopher, of whom we mining engineers had only known vaguely as a distinguished authority on the obscure problems of metamorphism, came forward with a treatise which appealed to us from the very first on account of its striking originality. Professor Van Hise attacked the subject from an entirely fresh standpoint. His essay is a deductive reasoning from physical and chemical principles; it is therefore in direct contrast to the induction from facts, which had hitherto been the method adopted by those who had investigated the problems of ore occurrence. For this very reason his work has proved illuminating and suggestive along unexpected lines, and it will, perhaps, during the next five years, bring out a new array of facts calculated to unravel many perplexities.

Professor Van Hise avoided the old blunder of sacrificing a broad conception to a narrow theory. He took the underground circulation of water as one connected manifestation of natural activity, and emphasized the fact that in the formation of ore deposits all the branches of that circulation may at different times and in diverse places play a part. Two conclusions, however, he insisted upon, namely: that sulphide ores are generally deposited by ascending waters, and that secondary enrichment of such ore is effected, to very considerable depths, by the agency of descending waters.

In regard to the latter it is an interesting fact that other observers had for several years ruminated



over the subject of secondary enrichment, and each, unknown to the other, had formulated certain views without, however, making their opinions public. The discussion of the matter by Professor Van Hise was accompanied by the simultaneous appearance of papers on that subject by Mr. Emmons\* and Mr. Weed,† so that we soon had an immediate secondary enrichment of a most pertinent aspect of the general inquiry. For it is obvious that the concentrations of the metals, whether due to ascending waters or otherwise, are particularly those which are of value to man and that the investigations which concern themselves with the formation of bonanzas are of the greatest practical value to both the miner and the economist.

Thus, at last, geology in relation to mining has reached a point where the most unbelieving utilitarian cannot refuse to recognize its great economic value. There was a time when the disputations of the philosophers wearied the poor miner, who could not see how any of it would guide his pick amid the

**THE GEM-JESSIE COPPER AND SILVER GROUP AT BUTTE.**

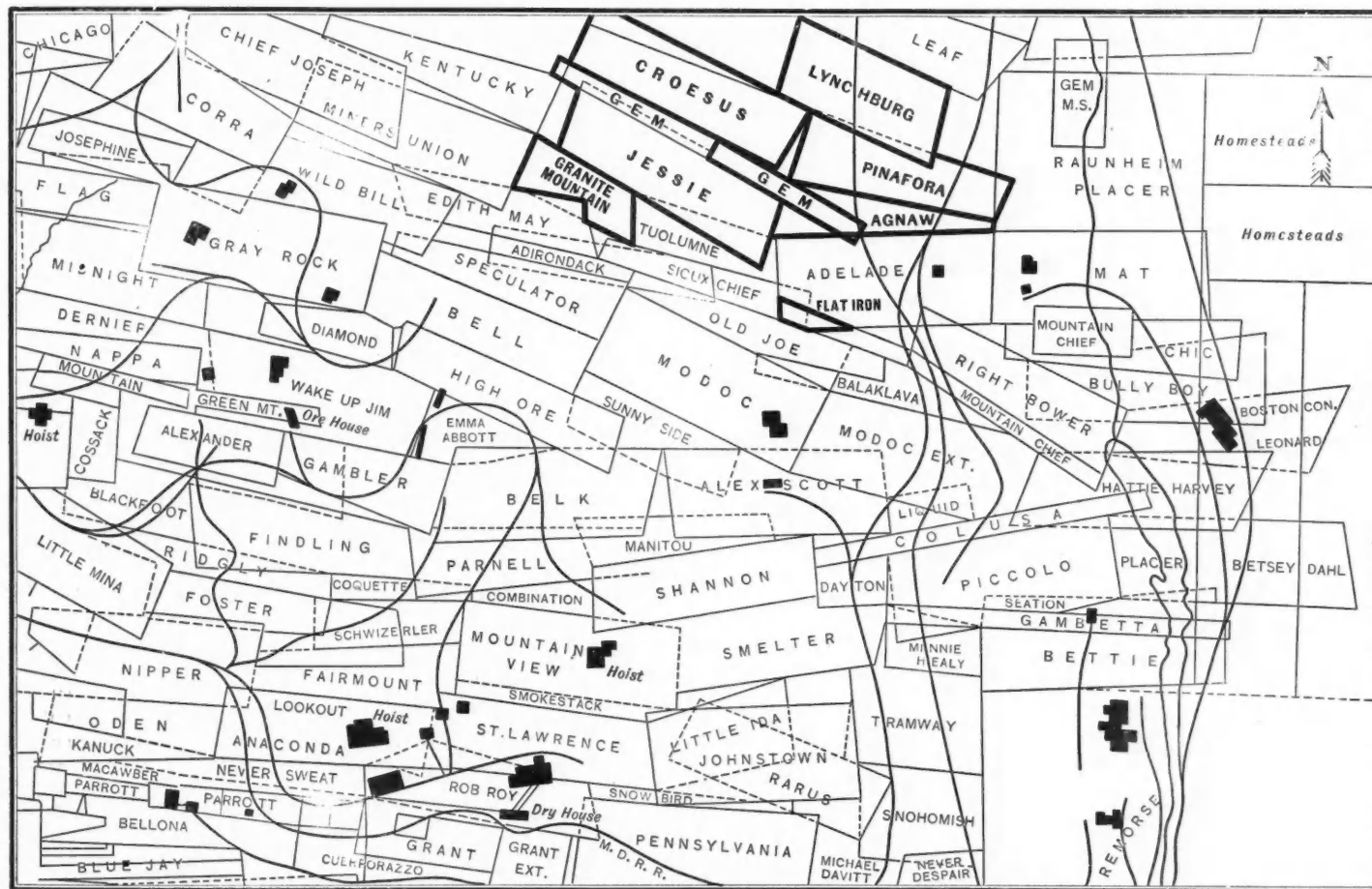
BY AN OCCASIONAL CORRESPONDENT.

A new group of copper mines in the center of the Butte copper district has become very interesting of late. It was believed formerly that the principal copper veins were further south, and no work to any extent had been done for the last 20 years on all sides by the best properties of the Anaconda Copper Company, the Boston & Montana, and the Butte & Boston Copper companies, all now controlled by the Amalgamated Copper Company.

The group mentioned consists of the following claims: 1. The East Gem, Lot 134; 2. The Lynchburg, Lot 118; 3. The Jessie, Lot 122; 4. The Granite Mountain, Lot 208; 5. The Flat Iron, Lot 234; 6. Thirteen twenty-fourths of the Croesus Mine, Lot 165; 7. One-half of the Pinafore, Lot 213; 8. One-half of the Agnaw, Lot 212. The Anaconda

10 to 30 per cent, with about 1½ ounces silver to 1 per cent of copper. From the 500-ft. level, a cross-cut was run north into the Croesus Mine for a distance of 425 feet and two very large and one small copper veins were cut through. It seems that these veins extend east through the Pinafore and Agnaw claims. The last one cut through shows remarkably good copper ore and is high grade in silver. From the 700-ft. Gem Mine level another cross-cut into the Croesus Mine was run north, but only for a short distance; it struck one of the South Croesus copper veins.

In the Jessie Mine a good deal of work has been done recently, and the shaft has been sunk to a depth of 300 feet on the south vein, which is identical with that of the Mountain Chief. Its ore is one of the highest grade copper and silver ores in the total area of Butte. The north vein of the Jessie has part of its apex almost for its entire length on the Jessie, while it traverses the Agnaw in its course and ultimately runs into the Adelaide.



MAP OF MINING CLAIMS IN BUTTE DISTRICT, MONTANA.

darkness underground. He felt like the Scotchman who was given claret and found it so thin a beverage that he complained that he could get "no forwarder" on it. Subsequently he was given a sip of Chartreuse and exclaimed: "Bring me a mug of that stuff." That is how the miner feels toward the last results of geological inquiry. It means business.

**MANGANESE BRONZE FOR BOILER STAY-BOLTS.**—The Hungarian State Railways have tried stay-bolts of manganese bronze, which alloy, when tested for tensile strength, has given very high percentages of elongation, and at the same time excellent results as regards ultimate stress. The alloy, as specified by the Hungarian State Railways, consists of a mixture of copper and manganese, the minimum quantity of the latter metal allowed by the specification being 3.8 per cent.

\*"The Secondary Enrichment of Ore Deposits," Vol. XXX., Transactions American Institute of Mining Engineers.  
 †"The Enrichment of Gold and Silver Veins," Vol. XXX., Transactions American Institute of Mining Engineers.

Copper Company owns the other half of both the Pinafore and Agnaw. They are all patented by the United States and some of them are among the oldest locations in the camp.

The country rock is granite of the same character as in the balance of the Butte District. The different veins on all of these properties are true fissure veins; strong, well-defined copper veins, but carrying a higher percentage of silver than the more southern veins; they are similar to those in the Bell Mine, the Mountain Chief, and the Adelaide, owned by the Amalgamated Copper Company.

The principal work has been done lately at the East Gem Mine, where a shaft was sunk to a depth of 700 feet, and sinking continued to the 1,000-ft. level.

The East Gem vein splits between the 200 and 300-ft. levels into a south vein with a dip of 60° to 70° south; while the main Gem Mine stands almost perpendicular at this point, but near the 500-ft. level takes the regular southern dip, common to all Butte veins, as depth is reached. Connection between the two veins has been made at the 400, 500 and 700-ft. levels. The copper contents vary from

The Lynchburg is almost a full claim and shows a large vein on the surface but there is nothing deeper than a 50 or 60-ft. shaft. This shows good indications.

The Pinafore is one-half owned by the Anaconda Company. The vein is a continuation of the Croesus veins. Only surface work has been done.

The Agnaw is a continuation of the Croesus vein. The south half of this claim has the apex of the Adelaide lode for about 250 feet.

The Flat Iron claim holds the apex of the Mountain Chief vein for its whole length, carrying the same high grade copper and silver ore as is referred to under the Jessie.

The occurrence of the ores as already opened up and indications such as have proved everywhere else in the camp to lead to ore in quantity at depth, will justify the statement that these properties will undoubtedly make a big mine; and that the owners may expect to strike quantities of ore from 700 feet down to as deep a level as any other mine in the Butte District. The accompanying sketch map shows the location of the claims with relation to other well-known mines.

### GOLD IN HYDRAULIC TAILINGS AT JUNCTION CITY, CALIFORNIA.

BY OUR SPECIAL CORRESPONDENT.

During a trip last fall through Trinity County, California, in the endeavor to locate new deposits of the much wanted metal, platinum, your correspondent concluded it would be of interest to examine rather carefully the enormous heaps of tailings resulting from the hydraulic operations carried on years ago in the neighborhood of Junction City. It is probable that all of the platinum would still be found in these tailings, if any had ever existed there.

Mr. R. W. Shuford was engaged to take sample panfuls from each of the principal piles of tailings and to roughly concentrate this material and send the concentrates for further examination to your correspondent, who has just finished a careful examination of these tailings. They came from the following localities:

- No. 1. Lower end Filibuster Flat, 3-4 mile below Douglas City.
- No. 2. Bar below Whetstone Bar Dam, north side Trinity River.
- No. 3. Red Bar, north side Trinity River.
- No. 4. Old tunnel, upper end Steiner's Flat, north side Trinity River.
- No. 5. Mouth of Blue Gulch, Steiner's Flat, north side Trinity River.
- No. 6. Mouth of Dutton's Creek, north side of Trinity River.
- No. 7. Upper end of Slate Bar, north side Trinity River.
- No. 8. Mouth of Brown Creek, south side Trinity River.
- No. 9. Mouth of Dutch Creek, south side Trinity River.
- No. 10. Half mile below Dutch Creek, south side Trinity River.
- No. 11. One mile below Dutch Creek, south side Trinity River.

Not a trace of platinum was found in any of these samples, but on the other hand, every panful examined showed several colors of gold to the pan. It seems quite evident therefore that the original hydraulic work done at these points was rather imperfect, and that the dumps still contain enough gold for reworking.

### PETROLEUM BRIQUETTES IN FRANCE.—

A consular report of recent date notes the formation of a company at St. Etienne, France, to manufacture briquettes from petroleum. They will cost more per ton than coal, but it is claimed that their calorific power is much greater and that they present many advantages where a comparatively light and compact fuel is required, as on shipboard. The company will also manufacture briquettes of a mixture of coal dust and petroleum.

### RECENT DECISIONS AFFECTING THE MINING INDUSTRY.

SPECIALY REPORTED.

**MINERS' LIENS IN ARIZONA.**—Where miners perform labor for the lessee of a mine under contract with him alone, they are not entitled, under the Revised Statutes, par. 2276, to a judgment against the owner of the fee, foreclosing mechanics' liens on the freehold.—Griffin v. Hurley (65 *Pacific Reporter*, 147) Supreme Court of Arizona.

**OWNER OF MINERAL RIGHTS CAN BUY SURFACE AT TAX-SALE.**—The owner of mineral rights under a reservation in a deed of the surface of the lands, not being a tenant in common or joint owner with the owner of the surface, can buy the estate of the other at a tax sale.—Hutchinson v. Kline (40 *Atlantic Reporter*, 312) Supreme Court of Pennsylvania.

**NECESSITY OF WITNESS TO OIL LEASE IN OHIO.**—The attestation of two subscribing witnesses to the signature of the lessor is as essential to the valid execution of a lease of land for the development of gas and oil for a term exceeding three years as it is to the execution of a lease for a like term for any other purpose.—Langmede v. Weaver, (60 *North-eastern Reporter*, 992) Supreme Court of Ohio.

**CONTRIBUTORY NEGLIGENCE OF MINER.**—Where decedent, a miner, was killed in taking out the pillar of coal which had been left for the support of the roof, but there was no evidence that he called for any props which were not furnished, and it affirmatively appeared that he knew the coal was crumbling because of the weight of the roof; the court properly directed a verdict for the defendant.—Oleson v. Maple Grove Coal and Mining Company (87 *North-western Reporter*, 736); Supreme Court of Iowa.

**PLACER AND LODGE CLAIMS.**—Under the act of Congress of May 10, 1872, reserving in section 11 known lodes from passing with placer claims, but declaring in section 16 that the act shall not impair rights or interests under existing laws, the reservation did not apply to a claim on which payment had been made, and a certificate of purchase issued, before the passage of the act. Under the act of July 9, 1870, section 12, known as the "Placer Act," declaring that claims usually called "placers," including all forms of deposit "excepting veins" of quartz and other rock in place, shall be subject to entry under the act, but authorizing the sale of placer lands in tracts of 160 acres without reservation, except such as the law directs should be contained in the patent, a patent for a "placer" will pass a lode.—Cranes Gulch Mining Company v. Scherrer and others (66 *Pacific Reporter*, 487).

### ABSTRACTS OF OFFICIAL REPORTS.

*Boston Consolidated Mining Company, Utah.*

This company has a capital stock of \$1,000,000, all of which is owned by the Boston Consolidated Copper and Gold Mining Company, Limited, an English corporation. The report is issued from the London office, and covers the year ending September 30, 1901. The total expenditures during the year on prospecting and exploration work were \$47,022; bringing up the amount spent on the property to a total of \$217,870.

The report of Managing Director Samuel Newhouse, on the operations at the mine says that nothing has been done further towards opening up the great mass of copper bearing porphyry on the west end of the property, because it has seemed to be sufficiently developed until some conclusion is reached as to the advisability of erecting a concentrating mill for the treatment of the ore. On the contrary, however, every effort has been directed toward the discovery and development of ore which can be used directly in smelting without the intervening process of concentration; consequently all of the work has been confined to the east end, where work was directed toward opening the Edison Tunnel sulphide body through the Armstrong Tunnel, which is 151 feet below. There was every reason to hope that a drift west (No. 1) along the limestone-quartzite contact in which this ore occurred would break into the ore body at the deeper level of the Armstrong, but at 110 feet from the main level, the drift came upon a fault which had displaced the formation, and as yet it has been impossible to locate the position of this ore on the Armstrong level. At the close of the year 1900 work was confined to the development of the lead-silver concentrating ore body in the Phoenix Tunnel. This body of ore was developed by winze, cross-cut and drift to a depth of 63 feet below the Phoenix level, when so much water was encountered that work was temporarily abandoned.

About this time prospecting was begun on the Phoenix Tunnel intermediate level. After driving

35 feet, a body of copper and iron sulphide ore was struck which gave every indication of being the best ore ever encountered on the property. A drift to the east and a series of cross-cuts disclosed a pretty definite shoot of ore about 100 feet long and varying from 8 to 30 feet wide at this level. A large number of samples were taken as work progressed, and assays ranged from 1½ to 11.6 per cent copper, with bunches of high grade ore in the mass as high as 26 per cent copper. All of the samples taken indicate an average of this body of ore of about 4 per cent copper.

A body of oxidized ore was encountered here, the cross-cut showing it to be about 80 feet wide. Samples taken as work progressed gave from 3 to 8 per cent in copper, with gold and silver values running from \$1 to \$2 per ton, and an excess of iron. Drifts from both ends of the cross-cut east and west show the body to be 80 by 80 feet so far as developed.

The Armstrong Tunnel cross-cuts the ore-bearing limestone-quartzite contact, at an angle of about 45°, and at a vertical depth of 536 feet below the Phoenix Tunnel. About the time of the discovery of the Phoenix Tunnel ore bodies, it became apparent that the greatest hope of finding sulphide ore of a smelting character at a sufficient depth to add great values to the property would be somewhat along the line of this contact. It was then decided to start a drift to the east, and continue it until it had intersected the downward extension of the Phoenix level ore bodies, provided they existed at this depth. The drift was run for many months by ordinary hand labor, but the importance of driving with greater speed, warranted the purchase and installation of a compressor plant and drills. For several hundred feet the contact plane between the quartzite and limestone was easily followed, and in no place has evidence of mineralization been lacking. At many points the mineralization encountered seemed almost sufficient to justify the belief that they were going immediately into a definite ore shoot. A number of cross fissures were encountered, and some drifting was done on them, but so far without good results.

After driving about 600 feet, the character of the ground changed materially, the stratification was very irregular, and in places it became almost impossible to distinguish the contact plane itself from an ordinary bedding plain in limestone. The mineralization was much more extensive, which fact is probably due to the broken condition of the country. Towards the present end of the drift this condition led the explorers to turn almost abruptly to the right in an attempt to follow the more mineralized ground, until finally, after a series of changes, they were brought directly against massive porphyry, which is apparently the same porphyry to which reference has been made as the footwall of the oxidized ore in the Phoenix workings. Two branches of the Armstrong east drift had been planned to be run from very encouraging looking places at 120 feet and 350 feet from the present end of this drift, and work is progressing upon them at this time. They are directed toward the section of country into which the Phoenix level ore shoot should dip.

The total development work done during the year was 3,033 feet. The report says, in conclusion: "The year's work has been very encouraging and productive of tangible results. We have opened up a large amount of ore in the Phoenix Tunnel. It is true that the physical conditions there render it almost impossible to compute the available tonnage opened up, but it seems perfectly safe to estimate at least 50,000 tons of workable smelting ore in the east of this territory, between the top of the intermediate raise and bottom of Winze No. 3. In addition to the above tonnage there can be legitimately added a considerable amount shown by the main tunnel and No. ½ cross-cut. Furthermore, this tonnage does not include the lead-silver concentrating ore shown by the extreme west Phoenix workings nor all of



the probable ore within the limits of the mineralized zone as shown on the map. The last report contained a description of the sulphide ore shoot opened by the Ingersoll Tunnel. A conservative estimate of the ore available here, as far as development went, would permit us to fix the amount at about 40,000 tons. The Edison Tunnel should supply about 10,000; so that we can safely estimate that our prospecting has shown a certain supply of 100,000 tons of workable smelting ore. There is scarcely any doubt that in mining this ore a much greater tonnage will be found within the limits of the ground considered, as we have only taken into consideration that ore which has actually been encountered.

"There have been purchased and installed during the year a 16 by 16 Norwalk high altitude air compressor, one 50-h.p. tubular boiler with upwards of 1,600 feet of air line to the end of the Armstrong east drift, with the necessary air receiver, tanks and feed pump. This compressor is capable of driving 5 Leyner rock drills and will be amply sufficient for all our prospecting work. We have also extended a 3-in. air line from the compressor plant to the Phoenix Tunnel, a distance of about 2,000 feet. From this place an air pipe is conveyed through the Phoenix Tunnel to the Phoenix winze, where our surplus air is used for hoisting and pumping. We have installed at the Phoenix winze No. 3 a small hoisting engine and pump. The compressor plant is enclosed in a modest but thoroughly sufficient iron building."

#### Nickel Corporation, Limited.

We noted recently the transfer of the controlling interest in the stock of this company from the London & Globe Corporation to a syndicate in which American capital is represented. The company owns concessions in New Caledonia, but has thus far done very little towards developing the property. The board of directors chosen by the new owners consists of Col. Millard Hunsicker, who is understood to represent the United States Steel Corporation; J. W. Downes, of the National Tube Company; Henry Gardner, of the London firm of Henry R. Merton & Company; J. Ewart, of James Morrison & Company, of London, and A. J. Greenop.

These directors have issued a report under date of December 20, 1901, in which they say that it is impossible to give any balance sheet, as the accounts, especially those in New Caledonia, are not in a proper condition to audit, and are very incomplete. The report goes on as follows:

"In accordance with the recommendations of the auditors and in order as soon as possible to examine and audit locally the New Caledonia accounts, which examination and audit your directors are informed will occupy, including time for travel and return of reports by mail, a period of three or four months, your directors have secured the services of a competent and reliable accountant, who has already started for Noumea. Though unable to present as yet any financial statement, your directors presume it to be a matter of common knowledge among the shareholders that the financial condition of the company is very unsatisfactory—it having been seriously crippled by the failure of the London & Globe Finance Corporation to repay the large sum borrowed by it from the company. At the time of the purchase by the company from the International Nickel Corporation of the mines acquired by the latter company from Mr. L. Bernheim, there was due to Mr. Bernheim a considerable portion of the purchase price of the properties, payable in instalments and secured by a vendor's lien. The balance now due to Mr. Bernheim on this account, including interest, amounts to about £47,300, of which sum £27,300 becomes due on January 9, 1902, and the balance, with further interest, on January 9, 1903. In addition to that liability, the assets and income of the company are encumbered by a mortgage to the liquidators of the London

& Globe Finance Corporation, dated October 23, 1901, upon which mortgage there now appears to be due, exclusive of interest, the sum of £33,824. Further minor obligations bring up the total liabilities of the company, so far as they have been at present ascertained by your directors, to about £85,974, exclusive of certain registration or transfer fees payable in New Caledonia and certain other indefinite sums, the aggregate amount of which cannot as yet be determined.

"Your directors have been advised by the solicitors of the company that considerable risk would be run by failing to pay promptly the instalment due to Mr. Bernheim on January 9, 1902; as under the French law, now in force in New Caledonia, an unpaid vendor does not occupy a position similar to that of an ordinary mortgagee. It appears that the solicitors of the company were under the impression that Mr. Bernheim would consent to an extension of time for the payment of a portion of the next instalment due to him, but he now declines to consent to any extension. Your directors have therefore entered upon certain negotiations, as a result of which they hope to obtain within a few days a temporary loan of £20,000, which sum, together with the money now at bank, and other expected funds, will suffice to pay the instalment due to Mr. Bernheim on January 9, 1902. Your directors deem it of the greatest importance that the property and assets of the company should be freed from the existing vendor's lien, and from the onerous conditions of the mortgage to the liquidators of the London & Globe Finance Corporation; and also that certain considerable sums immediately needed for the purchase of machinery, and for the development and working of the company's mines should be supplied. They have under consideration various plans for the attainment of this result, but no definite statement as to these plans can as yet be made. It is evident, however, that the shareholders must be prepared to make sacrifices in order to put the business of the company upon a sound basis."

#### BOOKS RECEIVED.

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

*Thonindustrie Kalender*, 1902. Berlin, Germany; the *Thonindustrie Zeitung*. Part I, 300 pages; Part II, 276 pages.

*Censo y Division Territorial del Estado de Sonora*. Mexico; issued by the Secretaria de Fomento. Pages, 336.

*Annual Report of the Commissioner of Internal Revenue for the Fiscal Year Ended June 30, 1901*. Washington; Government Printing Office. Pages, 470.

*The Mechanics of Engineering. Volume I. Kinematics, Statics, Kinetics, Statics of Rigid Bodies and of Elastic Solids*. By Professor A. Jay DuBois. New York; John Wiley & Sons. London; Chapman & Hall, Limited. Pages, 668; with diagrams. Price, \$7.50.

*Mineral Resources of the United States, 1900*. United States Geological Survey, Charles D. Walcott, Director; David T. Day, Chief of Division of Mining and Mineral Resources. Washington; Government Printing Office. Pages, 927.

*Power and Power Transmission*. By E. W. Kerr, Assistant Professor of Mechanical Engineering, Agricultural and Mechanical College of Texas. First Edition, First Thousand. New York; John Wiley & Sons. Pages, 356; illustrated. Price, \$2.00.

*Power and Power Transmission*. By E. W. Kerr. First Edition, 1902. New York; John Wiley & Sons. London; Chapman & Hall, Limited. Pages, 368; with 264 figures. Price, cloth, \$2.

*Discussion on the Teaching of Mathematics at the Meeting of the British Association, Glasgow, 1901*. Edited by John Perry. London; Macmillan & Company, Limited. New York; the Macmillan Company. Pages, 108. Price (in New York), 75 cents.

*Die Wartung der Fördermaschine*. By Wilhelm Wirtz. Essen, Germany; G. D. Baedeker. Pages, 112; illustrated. Price (in New York), \$1.50.

*Map of the Petroleum Fields of the Caucasus*. Compiled by S. Goulichambaroff, Engineer. St. Petersburg, Russia; issued by the compiler. One sheet, 36 by 24 inches.

*Eastern Peru and Bolivia*. By William C. Agle. Seattle, Washington; the Homer M. Hill Publishing Company. Pages, 46; with map. Price, 50 cents.

#### NEW PUBLICATIONS

*Methods for the Analysis of Ores, Pig Iron and Steel in Use at the Laboratories of Iron and Steel Works in the Region about Pittsburg, Pa.* Contributed by the Chemists in charge and Edited by Francis C. Phillips. Second Edition. Easton, Pa.; the Chemical Publishing Company. Pages, 170; illustrated. Price, \$1.

The first edition of this work originated in a series of papers contributed to the Engineers' Society of Western Pennsylvania in 1896. The series was suggested by a committee of the Chemical Section of the Society, and a very general response was made by the chemists in charge of the laboratories of the iron and steel works of the region. In the present edition the papers then presented have been revised and brought up to date. They show in the five years' interval a general shortening of the methods, as might be expected from the demand for rapid work everywhere. Steel works chemists are constantly endeavoring to shorten the course of analytical procedure, so far as they can do so without sacrificing accuracy of results; they are forced to do so by the constant demands upon them, and by the necessity of knowing the proportion of various constituents of products at the completion of each stage in a metallurgical process. This volume will be of much interest to steel works chemists everywhere as showing the methods adopted in the largest and most important steel and iron works in the country.

#### CORRESPONDENCE.

We invite correspondence upon matters of interest to the industries of mining and metallurgy. Communications should invariably be accompanied with the name and address of the writer. Initials only will be published when so requested.

Letters should be addressed to the MANAGING EDITOR.

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

Clarence King.

SIR:—It is far more fitting that honor be done Clarence King in some masterpiece of poetry, music or art, but, powerless to do this, I can only offer my tribute to his memory in a few halting phrases.

The news of his death reached me just a year from the day we became acquainted, and in thought I live over again that and the few succeeding days during which I had the privilege of intercourse with one of the rare souls which make this earth happier and better for their presence. During these days the disease which ultimately proved fatal was slowly fastening upon him, yet even in his suffering his cheerful and kindly smile, and his fascinating conversation made the lonely mining camp a radiant spot. His constant courtesy to the most humble miner or servant, his unflinching humor, which neither sickness nor disappointment could check, his sympathetic interest in the perplexities of his associates, and the rare charm and polish of his conversation marked him as a perfect gentleman and an unselfish soul.

Men such as Clarence King are few indeed. His interests were as broad as civilization and his sympathies as catholic as humanity. Merely to be in his company was in very truth a liberal education, and I feel that I cannot estimate the great value to myself of that month of daily intercourse with him. Only too clearly I realize the impossibility of expressing in these feeble and commonplace sentences the great privilege of an acquaintance with Clarence King. But I could not do less than try.

With the ending of his life it seems as though the sun had set on a glorious day. But in the darkened firmament the brilliant star of his memory will remain a constant reminder of the goal he reached and toward which we all may strive in perfect faith that it is worthy of every high thought and noble purpose.

HENRY M. ADKINSON.

Chicago, Jan. 8, 1902.

#### Platinum in Ontario.

Sir: In the very interesting article in your issue of December 28 last, by Mr. Wilbur C. Knight on the recent discovery of platinum in Wyoming full justice is not done to Ontario when it is said: "This is, I believe, the third instance where platinum has been found associated with veins. The one in Canada has no commercial bearing." Mr. Knight and all your readers will, I am sure, be interested and pleased to hear that platinum in commercial quantities was discovered during 1901 in a quartz vein carrying also a notable amount of gold, which occurs on a small island in the Lake of the Woods some 12 miles from the town of Rat Portage. How much of the vein will be platinum bearing is not known, since no development work has been done beyond sinking a pit; but if the samples submitted to assay were fairly representative this is a promising deposit of this rare metal. Any inquiries will be answered by Mr. T. W. Keyworth of Rat Portage.

JOHN McAREE.

Rat Portage, Ont., Jan. 3, 1902.

#### The Institution of Mining and Metallurgy of London.

SIR:—In your issue of December 14 you invite communications from members of this institution on the subject of your correspondent's letter of November 27 from London. As a past-president and present member of Council, I venture to offer a few explanations of what has been misunderstood by your correspondent. I will not refer to the tone of his first letter, since he has evidently intended to correct it in his second.

If not imposing too much on your space, I will ask you to print with this a circular with a list of officers which will be distributed to the members probably by the time you receive this. The circular relates to an endowment fund which has been started by several generous subscriptions, and its publication with this letter would be the simplest method of describing the history and objects of the institution and show the men who are taking an active part in its direction.

It is unnecessary to start any controversy as to whether it is good or bad policy to have a special qualification for membership in an institution of this kind, because experience has in our case so fully justified the original lines of the foundation that no alteration in essentials is at all probable. There are many circumstances connected with the mining business and mining profession in England which are not found elsewhere; and, therefore, comparisons with kindred organizations are futile. But it is desirable, since we invite applications for membership from engineers all over the world, that a paper of your influence should properly present the objects and regulation of the society.

Your correspondent has taken exception to an expression used by the president in an after-dinner speech, and although the actual by-laws of the institution have been shown to him and are quoted in his second letter, he asks for an explanation of an apparent divergence of views between the words of the speech and the interpretation of the by-laws. The president says (after dinner): "The object of the founders was to give a 'Hall Mark,' as it were, to

qualified mining engineers by which they might be distinguished from the so-called mining expert of the early Victorian era." The member of council (who happened to be myself) said to your correspondent, "The qualification test is not exacting, and there is no idea at all that being a member is equivalent to a 'Hall Mark' of absolute reliability and good judgment." It is surely permissible to say both statements are correct, if not unduly twisted. A diploma of a school of mines might be figuratively taken as a hall mark without deceiving any one as to the extent of its significance. Membership in the Institution of Mining and Metallurgy means simply that the one bearing the title is over 30 years of age and has satisfied a Council (made up of many well known men), that he has had at least 5 years' practical responsible work in mining or metallurgy. It also implies that nothing is definitely known to the Council against his personal character which would justify dropping his name from the list of members. This qualification is not too high for any practical man who desires to direct the investment of British capital, and the President's aspirations that all such men would in time be found in the list of members is not unreasonable.

It is sometimes difficult to accurately define what is a "responsible position" and what is not within the meaning of the by-laws, and, of course, failure to gain admission will give rise occasionally to hurt feelings; but the principle followed is that a member shall show 5 years of management of mines or metallurgical works, or reporting, or consulting work. The classes of Associate and Student are open to those who do not fill the full requirements of membership.

The list of members shows many well known American engineers, and the steady increase in applications is the best evidence that the advantages of a central institution in London and the value of the *Transactions* are appreciated. I think that an examination of the names of the members of Council who have to interpret the by-laws which regulate admission of members is sufficient to answer the suggestion in your correspondent's first letter that the Council might have some mysterious stock exchange influences urging them to exclude good men. The objects to be gained by any such influences I am quite unable to even guess at, for the Institution never recommends any man for any position, accepts no responsibility for its members, and, further, it is desirous of increasing its membership so as to increase its revenue and influence. No doubt is felt by those connected with it as to the present and ultimate benefits of keeping up the qualification test for admission, rather than aiming at the greatest membership possible, since the financial position is already a safe one.

WALTER McDERMOTT.

London, December 31, 1901.

The circular referred to in Mr. McDermott's letter is as follows:

*Objects of the Institution.*—The institution was founded in 1892 for the advancement of the Science and Practice of Mining and Metallurgy, and with the particular object of establishing in London, as the natural center, an association which should be international in its interests. Societies previously existing in connection with Mining and Metallurgy had been practically limited to the industries of Great Britain, and chiefly to Iron, Steel and Coal. The Institution of Mining and Metallurgy, takes on the contrary, Metalliferous Mining and Metallurgy (other than that of Iron and Steel) as its special sphere; and is therefore chiefly occupied with the vast Mining interests outside of the British Isles, which are so largely owned and managed in London as the financial center.

An important feature of the institution is that full membership is not granted unless the applicant be over thirty years of age and can show practical experience of at least five years in a responsible position connected with Mining and Metallurgy, or shall be qualified by recognized scientific attainments. As a consequence, its diploma is becoming recognized as having a distinct value. It is believed that the institution will gradually assume a position which will enable it to exert a direct influence on the standard of professional competency and conduct, such as similar central societies do in other professions.

*Growth of the Institution.*—During the first few years of its existence, the progress of the Institution was satisfactory, and in recent years the advance has been most marked in membership, quality of the transactions published, and in the interest taken in the regular meetings and discussions on papers read. At present there are 428 members, 191 associates and 185 students, a total of 804. In this membership are included the names of many of the best known mining engineers and metallurgists of the world, who have recognized the international character of the institution, the value of its transactions, and the great advantage of its being situated in the City of London.

*Financial Requirements.*—The Council, in steadily pursuing the objects of the Institution, has been limited in the measures to be adopted by financial considerations. The increasing income has allowed of larger expenditure on the publications, but has hitherto provided no substantial surplus for other important means of enlarging the influence and usefulness of the institution.

The objects immediately in view are:—

(1) To provide adequate accommodation, including offices and other rooms, which shall be at the disposal of members, associates and students as a convenient center for meeting, for writing and reading, and also serve as headquarters for members visiting London from abroad.

(2) To provide a good reference library, with the current technical magazines and journals for the use of members.

(3) To offer prizes for papers which are published in the *Transactions*, to encourage special research work, and to provide, within the scope of the institution, educational aids to its students.

(4) To supplement in certain cases the training of students of the Royal School of Mines, by assisting in securing for them practical experience in mines and works, which is so necessary in their preparation for the profession. For this object to make loans or advances in suitable cases to students going abroad. The disadvantage under which British students labor, as compared with those in some mining schools in other parts of the world, will thus, to some extent, be removed.

(5) To form a fund for obtaining a permanent lecture hall and offices for the institution in the City of London.

*Endowment Fund.*—To carry out the above objects, which will insure an immediate increase in the usefulness of the Institution, it is now proposed to raise a fund, which must necessarily be of substantial amount, the interest upon which will be at the disposal of the Council.

The Council has already received promises of support from individuals and companies interested in the mining industry, and a number of members have also expressed a desire to subscribe towards such a fund. It is, of course, most desirable that the members should join liberally in the establishment of a fund by which they are to benefit, and to which others who are interested in the industry are to be asked to subscribe.

The immediate objects in view have been above stated, but it is not desirable that any condition should be attached to subscriptions, except, naturally, to limit the expenditure of any fund raised to the purposes of the institution.

To secure this object the principal sum raised will be invested in the names of trustees for the institution, with instructions to pay the interest accruing to the Council for use at their discretion; but the trustees will not have authority to dispose of any portion of the principal sum, except for purposes approved by resolution of the institution in general meeting, called for the purpose according to the by-laws.

Having regard to the vast interests involved in the mining industry, the Council feel that they can appeal with confidence to members, and to the great corporations and others interested in the industry, for support in achieving the objects they have in view.

On behalf of the Institution of Mining and Metallurgy,

C. ALGERNON MOREING, *President.*  
ARTHUR C. CLAUDET, *Hon. Treasurer.*  
HENNEN JENNINGS, *Vice-President.*  
WALTER McDERMOTT, *Past President.*  
R. T. BAYLISS, *Member of Council.*  
THOS. H. LEGGETT, *Member of Council.*  
Endowment Committee.  
C. McDERMID, *Secretary.*

The following is a list of the present officers and council of the institution:

President—C. Algernon Moreing.  
President-elect—A. G. Charleton.  
Vice-presidents—William Frecheville, Hennen Jennings, Alfred James, Edward Riley.  
Past Presidents—(*Ex-officio Members of Council.*)  
—Professor A. K. Huntington, J. H. Collins, James Mactear, Walter McDermott, S. Herbert Cox.  
Members of Council—Charles J. Alford, Edwin J.



Ball, Hilary Bauerman, R. T. Bayliss, Charles Butters, John H. Corder-James, J. Hays Hammond, F. H. Hatch, Edward Hooper, Christopher James, J. D. Kendall, Benedict Kitto, Thomas H. Leggett, C. G. Warnford Lock, Bedford McNeill, William Morgans, Arthur L. Pearce, E. P. Rathbone, T. Kirke Rose, John Edward Stead, H. Livingstone Sulman, Edgar Taylor, William Thomas, R. A. Varden, Gardner F. Williams.

Trustees—Arthur C. Claudet, J. H. Collins, Benedict Kitto.

Honorary Treasurer—Arthur C. Claudet.

Honorary Counsel—E. J. Castle, K. C.

Honorary Technical Editor—Arthur C. Claudet.

Bankers—Messrs. Prescott, Dimsdale & Co., Limited, Cornhill, E. C.

Auditors—Messrs. Woodthorpe, Bevan & Co., C. A., Leadenhall Buildings, E. C.

Secretary and Editor—C. McDermid, Broad Street House, New Broad street, E. C.

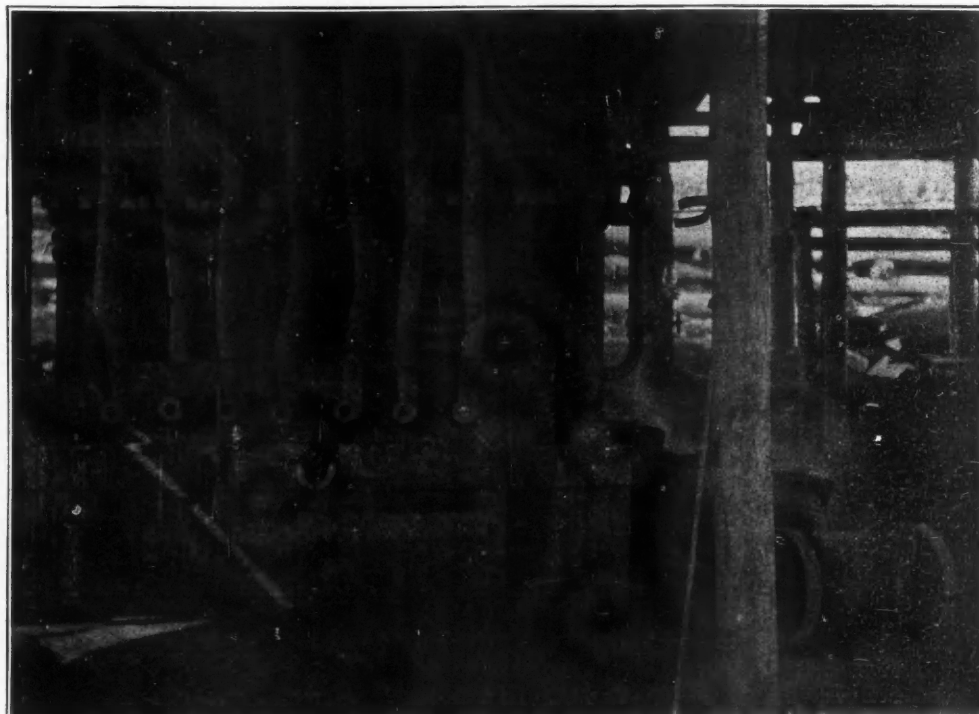
*Volcanic Pipes in New South Wales.*

SIR:—In the review, by Mr. Rickard, in your issue of October 19, "Mineral Resources of New South Wales," reference is made to the occurrences of volcanic pipes filled with agglomerate which are found to be metal bearing in Colorado, and a comparison is suggested with the diamond deposits of Bingara, N. S. W., described in the book, and with those of Kimberley, S. A. There is no need to go so far for comparison, as in New South Wales itself we have at Drake, a mining district in the north of the State, a very similar deposit to those of Silver City. The White Rock Silver Mine there, which has been described by Mr. Pittman, the Government Geologist, in the records of the Department of Mines, bears a striking likeness to the Bassick and Bull Domingo mines. It is a volcanic pipe filled with agglomerate and carries silver, lead and zinc, as sulphides, with iron in the form of pyrites and also as carbonate. The ore forms extremely irregular veins running in

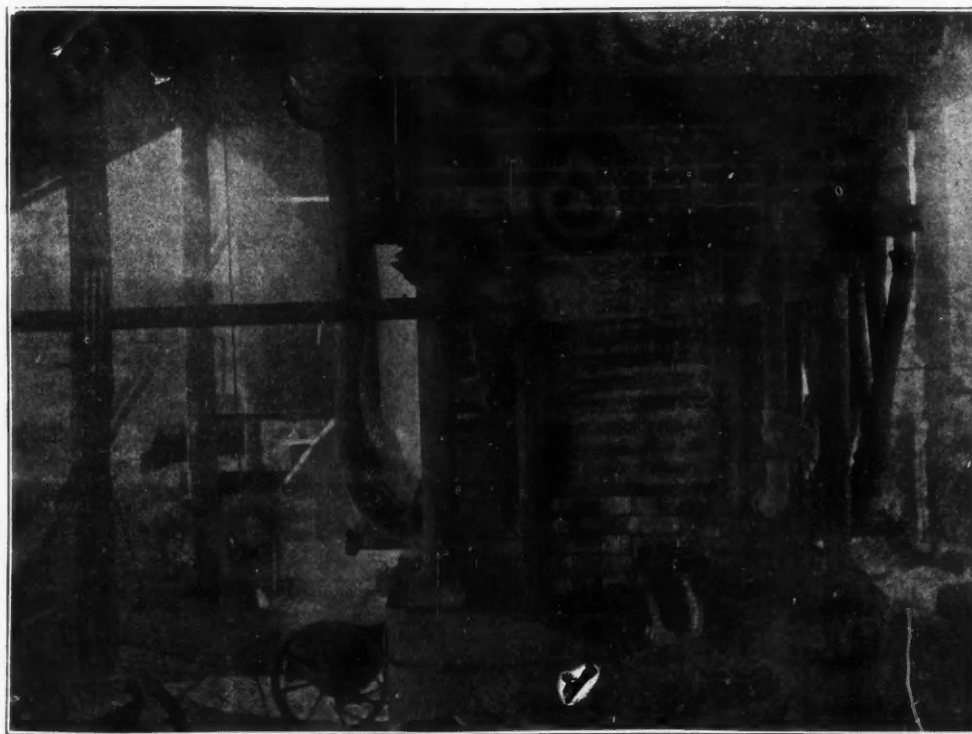
Engineers, Volume XXVI, page 297, as coming from Wann's Lode at Drake. Often the mineral is found in concentric rings around rounded particles of felsite. This mine carries gold and silver, but no other metals, and differs in most respects from the White Rock. Neither deposit is described in the admirable

followed is fine crushing and concentration on Frue vanners, followed by cyaniding the tailings and slimes. By this means 60 per cent of the silver and 90 per cent of the gold can be saved.

The Drake mining field forms an area of tuffs and agglomerates of Permo-Carboniferous age, in which



BLAST FURNACE, WITH PIPE JACKET, RUNNING SLAG.



BLAST FURNACE, WITH PIPE JACKET, DRAWING LEAD.

all directions through the agglomerate, and fills narrow cracks, and vughs in the formation, but does not form in rings around the particles of felsite. At Sawpit Gully Mine, about 4 miles distant in the same district, a felsite breccia occurs, forming a deposit 30 feet wide and over 500 feet long, dipping 45°, where the mineral matter does surround the particles of felsite; in fact, the felsite breccia is cemented together with quartz and pyrite, the cementing material forming about half the bulk. Some of this ore was exhibited at the World's Fair in Chicago in 1893, and is referred to by Prof. William P. Blake, in the *Transactions of the American Institute of Mining*

handbook of Mr. Pittman, probably from excess of matter and from the fact that neither mine has attained commercial importance. The White Rock has been one of the noted failures of the State, large sums of money having been spent in attempts to work it; it is now desolate, and seems hopeless, as the value does not exceed 5 ounces of silver per ton with no other values, and the veins are too erratic to allow of profitable mining by themselves. Wann's Lode is being worked with some hope of success, as the values are higher—13 ounces of silver and 0.15 ounce gold per ton—and the mineral is more uniformly distributed through the rock. The method

a variety of minerals occur in situations strongly suggestive of solfataric action. Its chief values are in gold, which is found in extremely rich patches in small lodes in association with copper. Five miles distant gold occurs in similar rocks associated with native metallic arsenic at a place called Lunatic.

I enclose two illustrations which may be interesting, of a lead smelter, 100 by 42 inches, made of 3-in. pipes, after a suggestion contained in Hixon's book on lead and copper smelting. The furnace was built to smelt a quantity of rich lead slags, at a Queensland mine where money is scarce. It has now been at work over three months and has proved a perfect success. One picture shows the lead being tapped from the side, the other shows slag running. Where money is not plentiful and no long campaign can be looked forward to, Mr. Hixon's suggestion can be followed with great advantage. EDGAR HALL.

Tenterfield, N. S. W., Dec. 2, 1901.

**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, or can we give advice about mining companies or mining stock. Brief replies to questions will be welcomed from correspondents. While names will not be published, all inquirers must send their names and addresses. Preferences will, of course, always be given to questions submitted by subscribers. Books referred to in this column can be obtained from the Book Department of the ENGINEERING AND MINING JOURNAL.)

*Fluorspar for Iron Flux.*—Please advise if fluorspar tends to eliminate phosphorus or sulphur in the blast furnace in greater degree than does carbonate of lime. State its advantages, if any, over carbonate of lime as a flux. Can you refer me to books or other literature on the subject?—S. L. G.

*Answer.*—The use of fluorspar as a flux makes a more fluid slag and also reduces the melting point of the blast furnace charge. We do not know that it possesses any quality for reducing phosphorus and sulphur, not possessed by limestone. Gruner's "Studies in Blast Furnace Phenomena" is a good work to refer to.

**ELECTROLYTIC CYANIDE VAT**

An apparatus designed to act in conjunction with a cyanide solution to continuously extract values from ores, patented recently to Albert I. Irwin, of Cripple Creek, Colo., comprises a series of tanks to retain the solutions and provided with conveyors for passing the ores from end to end of the series. The several tanks are similar in form, shallow, and each formed with an inclined end from which it discharges into the next in series. The first tank contains a caustic soda solution, in traversing which the ores absorb sufficient alkali to counteract their acidity and to increase the electrical conductivity of the cyanide solution in which they are subsequently immersed. The last is a filter through which the exhausted solution is drawn for regeneration and return. The intermediate tanks are electrolytic vats. In these the conveyor becomes the anode, formed of a pair of endless chains moving upon guide rods in the sides of the tank and connected by metal bars to whose lower faces are attached wooden blocks, oppositely inclined on alternate bars, and serving to stir the ores and move them from side to side of the tank. Two cathodes are used, one being a plate resting upon the bottom of the tank, and the second parallel to the first and to the anode, a similar plate supported between the upper and lower stretches of the endless belt. The novelty of the apparatus lies in the structural details, for the plan of causing the material to be dissolved to pass through the electrolyte and even of using the anode as a conveyor, dates from the early days of the art. In the present construction one of the cathodes is so placed as to be scoured by the moving sludge—a disposition most unfavorable to complete recovery of the precious metal.

**MINERAL IMPORTS AND EXPORTS OF SPAIN.**—Imports of fuel into Spain for the 10 months ending October 31, included 1,803,213 metric tons of coal and 183,713 tons of coke. Imports of metals included 4,784 tons pig iron, 5,834 tons wrought iron and 23,617 tons steel. Exports of minerals are reported by the *Revista Minera* as follows, in metric tons:

	1900.	1901.	Changes.
Iron ore .....	7,121,362	6,075,945	D. 1,045,417
Copper ore .....	936,978	937,664	I. 686
Zinc ore .....	55,275	66,491	I. 11,216
Lead ore .....	4,660	3,607	D. 1,053
Salt .....	193,927	282,614	I. 88,687

Exports of metals included 29,989 tons pig iron, against 19,119 tons in the corresponding period of 1900; 26,223 tons copper, against 25,774 tons in 1900; 138,160 tons lead, against 141,948 tons in the previous year.

**PATENTS RELATING TO MINING AND METALLURGY****UNITED STATES.**

The following is a list of patents relating to mining and metallurgy and kindred subjects, issued by the United States Patent Office. A copy of the specifications of any of these will be mailed by the *ENGINEERING AND MINING JOURNAL* upon receipt of 25 cents.

*Week Ending December 31, 1901.*

689,849. **APPARATUS FOR DETECTING AND LOCATING METALLIC MINERALS, ETC.**—Fred H. Brown, Chicago, Ill. The combination with circuit terminal independent of and freely movable with respect to each other and adapted to be brought into contact with the earth at various and widely-separated points to close electric circuits, which include the earth between such terminals, and means for measuring the resistance of the earth portions of said circuits.

689,868. **RED-LEAD FURNACE.**—Henry M. Gabel, Cincinnati, Ohio, and Thomas E. Kearns, New Kensington, Pa. In a red-lead or litharge furnace, the combination of a horizontally-disposed refractory-lined rotary cylinder having axial openings in each of its ends and having charging and discharging openings, mechanism for supporting and rotating said cylinder, a discharge-flue connection at one of said axial openings in the cylinder, a fuel-furnace, a fixed boss engaging the other axial opening in the cylinder and having a passage through it connecting with said fuel-furnace, ports in said boss within said cylinder, a flue disposed within the outlet-pipe, and a hand-operated rod connected with the diaphragm and extending therefrom and from the casing for controlling the cut-off valve.

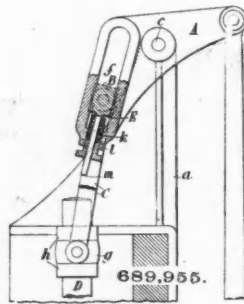
689,882. **PIGMENT AND PROCESS OF MAKING SAME.**—Charles B. Jacobs, East Orange, N. J., assignor, by mesne assignments, to the United Barium Company, Jersey City, N. J., a corporation of New Jersey. A composition of matter consisting of molecular equivalent proportions of zinc hydrate and barium sulphate, in a state of fine division and molecular mixture.

689,907. **METHOD OF MAKING POTASSIUM-MAGNESIUM CARBONATE.**—Heinrich Precht, Neustassfurt, Germany. The process consists in reacting with carbonic acid upon a solution of potassium chloride holding in suspension magnesium carbonate containing three molecules of water of crystallization.

689,926. **PROCESS OF MAKING SODIUM AMALGAM.**—Eugene B. Smart, Florence, Colo. The process of making an amalgam of an alkali metal, which consists in heating paraffin to a temperature sufficient to melt the same and the alkali metal, then adding the metal to the melted paraffin and continuing the heat until all the metal is melted, the amount of paraffin employed being sufficient to cover the metal when both are melted, then adding mercury to the melted mixture of paraffin and the metal, and then decanting the paraffin.

689,946. **ORE-TREATING FURNACE.**—Aron M. Beam and Howard S. Bailey, Denver, Colo. In an automatic furnace for converting rebellious ores to a free-milling and leaching condition comprising suitable inclosing side and end walls, muffles within said walls, flues, surrounding said muffles, means for heating and for regulating the heat of said muffles, flues and walls; swinging-door partitions in one of said muffles arranged to divide said muffle into separate compartments, means for substantially preventing all but a small amount of air from entering one of said compartments, a combined ore-conveyor and rabble in said muffles, a variable-speed driving mechanism for said conveyor, means for introducing hot air or steam into another compartment of said muffle, that is divided into compartments, means, including flues for heating said muffles and valve-controlled outlets leading from said muffles into said flues, and means for opening and closing said valves from the outside of said furnace.

689,955. **STAMP MILL OR BATTERY.**—Walter Fowler and John D. Ewen, London, England, assignors to Frank Butterworth, New York, N. Y. In combination a stamp stem, a vibrating lever, a sliding member carried by the lever, a buffer acting upon the sliding member, and guide



means on the vibrating lever for the sliding member, and in which the said sliding member moves freely, said buffer acting upon the sliding member only when the same is at or near the end of its movement on the vibrating lever, and links connecting the sliding member with the stamp stem.

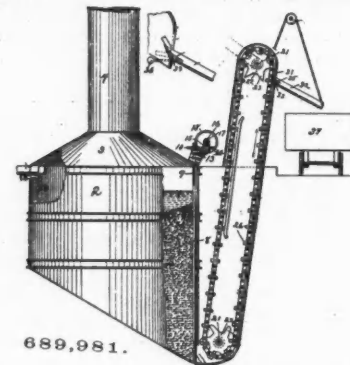
689,959. **PROCESS OF DISINTEGRATING AND COMMINUTING MINERALS OR ORES.**—Edward L. Graham, Upper Warrington, England. A process for treating ores consisting in the following steps: First immersing the ore without preliminary heating in a cold acid solution incapable of dissolving it; secondly, passing an electric current of sufficient strength to disintegrate the ore through the solution and finally extracting the metal from the ore.

690,048. **PROCESS OF TREATING NATURAL PHOSPHATES.**—Lewis Cheeseman, Sr., Alexandria, Va., assignor of two-thirds to A. H. Agnew and Park Agnew, Alexandria, Va. The process consists in mixing phosphates in a finely-divided state with water and an acid salt which by metathesis will change tribasic phosphate to mono or dibasic phosphate or both, passing through the mixture for a suitable period of time a current of electricity, and evaporating the water from the mixture.

690,058. **OIL-WELL FLOODER.**—Charles C. Howell, Bradford, Pa., assignor of one-half to Robert Roy, Bradford, Pa. In combination, a pump-barrel having a vent for the escape of fluid to wash the walls of the well, a valve closing said vent, a lever extending longitudinally of the pump-barrel, carrying the valve at its lower end, said lever being pivoted intermediate of its length and having a free upper end extending into the path of the pump-rod, the pump-rod, a projection thereon to engage the upper end of the valve lever to open the valve, and means for pressing the valves normally closed, said means consisting of leaf-springs arranged longitudinally of the pump-barrel and located between the upper ends of the valve-levers and the wall of the pump-barrel.

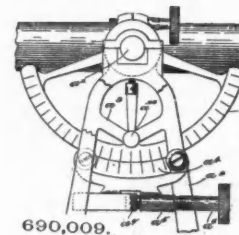
689,981. **APPARATUS FOR HANDLING BLAST FURNACE SLAG.**—Patrick Meehan, Lowellville, Ohio. In

apparatus for handling slag, a closed reservoir having an inlet for the slag near its top and an outlet for the same



at the bottom, means for forcing water against the entering slag, and a stack leading from the top of said reservoir.

690,008. **EQUATORIAL ADAPTER FOR MINE SURVEYING INSTRUMENTS.**—Christian L. Berger, Boston, Mass. The combination with a transit of the kind having a main telescope, an auxiliary telescope and a threaded fixed support movable with said main telescope, of an equatorial adapter mounted on said threaded support and comprising a polar axis extending perpendicular to the plane



including said telescope and its horizontal axis, and a threaded declination axis extending at right angle to said polar axis and rotatable independently of said auxiliary telescope, for removably securing said auxiliary telescope, to said declination axis, the threads of the fixed support, and of the declination axis being the same size.

690,009. **ATTACHMENT FOR TRANSITS.**—Christian L. Berger, Boston, Mass. In a surveying instrument having a telescope, a graduated limb containing means for mounting on the axis of said telescope, and a clamp independent of said mounting means, said clamp being connected to the limb and including operating means co-operating with the rest of the clamp and connection for clamping the limb on or releasing it from said axis, without liability of varying the shape of the limb or any part thereof.

690,018. **CENTRIFUGAL FAN OR PUMP.**—Samuel C. Davidson, Belfast, Ireland. In centrifugal fans and pumps wherein the fluid operated upon is admitted axially and discharged circumferentially with a free or unincased discharge therefrom all around the periphery of the fan or pump, a concentrating channel around the periphery of the fan or pump, one side of said channel being an outward extension of the disk on which the blades are mounted.

690,045. **BRACKET FOR SURVEYING INSTRUMENTS.**—Christian L. Berger, Boston, Mass. A horizontal support for surveying instruments, comprising a body portion having means for securing the same rigidly in fixed position to a vertical wall, an instrument receiving portion, and a vertical hollow post detachably mounted in the latter, and a clamping device on said post for adjusting said instrument relatively to said body portion, the top of said post having means for receiving the instrument thereon.

690,046. **STANDING VALVE FOR WELLS.**—Hiram Bickel and Alfred T. Evans, Guffey, Pa. In a standing valve for artesian and oil wells, the combination of a cylinder the ends of which are recessed internally and threaded externally, a base piece tapered at its lower end and provided with an opening, the upper end of which is enlarged and threaded to receive either end of the tube or cylinder, a gasket seated in a recess in the tapered portion of the base piece, and a seat having a tapered opening with an annular recess.

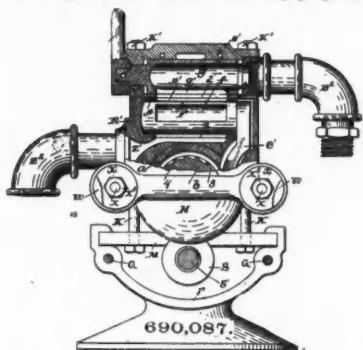
690,062. **METHOD OF MAKING SULPHURIC ANHYDRIDE.**—Rudolph Kniesch, Ludwigshafen, Germany, assignor to the Badische Anilin & Soda Fabrik, Ludwigshafen, Germany, a corporation of Germany. The process consists in passing a gas containing sulphur dioxide and oxygen through a contact substance while removing excess of heat due to the reaction from the contents of the contact chamber by means of a current of fluid which does not enter the contact material.

690,082. **CLAY-SEPARATING APPARATUS.**—George D. Snyder, New York, N. Y. In combination, a beating engine, and a trough leading from said beating engine in the path of the beaten product, said trough having a series of pivoted riffles.

690,087. **ROCK DRILL.**—Governor D. Warren, Independence, Colo., assignor of one-half to Charles H. McCormick and Solomon I. Lancto, Independence, Colo. A rock drill, comprising a cylinder, a piston therein, having a re-



duced central portion provided with spirally arranged ratchet grooves, a valve therefor, and an arm attached to the valve extending into the cylinder and engaging said grooves



in the reduced portion of the piston adapted to oscillate the valve and to rotate the piston.

690,100. CONTINUOUS COMPRESSION OF FLUIDS.—Adam E. Chodzko, San Francisco, Cal. A revoluble shell open upon one end and having a central annular inlet, vanes revoluble with the shell and acting to direct the fluid toward the periphery, and fixed collecting scoops.

690,126. PROCESS OF MANUFACTURING TABLE SALT.—George Weddell, Newcastle-upon-Tyne, England. A process of converting the deliquescent salts, usually existing in common salt, into non-deliquescent salts, which consists in admixing, triturating and heating together a sodium salt of an oxygen acid and common salt in a finely divided state, but containing only a minute quantity of moisture.

690,133. PROCESS OF MAKING SULPHURIC ANHYDRIDE.—Adolf Clemm and Wilhelm Hasenbach, Mannheim, Germany. The process consists in passing roaster gases over substances containing ferric oxide, then purifying the gases by dry filtering, and then passing them over platinum contact substances.

690,137. TUNNELING MACHINE.—John E. Ennis, Chicago, Ill. A tunneling machine, having a digger mechanism including a plow movable in a circular sweep, means carried on the machine for imparting the said sweep movement to the plow and simultaneously forcing it forward and in a spiral direction, and means for automatically shifting the movement of the plow to cause it to travel from the perimeter of the machine inward, or from the axis of the machine outward during its sweep movement.

690,141. CONTINUOUSLY ELECTROLYZING ALKALI CHLORIDES.—Wilhelm Gintl, Aussegg, Austria-Hungary. An improvement in the process for the continuous electrolysis of gas-producing salt, which consists in passing a current from anode to cathode through the electrolyte gently introducing the fresh electrolytic solution in the immediate vicinity of the anode, and in a chamber or compartment separate from the cathode, and drawing off the liquid from the immediate vicinity of the cathode, thereby producing a gradual movement of liquid toward the cathode, and in restricting the downflow of the electrolyte in the vicinity of the anode, and causing it to meet the rising bubbles of gas and be intimately mixed thereby; whereby the rapid downpour and dissemination of the electrolyte in the lower portions of the bath are prevented and a substantially constant stratification is maintained substantially undisturbed.

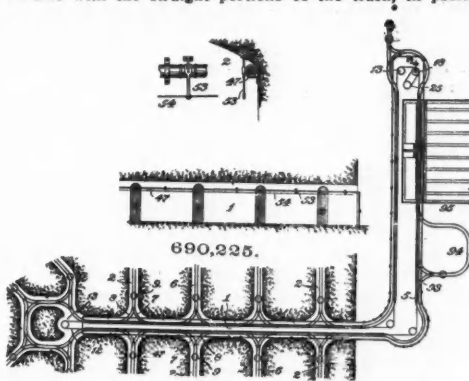
690,152. PORTABLE MELTING APPARATUS.—Newell S. Jenkins, Dresden, Germany. The combination with a muffle having an open front and a hole in the bottom, a base-plate and support therefrom for the muffle, of a generator of hydrocarbon vapors, a burner beneath the hole in the said muffle having a central pipe for the passage of compressed air and an annular chamber for the reception of the said vapors, the said air-pipe extending beyond the end of the said chamber, which latter is provided with perforations for the escape of the said vapors at which points the said vapors burn, a reservoir for collecting the condensed vapor, a pipe leading from the bottom of the said annular chamber to the said reservoir for collecting the condensed vapor, and a screen of glass adapted to be interposed between the said burner and the operator.

690,190. APPARATUS FOR TREATING GOLD ORES.—Vicente P. y Sacio, Yauli, Peru. An apparatus comprising receptacle having a wide upper portion with an annular collecting-channel in its bottom, and a reduced lower portion, a stirrer extending into both portions of the receptacle, an electrolytic vessel or cell, and passages leading from said vessel to the lower part of the reduced portion of the receptacle and to the said collecting-channel respectively.

690,198. DUMPING-BUCKET.—Edwin E. Slick, Braddock, Pa. The combination with a hanger, of a bucket supported therefrom, and provided with a swinging bottom, a hand-lever secured to the side of the bucket, a stop on the outer side of the bucket, and a link connecting the hand-lever to the swinging bottom.

690,225. AUTOMATIC HAULAGE AND DELIVERY SYSTEM.—Ralph Baggaley, Pittsburg, Pa.—The combination of a railroad-track having straight portions or tangents connected by an intermediate curve, and which is upwardly inclined, adjacent to the curve and thereafter downwardly

inclined, in order to enable the traverse of cars around the curve to be effected by gravity, a propelling-cable extending in line with the straight portions of the track, in position



to impart movement to a car thereon, and means, as a guide-roller, by which the cable is led clear of the curve and its direction changed from the line of one tangent to that of the other.

690,226. DUMPING-CAR.—Ralph Baggaley, Pittsburg, Pa. The combination of a railroad-car, a door hinged to the car-body and controlling a lateral discharge-opening therein, a locking-bolt for retaining the door in closed position, and an upwardly and outwardly projecting tripping-lever journaled on the door and coupled to the locking-bolt, in position to be swung in its bearings and release said bolt by contact with a resistance applied at a point above the track.

690,257. METHOD OF MAKING ALUM.—Edgar Everhart, Atlanta, Ga., assignor to Piedmont Chemical Company, Portland, Me. The process consists in first adding bauxite or other aluminous substance to a solution of niter-cake, heating this compound to form soda-alum and sulphate of soda, adding a solvent, adding an alkali, drawing off the liquor, crystallizing the Glauber salts from said liquor, draining off the solution of soda-alum, heating the same and adding thereto potassium chloride, and purifying and crystallizing the resulting product.

690,278. APPARATUS FOR EXTRACTING GOLD AND CONCENTRATING ORES AND METALS.—William F. Heatherman, Santa Ana, Cal. Apparatus consisting of a tiltable, elongated water-holder, adapted to assume vertical and horizontal positions, and having a wide opening at its upper end and its lower end being tapered or conical and provided with a series of openings arranged one at the apex, and the others in the side at different distances above the apex, and an ore or metal receiving box fixed directly over the water-holder, and provided with means for releasing and allowing discharge of its contents.

690,293. SQUIB.—John T. James, Plymouth, Pa. A blank for a miner's squib consisting of a strip of paper treated at both ends with a solution to prevent it from blazing when ignited and the main body portion left untreated.

690,295. PROCESS OF EXTRACTING ZINC FROM WASTE PRODUCTS OF ROASTED PYRITES.—Carl Kellner, Vienna, Austria-Hungary. A process of treating roasted sulphide ores of zinc, which consists in converting the zinc compounds therein into sulphites by suitable means, converting the sulphite into a sulphate by a suitable oxidant, treating the sulphate with an alkali metal or alkaline-earth metal chloride, thereby forming chloride of zinc and sulphate of an alkali metal, removing the latter and recovering the zinc.

690,301. ORE-CONCENTRATOR.—Richard R. Lee, Pinos Altos, N. Mex. The combination of a circular pan, a central vertical rotating shaft carrying a rigidly-attached bowl, two sets of radial arms connected to said bowl in the same horizontal plane, one set being provided with pendant and dragging rubbing devices, and the alternate set being constructed as troughs rigid from end to end, but hinged at their inner ends to the bowl opposite openings in the same and extending to the outer periphery of the pan.

690,319. PROCESS OF PRODUCING CARBIDES.—Isaiah L. Roberts, Brooklyn, N. Y. A process of making calcium carbides which consists in feeding a mass of carbon and calcium oxide solely by gravity to a pair of angularly-disposed electrodes, passing a current of low amperage through the mass and then increasing the amperage of the current independently of the variable resistance due to the supply and discharge of the material thereby freeing the mass and effecting its gravitation.

690,359. SPLIT EXPANSION-BIT FOR DRILLING OIL WELLS.—Andrew R. Burt, Redlands, Cal.—The combination with a head, of bit members pivoted thereto which have apertures extending there-through transversely and webs intercepting said apertures and themselves having smaller apertures in the webs and into the main apertures, a spiral spring surrounding said pin and interposed between the webs, and heads on the pin which are adapted to limit the outward spread of the bits.

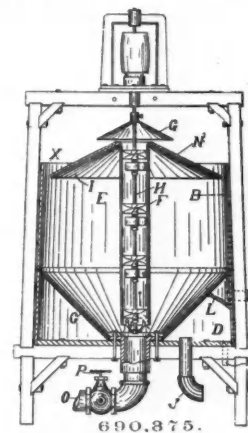
690,361. PROCESS OF TREATING METALLIC ORES.—Stanley C. C. Currie, New York, N. Y., assignor to himself, and Edward N. Dickerson, Stovall, N. C. The process consists of treating ores with a hypochlorite and an acid, and in maintaining the resulting solution substantially neutral by varying the amount of acid or alkali in said solution.

690,363. APPARATUS FOR THE PRODUCTION OF HALF-STUFF FROM PEAT.—Christian Esser, Wiener Neustadt, Austria-Hungary, assignor of one-half to Adolf Pollak, Vienna, Austria-Hungary. A machine for stamping peat-turf comprising an annular table, two radial shafts one above the other above the table, a series of stampers along each side of said shafts, means on the upper shaft for operating one series of stampers, and means on the lower shaft for operating the other series of stampers.

690,365. APPARATUS FOR THE CONTINUOUS ELECTROLYSIS OF ALKALI CHLORIDES.—Wilhelm Gintl, Aussegg, Austria-Hungary. In apparatus of the type having means for holding the liquids present a cathode and a gas-collecting chamber containing an anode, the cathode being outside of the said chamber, the improvement which consists in the anode being supported and proportioned to approximately fit the said chamber horizontally to separate and divide the space above the anode from the space beneath it, and in the means of communication or circulation from above to below the anode being restricted, thereby preventing substantially free circulation, and means for introducing electrolyte into the space above the anode.

690,372. MEANS FOR SETTLING DUST FROM COAL, ETC.—Chas. E. Lloyd, Chicago, Ill., assignor of one-half to Ralph W. Cavanaugh, St. Paul, Minn. The combination with a vault or other receiving-chamber opening, of a spraying device formed for the escape of a moistening agent in the form of a fine spray or mist.

690,375. AGITATING-MACHINE FOR CYANIDING.—George Rubsch, Jr., Los Angeles, Cal., assignor of one-half to Preston K. Wood, Los Angeles, Cal. An agitating machine for treatment of gold and silver ores by the cyanide process, comprising an agitating-tank, having a conical bot-



tom; a rotary pump centrally disposed in said tank; a rotary deflector affixed to the shaft of the rotary pump, and vertically adjustable thereon; and a stationary deflector-plate below the rotary deflector, adapted to deflect the solution to near the edge of the agitating-tank.

690,382. ROLLING-MILL.—Thomas Williamson, Cleveland, Ohio, assignor of one-half to John Goeppinger, Youngstown, Ohio. The combination with a set of finishing-rolls and their housing, of a power-press pivotally supported upon the housing for shaping the advance end of a rail preparatory to entering the final pass.

GREAT BRITAIN.

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

Week Ending December 7, 1901.

20,702 of 1900. LEACHING COPPER ORES.—T. A. Irvine, London. Extracting copper from ores by stirring the crushed ores in a solution of sulphuric acid and common salt.

20,713 of 1900. CRUSHER FOR ASSAYERS.—F. W. Braun, Los Angeles, Cal., U. S. A. An improved crusher for samplers and assayers.

21,506 of 1900. COAL DRILL.—R. D. Harris, Neath. Improved hand drills for coal, chiefly to make the drill more portable.

22,554 of 1900. ZINC RETORT.—E. H. Hopkins, London. A furnace for distilling zinc from mixed oxides of lead and zinc with a filter of incandescent carbon to prevent the lead from passing over.

23,811 of 1900. COPPER RECOVERY.—G. Thomson, Elizabeth, N. J., U. S. A. Method for recovery of copper from waste liquors of copper rolling mills.

788 of 1901. AMALGAMATOR.—W. W. Slater and J. Galloway, Edinburgh. Improved amalgamating apparatus, using steam to hasten the action.

18,102 of 1901. MAGNETIC SEPARATOR.—Magnetic Ore Separating Company, Melbourne, Australia. Magnetic apparatus for separating chalcopyrite from other ores and gangue.

19,068 of 1901. ELECTRIC AMALGAMATOR.—W. E. Henneberg and E. C. H. Pape, Hamburg, Germany. Improved apparatus for electrolytically precipitating and simultaneously amalgamating metals.

## PERSONAL.

Col. O. P. Posey has arrived in Salt Lake, Utah, from Los Angeles, Cal., and is about to leave for Boston.

Mr. A. F. Holden, managing director of the United States Mining Company has returned to Salt Lake, Utah.

Mr. M. J. Heller, one of Capt. J. R. De La Mar's staff, has returned to San Francisco, Cal., from Mexico.

Mr. Edwin Ludlow is now general manager of the Mexican Coal and Coke Company at Las Esperanzas, Coahuila, Mex.

Mr. A. B. Knight has been elected to fill the Chas. W. Clark chair of mining at the State School of Mines, Butte, Mont.

Mr. G. A. Land, who is interested in the Golden Anchor Mine at Tonopah, Nev., is in New York City, from Salt Lake, Utah.

Mr. Hudson H. Nicholson, mining engineer, of Denver, Colo., is in Boston on business connected with an extensive placer property in Colorado.

Mr. J. H. Sanborn, representing the J. George Leyner Drill Company, of Denver, Colo., has been traveling through Nevada and California.

Mr. E. McCormick, mine superintendent, of Negocias Minera de Vacas, Durango, Mex., has resigned to assume charge of mining operations in Colorado.

M. Pierre Faure, mining engineer and graduate of the Ecole Polytechnique, has been made a partner of the firm of Ehret & Faure, metal dealers in Paris, France.

Mr. Wm. Thompson, of London, England, has been in British Columbia, arranging for the construction of a smelter at the Tyee copper mine, near Victoria.

Mr. M. H. Kauffman, formerly of Golden, Colo., has removed to Graham, Socorro County, N. M., where he has accepted a position with the Helen Mining Company.

Messrs. T. L. Oddie and F. J. Siebert, general manager and superintendent of the Tonopah Gold Mining Company's property in Nevada, have been at Salt Lake, Utah.

Mr. G. D. Case, of Copper Hill, Tenn., was recently appointed general superintendent of the new Amalgamated Company's copper smelting plant at Anaconda, Mont.

Messrs. A. B. Lewis and Gill S. Peyton, who are interested in the Majestic and Imperial Copper Mines in Beaver County, Utah, left Salt Lake for New York City on January 10.

Mr. Amos Shephard, who has been superintendent of the Atlantic Mine, near Hurley, Wis., is now superintendent of the iron mines of the Corrigan-McKinney Company in Michigan.

Mr. Dennis Minihan, formerly with the Rio Tinto Mining Company, recently accepted the temporary management of the Refugio and Belen properties at Jesus Maria, Chihuahua, Mex.

Mr. H. S. Clark, superintendent of development of the Yreka Copper Company's property, on Vancouver Island, was in Tacoma, Wash., recently conferring with the officers of the company.

Mr. C. L. Dignowity, of New York City, passed through Salt Lake, Utah, on January 10, on his way east. He has been examining some gold properties in Utah and Nevada for Eastern parties.

Mr. A. M. Johnson, manager of the Clyde Gold Mine at Cripple Creek, Colo., was recently appointed manager of the Ophir Mine at State Lake, Utah, and of the Tiewaukee Mine at Bingham, Utah.

Mr. Willis McCornick returned to Salt Lake, Utah, recently from Siberia, where he has been for the past year managing the affairs of the Siberian Exploration Company in its placer mining operations.

Mr. Charles E. Lentz, manager of the Big Show Mining Company, in which Cincinnati, O., men are interested, has gone to Montana to purchase a mill on which the company has had an option for some time.

Mr. George Kuech, of Audenried, Pa., who has been boss carpenter for the Lehigh & Wilkes-Barre Coal Company, recently resigned his position to become superintendent of the Silverton colliery at Minersville, Pa.

Mr. E. V. Orford has been appointed manager of the De Lamar Mine, De Lamar, Idaho, in succession to Mr. D. B. Huntley, who has gone to Rhodesia, South Africa. Mr. Orford has been connected with the mine for a number of years.

Mr. George E. Gay, mining engineer, of Pottsville, Pa., has been made general superintendent of the mines, coke plants and the railroad operations of the Maryland Smokeless Coal Company, Pittsburg, Pa., with headquarters at Bellington, W. Va.

Mr. John McConaghy has been appointed general manager of the Colorado Mines Consolidated Mining Company, at Robinson, Summit County, Colo. Mr.

McConaghy was formerly connected with the St. Patrick Mining Syndicate at Glasgow, Scotland.

Mr. Joseph H. Hutchinson has resigned as superintendent of the Trade-Dollar Consolidated Mining Company of Silver City, Ida. It is understood that Mr. James McDonald, mine foreman, will be made superintendent. Mr. Hutchinson will live at Boise.

Mr. T. L. Oddie, treasurer of the old Tonopah Mining Company, of Tonopah, Nev., has been elected manager of the new Tonopah Company in place of Mr. J. H. Jenkins, resigned. Mr. F. Siebert, the manager of the old Tonopah & Salt Lake Company, has been appointed assistant manager.

Mr. Charles Derleth has been appointed Professor of Civil Engineering in the University of Colorado at Boulder, Colo., and entered on his duties January 13. He was graduated from the College of the City of New York in 1884, and from Columbia University in 1886. From 1896 to 1900 he was instructor in the Columbia summer school of surveying.

## OBITUARY.

Dr. Charles Harbordt, known to many mining men as an authority on metallurgy, died suddenly January 1, at his hacienda at Chiapas, Mex. Some 20 years ago he was superintendent of the Cheltenham Smelter at St. Louis, Mo., and afterward had charge of the Argentine, Kans., works of the Consolidated Kansas City Smelting and Refining Company. For the past 8 years he had lived in Mexico, where he had charge of the Aguas Calientes and Mapimi smelters for 6 years. Owing to ill health he was obliged to give up active work and retire to his hacienda 2 years ago. Dr. Harbordt was 54 years old at his death. He was a man of ability in his calling and had many warm friends.

## SOCIETIES AND TECHNICAL SCHOOLS.

WESTERN SOCIETY OF ENGINEERS.—W. H. Finley was elected president of this society at the recent annual meeting of the organization in Chicago. About 150 members and guests were present at the banquet. The outgoing president, Octave Chanute, gave the society a check for \$1,000 to provide an endowment fund for prizes for papers on engineering subjects. The report of the president showed the organization to be in a healthy condition.

COLORADO SCHOOL OF MINES.—In the recent annual report to the board of trustees of this school at Golden, it appears the school has an indebtedness of \$33,000. The value of the school property is \$226,700, of which \$150,000 is in buildings and grounds, and the balance in fixtures and supplies. There was expended for betterments during the year \$23,340. There are 242 students in the school, of whom 160 are residents of Colorado. Mr. W. S. Stratton gave \$25,000 to the school, and the only other gift of the year was that of M. Guggenheim Sons, which was \$1,000. The number of graduates last year was 37.

ENGINEERS' CLUB OF ST. LOUIS.—At the meeting on January 8 35 members and 22 visitors were present. The lease of the new quarters in the Howard Building was approved. The president was instructed by the club to appoint two members for the managing board for the new quarters.

Messrs. Thos. K. Peters and Alvin D. Reed were elected to membership.

Mr. A. S. Johnson read a paper on "Expanded Metal." The lecture was profusely illustrated by lantern slides and referred mainly to the use of expanded metal in connection with cinder concrete in the construction of walls, floors, arches, sewers, roofs and tanks. Mr. Johnson exhibited in the slides the methods of construction which were used, and gave some figures on the strength, weight and deflection of the various forms of construction. The views included working drawings, photographs of work in process of construction and of completed work. The principles of the designs and the limitations of their use were explained in detail. A number of samples of the metal, and of the metal imbedded in concrete were exhibited. The paper was heartily received and aroused considerable discussion.

## INDUSTRIAL NOTES.

The Gem Manufacturing Company, of Pittsburg, Pa., is said to be shipping boiler tube cleaners abroad, particularly to the English market.

H. E. Haynes & Company, of Salt Lake, Utah, are making a 5 by 20 ft. boiler for the Horn Silver Mining Company, of Frisco.

The Pittsburg Reduction Works has had its plant, at Shawinigan Falls, Que., in operation 2 months. The plant has already shipped 30 tons of aluminum to Japan.

A company is reported to be under formation in Toronto, Ont., for the purpose of manufacturing abrasive wheels and machinery from the Craig Mine corundum.

The Pacific Iron Works, of Seattle, Wash., is putting in a blast furnace and making other improvements at the smelter of the Puget Sound Reduction Company, at Everett, Wash.

The Vancouver Engineering Works has supplied tanks and outfit for the cyanide plant at Ymir, B. C., and will tender for the pipe line in connection with the cyanide concentrating plant at the Payne Mine.

The Burt Manufacturing Company, of Akron, O., announces government orders for its Cross oil filters for the battleship *Illinois*, and the torpedo boat *Bainbridge*. Cross oil filters were awarded the highest medal at the Pan-American Exposition.

The new copper leaching plant built by the Acme Mining Machinery Company, of Salt Lake City, for the Clara Copper Company, is completed. It is designed to use the Gardner process and is attracting the attention of parties interested in copper properties.

The Ingersoll-Sergeant Drill Company, through its Salt Lake branch, is filling an order for Roy & Titcomb, on the line between Sonora, Mexico, and Arizona, for a class A compressor; and the company has shipped several drills to the King of Arizona Mining Company.

James McKay & Co., chain-makers, have moved from Pittsburg to a new plant at McKee's Rocks, Pa. The new works cover about 40,000 sq. ft. of ground, and are fitted with the most up-to-date machinery for the manufacture and testing of chain of all kinds.

There has been a recent change in the officers of the Vulcan Iron Works, at Seattle, Wash. I. Hulme is now president and manager, with H. P. Strickland as secretary. Manager Hulme has recently acquired patents on a new concentrator that will be placed on the market soon.

The Arthur Fritsch Foundry and Machine Company, of St. Louis, Mo., states that it is well supplied with orders, most of which are for mining machinery. The firm is shipping rolls, crushers, jigs, etc., to adjacent mining camps, and building 2 large copper conveyors for the far West.

A Davis calyx drill, made by the Davis Calyx Drill Company, of New York City, bought by E. M. Warner, of Colfax, Wash., was recently installed upon a coal prospect 15 miles up the Orofino River. The drill takes out a core over 2 in. in diameter, and has been making from 20 to 25 ft. a day.

A world's record for steel rod production was made recently at the Rankin, Pa., plant of the American Steel and Wire Company. In 24 hours the rod mill made 586,070 lbs. of finished rods. The Rankin plant will attempt this month to beat the world's record for tonnage in finished rod for one month.

The National Abrasive Manufacturing Company, of New York City has been incorporated under the laws of New York with a capital of \$1,500,000 to develop mines and acquire mining rights in North Carolina and elsewhere. Among the directors are William H. Crow, J. W. Comey and E. H. Small, of New York City.

The Ironsides Company, of Columbus, O., reports a rapidly developing business that has necessitated extensive improvements at its factory. These improvements, recently completed, double the capacity. The company's specialties are compounds for preserving fibre ropes, belting, gearing, wire ropes and metallic surfaces generally.

The Cassel Automatic Water Motor Company, of Seattle, Wash., has sold to a Japanese engineering syndicate, Takata & Company, the use of its patents covering Japan, but the manufacture of the motor for the syndicate will be conducted in Seattle. An Italian company has also ordered 6 3,000-h. p. Cassel motors for installation in Italy.

The Sullivan Machinery Company, of Chicago, Ill., states its business in the Southwest and Mexico has become so great that it has decided to establish a branch office and supply depot at 306 St. Louis Street, El Paso, Tex. The company builds rock drills and diamond drills, air compressors, hoists, engines, mine fans and quarrying and coal mining machinery.

The Hampden Corundum Wheel Company, of Brightwood, Mass., has bought an emery mill in Chester, an emery mine in Peekskill, N. Y., increased its capital stock from \$16,000 to \$200,000, and is planning big additions to the plant in Brightwood. The mine in Peekskill is said to carry ore containing 60 per cent of oxide of aluminum and a few car-loads have been shipped.

It is said that the Federal Chemical Company, which was incorporated in October under the laws of Kentucky with \$3,000,000 capital, is to erect a large plant either in Atlanta or Nashville. The plant, which is estimated will cost something like \$200,000, will be used for the manufacture of finished fertilizer, acid phosphate and sulphuric acid used by the plant. The pyrites for the manufacture of the acid, it is said, will be imported from Spain.

Capt. C. R. Darnell, commanding the military hos-



pital at Iloilo, Philippine Islands, recently placed an order with the Pittsburg Boiler Scale Resolvent Company, of Pittsburg, Pa., for 1,000 lbs. of boiler compound. This compound will be used in the boiler of the government ice plant at the military hospital, Iloilo, where the water is highly impregnated with lime and salt. The Pittsburg firm has during the year shipped boiler compounds for the government to the Philippine Islands.

The Bullock Electric Manufacturing Company, of Cincinnati, O., with offices in the St. Paul Building, New York City, has added 4 new foreign agencies. Wm. M. McLean & Company, of Melbourne, Australia, will have direct supervision over Australia, New Zealand, Tasmania and Fiji. The new agency for Manchuria and Eastern Siberia will be in charge of E. L. Richardson & Company. Mr. Richardson will eventually make his headquarters in New York. The new Japanese agency will be at Tokio, and is to be undertaken by H. S. Tanka & Company. T. S. Allen will look after the Bullock interests in Porto Rico, with headquarters at San Jose.

The Stilwell-Bierce & Smith-Vaile Company, of Dayton, O., with New York City offices at 141 Broadway, is reported making some substantial shipments to its British representative, Frederick Nell, of London. Recent contracts secured comprise two 30-in. cylinder gates, one single 27-in. cylinder gate and two 27-in. cylinder gate turbines. The Stilwell-Bierce Company is also stated to be about to forward a large shipment of high pressure turbines to the Quiatchouan Pulp Company, of Quiatchouan, Province of Quebec, Canada. The shipment will include two 1,000-h. p., one 500-h. p. and one 100-h. p. equipment.

The Chicago Pneumatic Tool Company, which has been completed in all its details, has elected the following directors: Charles M. Schwab, Pittsburg; John A. Lynch, Chicago; John R. McGinley, Pittsburg; James H. Eckels, Chicago; William B. Dickson, Pittsburg, Pa.; Charles A. Miller, J. W. Duntley, Chicago, Ill.; Joseph Boyer, Detroit, Mich.; Edward Y. Moore, Chicago, Ill.; John Charles Taite, London, Eng.; Charles Parker Whitecombe, London, Eng. The executive committee is as follows: J. W. Duntley, chairman; Charles M. Schwab and Max Pam. The officers are as follows: J. W. Duntley, president; W. O. Duntley, vice-president; Edward Y. Moore, second vice-president; Ernest P. Wenger, treasurer; H. R. Kent, assistant treasurer; Leroy Beardsley, secretary; S. G. Allen, assistant secretary; Joseph Boyer, mechanical engineer; A. J. Doughty, general superintendent; Pam, Calhoun & Glennon, general counsel.

Roney mechanical stokers are being installed in the Manhattan Railway power plant by Westinghouse, Church, Kerr & Company. It was estimated by the engineers for the Manhattan Company that at least 270 men would be required to fire these boilers by hand, whereas with the Roney stokers this force can be reduced to 90 men, a saving in labor alone of over \$400 per day. Another important advantage is that hard or soft coal, either separately or mixed, can be burned by a simple adjustment of the feed and grate actuating mechanism. The supply of coal is regulated by the feed wheel, and the motion of the grate bars by the position of the lock nuts. These adjustments, the company says, are easily made. The present installation will consist of 256 stokers under the 64 525-h. p. boilers, and they will be capable of developing 50 per cent above the rated capacity of the boilers. The total equipment when the plant is completed as designed will consist of 384 stokers attached to 96 525-h. p. boilers, a total of 50,400 h. p., making this the largest boiler plant ever designed or installed. Roney stokers are also being installed in the large New York City power stations of the New York Edison Company, 244 stokers, 35,000-h. p. boilers; Third Avenue Street Railway Company, 240 stokers, 31,500-h. p. boilers; Metropolitan Street Railway Company, 174 stokers, 25,000-h. p. boilers.

TRADE CATALOGUES.

The Central Electric Company, of Chicago, Ill., has issued its January, 1902, price list, an illustrated pamphlet of 174 pages. The price list covers electrical supplies of all kinds and has a good index.

The Archer Iron Works of Chicago, Ill., manufactures steel wheel-barrows, lumber carts, trucks of all kinds, wheels of all kinds, and steel ore and coal cars. These are described in a neat 20-page pamphlet which the company mails on application.

The Western Electrical Supply Company, of St. Louis, Mo., is sending to the trade a practical daily reminder calendar for use on the desk. The calendar is mounted on an iron frame, and got up in a very substantial manner.

A little circular sent out by the Jackson Company, of Denver, Colo., describes the Jackson portable electric hammer for rivetting, chipping, calking or stone dressing. The hammer is made in 3 sizes. The company claims that this hammer can be more cheaply

installed than pneumatic hammers as no compressor plant is required.

Jules de Clercy, of Three Rivers, Quebec, is sending out circulars calling attention to the results obtained from a Riche gas producer plant installed for the Three Rivers Gas, Heat and Power Company. By the Riche system gas is produced from wood, peat, coal, and all organic substances. At the Three Rivers plant coal and wood are used.

John Davis & Son, of Derby, Eng., and 140 W. Fayette Street, Baltimore, Md., have issued section A of their catalogue for 1902 describing Davis' mining and surveying instruments, including compasses and transit theodolites. The pamphlet also contains illustrated price lists of a variety of safety lamps and fixtures.

Catalogue No. 2 published by the Allis-Chalmers Company, Fraser & Chalmers Works, of Chicago, Ill., is a neatly printed and finely illustrated pamphlet of 127 pages. It contains information about hoisting in general, and describes various types and forms of hoisting engines made by the company in accordance with its own designs or with the specifications of buyers. Some of the hoists mentioned are those at the Le Roi Mine, Roseland, B. C.; Tomboy Gold Mines, Telluride, Colo.; Homestake Mine, Lead, S. Dak.; and the Rand Mines, Limited, of South Africa.

The Western Electrical Supply Company, of St. Louis, Mo., states that on account of the flattering success met in the sale of Emerson alternating current ceiling and desk fans, and Peerless direct fans, it is endeavoring to contract for fans earlier than before. The firm says that last year it had the entire output of its factory sold before June 1, and hence it is advising customers to place contracts for fans as early as possible. A very large number of contracts are already closed. The firm has published 2 very attractive catalogues, illustrating current fans. These will be mailed on application.

The Nash gas and gasoline engines are described in a 43-page pamphlet sent out by the National Meter Company, of New York City. These engines are made single cylinder, two and three-cylinder and are recommended for electric lighting, pumping and power purposes. The single cylinder engines are made in sizes from 3 to 10 h. p.; the 2-cylinder from 15 to 30 h. p. and the 3-cylinder from 40 to 125 h. p. The engines are of 4-cycle type and use the pump system, the gasoline being pumped directly into the cylinder. The governor in the larger sizes is of the fly-ball type. Either incandescent tube or electric spark lighters may be used.

GENERAL MINING NEWS.

**Pipe Line Returns.**—The runs of Pennsylvania oil in December averaged 82,797 barrels, or 1,200 bbls. below the November record. The shipments averaged 97,644 bbls. a day, a decrease of 6,233 bbls. from November. The Ohio and Indiana runs were 47,853 bbls., a drop of 4,586 bbls. from November, and the shipments were 48,470 bbls., a drop of 3,774 bbls., says the Oil City Derrick.

The average daily runs for both the Pennsylvania and Lima oil fields for 1901 were heaviest in May, when they reached 146,283 bbls., and lowest in December, 130,650 bbls. The average shipments of the two fields were largest in August, 158,291 bbls., and lowest in February, 140,000 bbls.

The Pennsylvania net stocks decreased 558,507 bbls. while the Lima stocks increased 189,987 bbls., making the total decrease 368,520 bbls.

The following shows the condition of the net stocks in iron tanks held by the various pipe line companies at the close of 1900 and 1901:

Date.	Penn'a.	Lima.	Total.
Dec. 21, 1900.....	13,174,717	14,988,928	28,163,645
Dec. 31, 1901.....	9,420,421	17,760,306	27,180,727
Difference.....	D. 3,754,296	I. 2,771,378	D. 982,918

ALASKA.

CAPE NOME.

**National Cape Nome Gold Mining and Transportation Company.**—Judgment for \$49,913 was recently filed against this company at New York in favor of Daniel A. Loring for balance due on a note of \$50,000 made by the company on May 7, 1900, payable 5 months after date, on which \$4,000 has been paid. It is a Delaware corporation, and J. C. Hand, New York City, is secretary and treasurer.

DOUGLAS ISLAND.

**Alaska-Mexican.**—The report for the month ending December 15 shows 20,494 tons ore crushed, valued at \$23,775, and 530 tons sulphurets valued at \$23,164. Total receipts for month \$47,204, and expenses \$31,275. Ore averaged \$2.31 per ton. The large quantity of sulphurets is due to the cleaning of the bin containing them, which showed an excess of 150 tons above the estimates previously made.

JUNEAU DISTRICT.

**Alaska Gold Mines Corporation.**—This company, incorporated under the laws of Arizona with \$1,500,

000 capital, claims to be developing gold bearing quartz ledges on the Louis River, 6 miles southwest of Sumdum. The company states that in addition to the 8 claims first taken it has acquired 4 lode claims and 1 placer claim to get title to deep water front on Windham Bay for a dock, also 2 water rights. G. D. Sheldon, superintendent at Sumdum, states that work on a dock started recently and that a tunnel is to be run on one of the claims.

ARIZONA.

COCHISE COUNTY.

**Commonwealth Mining Company.**—This company has won its suit against the County Board of Equalization for adding \$250,000 to the assessed value of the mines at Pearce. The decision was on technical objections to the jurisdiction of the Board of Supervisors.

CRAHAM COUNTY.

**Arizona Copper Company, Limited.**—This company reports that the production of its mines at Clifton for the month of December was equivalent to 1,151 short tons of copper.

PIMA COUNTY.

**Consolidated Gold Mountain Mining Company.**—Charles R. Fleming, president of this company, has been in Pittsburg, Pa., to place contracts for \$260,000 worth of gold mining machinery and equipment. The total contracts will amount to about \$500,000. The company was organized a few months ago with Pennsylvania capital. The claims are in the Galiuro Mountain, near Tucson.

SANTA CRUZ COUNTY.

(From Our Special Correspondent.)

**Arizona Gold and Copper Company.**—The 50-ton custom smelter at Patagonia is just completed, and will shortly begin buying ore.

**Buena Vista.**—The main tunnel is in 235 ft. and has opened up a body of copper ore, from 3 to 6 ft. wide. A recent shipment of first class ore to the El Paso Smelter gave good returns.

**Wandering Jew.**—Work will shortly begin on this property, in Tyndal District. Shafts are to be sunk along the ledge to locate the silver-lead ores found in the adjoining property, the Santa Rita.

YAVAPAI COUNTY.

**United Verde.**—It is said that there is to be a reduction in the operating forces at this mine at Jerome as alterations and repairs are contemplated, which will increase the producing power of the properties. It is the intention to make all necessary improvements while the copper market is demoralized.

CALIFORNIA.

AMADOR COUNTY.

(From Our Special Correspondent.)

**Kennedy.**—The new East shaft of this mine at Jackson is 2,700 ft. deep. Stations are being put in at the 2,400 and 2,500 ft. levels preparatory to drifting.

BUTTE COUNTY.

(From an Occasional Correspondent.)

**Golden Front.**—This property, on the South Fork of the Feather River, 37 miles from Oroville, is owned and operated by the Consolidated Golden Front Mining Company, 302 Claus Spreckels Building, San Francisco, J. F. Waterhouse, superintendent. There are 3,000 ft. of development on the property, and the equipment consists of a Merrill's 3-stamp mill, and another 5-stamp mill, recently increased by the addition of 2 Standard concentrators, 10-stamps, and an 800-ft. steam hoist. As the old 5-stamp mill is not to run, the effective crushing capacity will be 13 stamps.

(From Our Special Correspondent.)

**Gold Bank.**—At this mine at Forbestown a prospecting crew is reported to have found good ore on the ledge they sought. Miners have been working on tribute for some time. The mine is well equipped and has one of the best chlorination plants in the State. The mine is owned by the family of the late W. W. Stow, with Harry Stow, superintendent.

CALAVERAS COUNTY.

(From Our Special Correspondent.)

**Fellowcraft.**—This mine at San Andreas was relocated on New Year's, it being alleged that no assessment work was done during 1901. There is a mill and other buildings. The new claimants are H. Zwinge, B. Johnson and F. Treat, Jr. The mine has been idle for 2 years, owing to litigation, and one of the owners, J. Tiscomia, was about to start work.

**Hexter.**—J. J. McSorley has given a 60-day option on the Hexter, or Stockton Hill, gravel mine, at Mokelumme Hill. The Hexter tunnel is expected to drain the channel, the middle portion of which has remained unworked owing to water. Two air compressors are being put in. Part of the channel paid well in early days.

**Iowa Consolidated.**—This mine at Rich Gulch is owned by Iowa and New York men. A 400-ft. tunnel is being run to tap the vein at 200 ft. depth. The tunnel is now in 130 ft. in hard quartzite.

**Jesus Maria District.**—At the village of Jesus Maria, 20 miles from Valley Spring, the old Ennis Mine owned by Wm. Hamilton is to be reopened. At the Salvator Mine a ditch is to be dug and a new mill built. The Blue Jay Mine, owned by John Courtmarsh and John Guccio, has been bonded to a Boston company and a new tunnel is to be started.

**Wright & Lane.**—The 40-stamp mill of this mine at Hodson is to be run by electricity, the power being brought from Knights Ferry 8 miles distant.

## EL DORADO COUNTY.

(From Our Special Correspondent.)

**Alpine.**—This mine, near Georgetown, is owned by Los Angeles men, and J. C. Harn is superintendent. Eight men are employed.

**Atwood.**—This mine, near Omo, is managed personally by Mrs. Atwood, formerly of Boston, who is owner. The only electric drills in the county are used there.

**Cambrian.**—At this mine, near Coloma, the new 1,200-ft. tunnel is completed. The 10-stamp mill is run by water power.

**Eagle.**—This mine, at Grizzly Flat, has been bonded by C. D. Lane, of Angels. W. I. Smart is in charge.

**Expansion.**—B. Berris and Chas. McDonald, of Placerville, have bonded to Oakland men this mine, 8 miles west of Placerville. A Huntington mill is to be set up.

**Golconda.**—This mine at Pilot Knob District, 6 miles from Shingle Springs, was recently sold to Bridgeport, Conn., men and will be actively worked.

**Gold Bug.**—A hydraulic elevator is used to work the gravel of this mine, near Georgetown. The mine is owned by a Cleveland, O., company and W. E. Thorn is superintendent.

**Noonday.**—Dr. J. Q. Wrenn, of Placerville, and Dr. I. M. Proctor, of Petaluma, have bonded this copper mine on Mathenas Creek, near Diamond Springs, to the Peyton Chemical Company of Martinez, and development is to start. Little work has been done on the property.

**River Hill.**—This mine, near Placerville, has its new 3-compartment shaft down 550 ft. Water power runs the mill and the hoist; the drills are run by compressed air. Geo. M. Clark is superintendent.

**St. Clair.**—At this mine, near Kelsey, heavier pumps are to be put in. B. L. Peters is superintendent.

**Vandalia.**—At this mine, at Canyon, Cornish rolls are being put in to crush the ore for cyanide treatment. The mine is owned by Louis Rosenfeld, of San Francisco, and C. F. Staver and Chas. E. Seymour, of Canyon, the latter being superintendent.

## FRESNO COUNTY.

(From Our Special Correspondent.)

**Copper King.**—This mine, near Letcher, hauls its ore to Clovis and ships by railroad to the smelter at Seal Bluff Landing on San Francisco Bay. The haul from the mine to Clovis has been made by steam traction engines. The Superior Court, on the suit brought by the county supervisors, has rendered judgment against the company, forbidding traction engines on the roads. An appeal has been filed by the company.

**Fresno Placer Mining Company.**—This new company, of which Alva E. Snow is president and S. L. Hogue secretary, is about to work by hydraulic elevator ground on Sycamore Creek, a tributary of Kings River, about 40 miles from Fresno. A 4-mile ditch has been dug from Big Creek, which will furnish water at 250 ft. head. The gravel is about 25 ft. deep and of high grade. Among the Fresno people interested are, W. D. Bowen, L. Manuel, Dr. F. M. Hayden, W. D. Noble, T. E. Langley, John A. Richter, Geo. D. Noble and Marion Childers. The latter was the discoverer of the ground and has worked it on a small scale.

## HUMBOLDT COUNTY.

(From Our Special Correspondent.)

**Beach Mining.**—The black sand gold property near Orick, owned by John Chapman, has been sold to a company of eastern men of whom Sturgess Whitlock of Darby, and H. D. Munson, of New Haven, Conn., are members. Certain portions of the ocean beaches have paid well for years, especially when after winter storms the waves have concentrated the gold in the black sands.

## MARIPOSA COUNTY.

(From Our Special Correspondent.)

**Garibaldi.**—At this mine, at Kinsley, 2 parallel veins about 10 ft. apart are worked. One is hard ore and the other softer. The hard rock is crushed by stamps and that from the other vein by a Huntington mill. The shaft is now down 335 ft.

**Mariposa Commercial and Mining Company.**—The electric machinery for the power plant has been received at Bagby, where the dam on the Merced River is located.

**Mount Gaines.**—It is rumored that this mine at Hornitos, which closed 2 years since, will again be worked. The Martin Mine is to be re-opened.

## NEVADA COUNTY.

(From Our Special Correspondent.)

**Electric.**—The Grass Valley Consolidated Mining Company is pumping out this mine, at Grass Valley, and a lot of new machinery has been shipped in. Superintendent Coffin is in charge.

**Slate Ledge.**—D. B. Marwick, E. K. Smart and Richard White have taken an option on this one of the smaller mines of Grass Valley. The mine has a 10-stamp mill, pumps, hoist, etc., run by water power and is producing. The present shaft is down 540 ft. below the drain tunnel. The mine has been under lease to Richard White.

## SHASTA COUNTY.

(From Our Special Correspondent.)

**Hardscrabble.**—R. H. Warren and E. F. Jones, owners of this gravel mine, near Oak, applied for a permit to work by hydraulic process, the tailings to be deposited in Clear Creek.

## SISKIYOU COUNTY.

(From Our Special Correspondent.)

**Quartz Valley.**—At this hydraulic mine, A. C. Brokaw is running 4 giants and a very large hydraulic elevator. He is also running a new mill in Hill Gulch on ore from a recent discovery.

**Red Bird.**—The new mill, near Yreka, has started on day and night runs.

**Yreka Mining Company.**—This company, which owns the Gold Ball, Mountain Laurel and Ohio Mines at Rollin, under the superintendence of L. D. Ball is running the mill on good paying ore. It is one of the steady producers of the county.

## TUOLUMNE COUNTY.

(From Our Special Correspondent.)

**Bonanza.**—This mine has closed down and the compressor and pumps have been removed.

**Crystalline.**—This property, adjoining the Whisky Hill or Harvard Mine, is located about ¼ mile west of Jamestown. Drifting, cross-cutting and stoping are in progress on the 300 level, and the ore is being run through the 10-stamp mill. Work on the new 60-ft. 3-compartment gallowes frame being put in by W. J. Stephens, of Redding, is about finished. New boilers and a 15 by 16 double hoist with a sinking capacity of 2,500 ft. are going in; also a 6-drill air compressor. The hoist was built by the Rix Compressed Air Machinery Company, of San Francisco, and the compressor was furnished by the Laidlaw, Dunn, Gordon Company, of Cincinnati, O. A. C. Morrison is superintendent.

**Dondero.**—At this gravel mine, at Yankee Hill, near Sonora, work has been resumed.

**Eagle-Shawmut.**—This property is 1 mile north of Jacksonville; Charles E. Uren is superintendent. A new gallowes frame is nearly completed over the new 3-compartment shaft, and the hoist is in place. The new 60-stamp mill is running, as is also the chlorination plant which was lately improved to the extent of \$12,000. About 200 men are employed at the mine. Oil is used for fuel.

**Horseshoe Bend Gold Mining Company.**—This company has been organized to work nineteen claims at Horseshoe Bend near the Stanislaus River, above Robinson Ferry. Timber for the gallowes frame is on the ground and machinery is being shipped in. The company has a water right to 10,000 in. from the Stanislaus River. The officers and directors are: Wm. A. Morse, president, Boston, Mass.; Dr. Eugene S. Taylor, vice-president, Dorchester, Mass.; Dr. Albert E. Miller, treasurer, Needham, Mass.; William B. Libby, secretary, Boston, Mass.; Fred E. Houghton, managing director, Boston, Mass.; M. E. Sanford, auditor; Geo. Morrice, manager; Joseph Y. Smith, superintendent, Sonora, Cal.

**Mount Jefferson.**—The 20 stamps at this mine at Groveland are crushing steadily. Since shipments of sulphurets have ceased about 180 tons have accumulated on the dump worth over \$40 per ton. James M. Meighan is manager.

**Over.**—The 1,100 ft. tunnel of this mine, at Columbia, is rapidly draining the old works.

**Peterson.**—This mine, at Columbia, has been bonded by Robert Yuill and W. S. Murray, of Victoria, B. C., who will start work at once.

**Pirate.**—Henry Barrett has bought out his partners in this mine at Sugar Pine, 17 miles from Sonora, and has sold an interest to Charles Jump.

**Possible.**—L. Radovich and Wm. Smith, of San Francisco, have purchased from J. Schoenfeld and D. Adler this mine, near Columbia.

**Wild Cat.**—The mill at this mine, near Soulsbyville, has started and the old workings are being cleaned out. C. G. Grimm, superintendent, has 12 men busy.

## YUBA COUNTY.

(From Our Special Correspondent.)

**Hydraulic Permits.**—The following applications to mine by hydraulic process have been presented to the California Debris Commission; J. D. Countryman for the Tannery Mine at Oregon Hill to deposit tailings in Oregon Creek; Manuel Fernandez for the Independence Mine at New York Flat, to deposit tailings behind the dam of the Nevada Mining Company.

## COLORADO.

## BOULDER COUNTY.

(From Our Special Correspondent.)

**Boulder Oil Fields.**—Great excitement prevails owing to the discovery of high grade illuminating oil at the Arnold well, controlled by the Consolidated Oil Company at a depth of 2,720 ft. The amount of oil is uncertain as yet.

**Logan.**—This famous mine at Crisman has closed down, except a few men who are contracting, until the new air shaft is completed.

**Lowell.**—It is reported that Dr. E. H. Cook, of the Richmond Mine, has taken up the Ben C. Lowell property at Magnolia. It is considered a profitable mine and will be actively developed.

**Riverside.**—This oil company was formed lately and is already erecting derricks.

## DOLORES COUNTY.

**United Rico Mines Company.**—A consolidation of a large number of mining companies under this title in the Rico District is announced. The movement has been under way for several months. The merged companies include the Rico, Enterprise, Aspen and all mines, mills, smelters and other plants connected with them. This new corporation will have a capital of \$3,600,000 and among the board of directors are William McKelvey, James H. Lockhart and William McConway, of Pittsburg, Pa. Other members of the directorate are David H. Moffat, Albert E. Roeder and Walter Beam, of Denver; Joseph H. Caven, of Philadelphia, Pa.; William N. Coler, of New York City, and Samuel Newhouse, of Salt Lake, Utah. William McKelvey is to be president of the new corporation.

## GUNNISON COUNTY.

**Augusta.**—Development work is now in progress on this mine, with promise of favorable results.

**Good Hope.**—Regular shipments are made from this mine at Vulcan. The shaft is being retimbered and enlarged. The rich vein of gold ore opened in the 600-ft. level some weeks ago is reported holding its own well. Dr. Louis Weiss, the principal owner, contemplates many improvements this year.

**White Pine District.**—George Williams, of Denver, has secured a bond and lease on several mining properties in this district, including the Comstock, owned by F. A. Porter. The properties are situated on Lake Hill. Mr. Williams is acting for a New York company.

## HINSDALE COUNTY.

(From Our Special Correspondent.)

**Golden Fleece.**—This vein, remarkable for the richness of its ores, is being developed through the tunnel which has reached the vein. Drifts and upraises are being made with favorable results.

## LAKE COUNTY—LEADVILLE.

(From Our Special Correspondent.)

**Leadville Ore Tonnage.**—There is no change in the smelter situation and a number of the large sulphide producers are figuring on closing down their workings, merely keeping the pumps going until there is a market for sulphide ores. It is announced that the Ohio & Colorado Smelting Company, owning the New Monarch, has started construction on its new smelter at Salida and will probably complete it by May or June. There is also talk of erecting new smelters in Colorado and Utah but so far, outside of the Ohio & Colorado plant, it is all on paper. The Salida plant will be equipped with a refinery and it is stated that the Rocky Mountain Smelter at Florence will also add a refinery.

**Bartlett.**—New lessees have opened a streak of ruby silver 2 in. wide from which a shipment will be made this week.

**Benton Mining Company.**—Fain & Co., lessees, are working Park No. 2 claim and driving the tunnel which is in low grade siliceous ore for the Penn ore shoot. Occasional shipments are made.

**Big Evans Mining Company.**—Machinery is being erected over the Hoffer shaft and as soon as all is in place the shaft will be drained and sunk deeper. The combination comprises 150 acres of virgin territory.

**California Gulch Mining Company.**—Additional money must be raised within 30 days to push the work abandoned some months ago or the leases will be forfeited.

**Carbonate Hill Mining Company.**—At a special meeting 11,000 shares more stock were subscribed



for at 35c. a share, the money to be used in pushing the drift for the P. O. S. shoot. Several tons of iron ore have been mined which will net \$7 a ton. The drift is within 40 ft. of the big iron body of the P. O. S.

**Pancho Mining Company.**—The new machinery is in place and the new shaft is down about 100 ft. **Gilt Edge.**—New lessees have secured a long-time lease on this claim lying across the gulch from the Moyer. A diamond drill will explore before shaft sinking starts.

**Gold Basin Mining Company.**—The vein cut a few months ago in the new workings on the Big Four is developing well and recent shipments have returned 5.5 ozs. gold, 75.8 ozs. silver, 8.4 per cent copper. The company is confident it has the old Big Four vein.

**Homestake Leasing Company.**—The open winter permits steady shipments from this property which after years of idleness is being extensively developed. Philadelphia people own the ground which is under lease to Leadville men, headed by George Campion and J. H. Weddle.

**Morocco Mining Company.**—The first shipments of ore from this new Leadville basin project, the A. V. shaft, were made this week from an iron shoot. The company refuses to say anything about the new strike but estimates that the ore is only found in bunches. The work is between the 400 and 425-ft. level close to the rich shoot at the 500-ft. level of the Bon Air.

**Nayr Mining Company.**—Another body of sulphides has been cut which will net \$7 to \$8 to the ton. Owing to the condition of the market no attempt is made to ship, but much development is being done.

**Ohio Gold Mining Company.**—The shaft on this new gold belt property is 300 ft. deep with 3 levels. In the upper 2 levels there is a fair grade oxidized vein. At the lower level 40 ft. from the shaft a good copper sulphide vein has been proven for 40 ft. The stuff averages \$40 to the ton on assays.

**Oro City.**—J. J. Gordon et al. have sunk a new shaft 50 ft. and are putting in machinery to sink to contact after the old lime ore shoot.

**Prospect Mountain.**—On the C. & S. group operated by Mansfield Bros. the tunnel has opened the vein. A new shaft will be sunk.

**Rialto Mining and Leasing Company.**—There is a temporary cessation of sinking. At 1,237 ft. the company has cut quartzite and has not yet decided whether to drift or to sink.

**South Winnie Leasing Company.**—The annual meeting will be held on January 17. Annual reports will show \$15,000 paid in dividends and an immense amount of development work done which has opened a very rich vein. Some gold streaks are being sacked which run over \$1,000 in gold.

**Umatilla Mining Company.**—Work which ceased in December owing to bad weather will resume next month. A tunnel in good mineralized ground lies near the famous Continental Chief.

**Wilkesbarre.**—Local lessees are working the vein which shows small streaks running 100 ozs. silver. This ore is being sacked.

LARIMER COUNTY.

(From Our Special Correspondent.)

**Big Creek.**—This claim has the deepest shaft in Pearl. The shaft is 180 ft. deep.

**Hogback.**—As a result of the discoveries in the Grand Encampment District, Wyoming, prospectors have been exploring the district south on the Colorado border. Among the new discoveries is the Hogback lode, near Zirkel, which gives strong evidence of mineralization.

SAN MIGUEL COUNTY.

(From Our Special Correspondent.)

The local Miners' Union has again shown itself to be a disturbing factor to the business interests of this district, by ordering a boycott against the Telluride "Journal," a newspaper published for more than 20 years, that has labored unceasingly, and in the main unprofitably, to develop and rebuild the district. Many local shopkeepers have, at the behest of the Union, withdrawn their advertising and subscription patronage from the paper; some continue their support. The incident arouses much acerbity and enmity. The paper continues its daily and weekly issues.

**Japan Mines Company.**—This company has rebuilt the burned compressor building at the mouth of the new cross-cut tunnel near Telluride and has resumed work in the cross-cut. It will cut the Japan vein 600 ft. below present workings, open much rich gold and silver ore and drain the lower levels which have been filled with water for more than a year. The new equipment consists of a Laffin & Rand air compressor, operated by power from the Telluride Power Company. Three shifts are employed. A new concentrating plant of 150 tons daily capacity has been ordered, and work on it will soon begin if weather permits. At all events, the mill will be erected and the tunnel completed before 1903.

**Smuggler-Union Mining Company.**—This company has rebuilt the tramway terminals at the mouth of the Bullion Tunnel and is sending ore to its 2 mills at Pandora. Both mills, with a combined equipment of 140 stamps, are running full capacity, and the leaching tanks of the 400-ton cyanide plant have been filled for the first time. The mining force is up to its normal number and additional men are being employed daily.

**Telluride Power Company.**—This company has contracted to furnish additional power to some mines and mills and is now furnishing some 2,500 h. p. beside power for lights in Telluride and Ophir. The two generating stations have a combined capacity of 4,000 h. p. It has put up 75 miles of transmission lines, and 50 miles of telephone lines.

TELLURIDE COUNTY—CRIPPLE CREEK.

(From Our Special Correspondent.)

**Acacia Gold Mining Company.**—Considerable work is being done. On the north block of the ground, Owsley & McFarland are shipping some ore and have let a contract for sinking the shaft 200 ft., which will make the shaft 825 ft. deep. On the old workings, Hinds & Co., lessees, are shipping considerable ore, as also is lessee Falve.

**C. K. & N. Gold Mining Company.**—The over-issue of stock is stated to amount to 95,000 shares in a circular issued by the officials. The circular also states that there is considerable stock in the treasury, which will be held in a special account to protect the over-issue. The company's property is situated on Beacon Hill, near the El Paso, and consists of the Raaler claim.

**Isabella Gold Mining Company.**—A determined effort is being made by some of the stockholders to wrest the control from Messrs. Williams, Kilborn and others. A circular has been sent to stockholders stating that the present management is undoubtedly operating the property for its personal benefit, and asking that proxies be given to William Lennox of Colorado Springs. This circular was signed by William Lennox, E. W. Giddings, Jr., Louis R. Ehrlich, J. A. Sill and Henry S. Hawks. The annual meeting occurs January 21. Both sides are trying hard to get the control. Messrs. Lennox and Giddings are prominently identified with the Strong, Gold King and other large mines. The present management also sends out a circular which sets forth that the affairs of the company have been carried on in a conservative manner, but that the results have been very disappointing. The circular also states that it is not the intention nor it never has been to consolidate the Orphan and Isabella. The circular is signed by Nelson B. Williams, president. With this circular, a letter from George Stone, one of the heavy stockholders, is sent, showing that Mr. Stone is satisfied with the present management. A number of mining men think it would be a great benefit to the Isabella company to have a change in management, while others believe that the present management is doing the best it can. A number of rumors are out that large bodies of ore have been opened in the mine, but have been covered to manipulate the stock better. These are merely rumors.

**Mine Leasing.**—During the past 60 days a number of leases have been let. This is a good sign, as small leasers are quite an addition to the district.

**Wild Horse.**—From all reports this property is making an excellent record. It is understood that the production amounts to about \$14,000 net per day. The property is controlled by the Woods Investment Company.

GEORGIA.

LUMPKIN COUNTY.

(From Our Special Correspondent.)

**Consolidated Company.**—This company is running 20 stamps on ore from the Hand Mine. The plates are said to show a saving of \$1.15 per ton.

**Crown Mountain.**—This mine is running its entire plant full time, 3 giants supplying the ore at the reported cost of mining, transportation and milling of 10c. per ton. A recent clean-up of the stamp mill plates alone gave 124 oz. gold.

IDAHO.

BLAINE COUNTY.

**Liberal Mining and Development Company, Limited.**—This company, of New York City, was recently organized under the laws of New York. Its capital is \$2,000,000. The directors are John B. Roach, J. F. Black and George C. Hetzel, of Chester, Pa., and F. C. Reed, of New York City. The property includes the Liberal group of mines on the Hailey gold belt. The president is John Roach, and the vice-president J. E. Black, of Chester, Pa. At the mine in the incline sunk from the main tunnel a cross-cut at a depth of 100 ft. is said to show ore 8 ft. thick. That is 250 ft. below the upper works.

BOISE COUNTY.

**Checkmate.**—This mine at Pearl, is said, will be transferred to Chicago people. The price is understood to be \$150,000. The stock of the company is all in

escrow in one of the Boise banks. By the terms of the deal \$50,000 is to be paid by March 1, whereupon the property is to be turned over. The principal owners of the Checkmate are E. E. Calvin, J. H. Young, J. D. Carnahan and Mr. Henry, of Ogden, and the heirs of J. C. Melvaney.

IDAHO COUNTY.

**Banner.**—A New York company is putting in 3 Huntington mills to work the ores of this mine near Florence. About 35 men are employed, and as soon as the mills are in place the working force will be increased to 60 or 70.

KOOTENAI COUNTY.

**Idaho-Centennial.**—This Duluth, Minn., company, of which A. Klockman, of Port Hill, is resident manager, is planning to install a 20-drill air compressor and a concentrator in its mines. The company reports a 22-ft. vein of good concentrating silver-lead ore in sight. About 100 men are employed by the company, 30 at the mines and the others at the road from the mines to Port Hill. High grade ore will probably be shipped to the Everett, Wash., smelter as soon as the road is in good shape.

NEZ PERCES COUNTY.

(From Our Special Correspondent.)

**Crooked River Mining and Milling Company.**—This company has purchased from F. J. Rowlands, of Butte, Mont., a 10-stamp mill and tables complete; also a saw mill. The ore is free milling, and is said to save \$8 on the plates. Tom A. Hogan and brother, of Butte, are the principal owners and managers.

ILLINOIS.

RANDOLPH COUNTY.

**Chicago-Coulterville Mining Company.**—An 8-ft. vein of coal was recently struck in this company's new shaft, at Coulterville. The company owns 2,500 acres of coal land along the Illinois Central Railroad, 45 miles southeast of St. Louis, and will equip at least 3 other mines on the Illinois Central and Illinois Southern Railroads. The following Kansas City men are interested: D. D. Thomas, S. G. Warner, A. C. Olds, C. H. Hill, A. E. Pinkney and W. W. Avery.

SANGAMON COUNTY.

(From Our Special Correspondent.)

**Capitol Coal Company.**—An old fire in this mine at Springfield broke out again a few days ago and the mine is temporarily shut down.

**Co-operative Coal Company.**—At this mine at Cannelton, on January 6, a trap door leading to the pump house at the bottom of the air shaft caught fire, burning the timbers in the shaft and the fan house at the top. The mine is now on fire and idle. Both shafts are closed to smother the fire.

INDIAN TERRITORY.

(From Our Special Correspondent.)

**Coal Mining.**—Production is light and mining moves slowly, partly because of the present scarcity of cars and partly because this scarcity has lasted so long that many miners have gone to more active fields. Demand is fairly good and the output from about McAlester should be about 500 cars daily.

D. Edwards & Company, of McAlester, and the Balen Darnell Coal Company, of Kansas City, Mo., are opening large coal properties on the Ardmore extension of the Choctaw, Oklahoma & Gulf Railroad.

The competition of Texas oil has not been felt severely, though it had taken the place of coal in many of the smaller plants of Texas and thus diminished the demand for slack somewhat, but reduced rates made on slack to Texas points January 1 have stopped the falling demand for slack.

CHOCTAW COUNTY.

**Dow.**—Fire started in the new slope at this mine, near Hartshorne, one of the principal properties of the Big Choctaw Coal Mining Company on January 13. Later the dead bodies of 4 men were brought to the surface, and it is feared that at least 10 others have been burned to death.

KENTUCKY.

LIVINGSTON COUNTY.

**Fluorspar Mining Company.**—This company now has 8 mines in operation in this county, 5 being near Smithland. A tramway from the mines to the Cumberland River is about completed.

MARYLAND.

FREDERICK COUNTY.

**Blue Mountain Iron and Steel Company.**—The D. W. R. Read Company, of Philadelphia, dealers in coal and coke, has filed a petition in the County Circuit Court for the appointment of a receiver for this company of Baltimore, and for an injunction restraining the company from disposing of its property. The plaintiffs are creditors of the company to a large amount for coke furnished at the Catoclin furnace, none of which has been paid for.

The complaint alleges that the company is insolvent, that its affairs are very much involved, and that

a judgment now stands against it for a considerable amount. The company was organized with some flourish 2 years or so ago. It owns the Catoctin furnace, subject to a mortgage of \$26,000, part of which may have been paid, now held by William T. Rainey, of Cleveland, O., and a second mortgage to the Produce Exchange Company, of New York, to secure an issue of \$500,000 worth of mortgage bonds. The plant was recently advertised for sale under the first mortgage, but was withdrawn.

MICHIGAN.

COPPER—HOUGHTON COUNTY.

*Atlantic.*—The December output is given as 27 tons, 800 lbs. of mineral.

*Franklin Mining Company.*—The December output was 375 tons of mineral, which compares with 317 tons for November and 195 tons for December, 1900.

*Mass.*—The December output is given as 135 tons of mineral, one-half of which was mass and barrel work from the mine.

IRON—MARQUETTE RANGE.

*Negaunee.*—At this mine at Negaunee, 9 men were imprisoned by the recent fall of ground. The drift in which the men were caught soon filled with water. The United States Steel Company owns the mine and Manager T. F. Cole has been directing the work of recovering the bodies.

*North Champion.*—At this new mine near Champion of which Walter Fitch is part owner, the ore body is reported 80 to 135 ft. wide and about as long. The mine will ship next summer.

*Richards Iron Mining Company.*—This company has sold 40 acres of land near Palmer to M. B. Thompson, of Ishpeming, for \$13,000.

IRON—MENOMINEE RANGE.

*Chapin Mining Company.*—The Chapin Mine, at Iron Mountain, is now operated by the Oliver Iron Mining Company directly. This entails no change in management, as the Oliver company is in turn owned and operated by the United States Steel Company, which is doing away with the many small iron mining companies controlled and placing their management directly in the hands of the Oliver company.

MINNESOTA.

(From Our Special Correspondent.)

Work has started on the new ore dock for the Duluth & Iron Range road. The Duluth, Missabe & Northern road has let a contract for replacing the wood approach to Dock No. 1 with steel upon stone piers before the opening of navigation. The same road is negotiating for a number of additional locomotives and is grading a line to the Snyder-Oliver mine in 22 58 20 as well as straightening its Hibbing line near the east line of Range 20.

The mines owned under subcorporations of the United States Steel Corporation will be operated directly by the Oliver Iron Mining and the Minnesota Iron Companies, doing away with many concerns that have had officers and a legal status. The new method will save annoyance and delay. The Lake Superior Consolidated Iron Mines (J. D. Rockefeller) will be eliminated also, though its legal organization must continue some time. It is probable that the American Mining Company (American Steel & Wire Company) will also be wiped out. On the old ranges the bulk of mining for the United States Steel Corporation will be by the Oliver Iron Mining Company acting as operator as last year, though in some cases where there are outside minority interests individual corporations must continue in the management. This is the case, particularly, with the Regent Iron Company and the Lake Superior Iron Company, of the Marquette Range, and the Chandler Iron Company, of the Vermillion Range.

The annual report of the labor inspector of Minnesota gives these figures of average daily pay:

	1896.	1898.	1900.	1901.
Miners	\$1.83	\$1.865	\$2.20	\$2.42
Trammers	1.61	1.815	2.00	2.08
Underground labor	1.82	1.77	1.80	2.10
Surface labor	1.40	1.48	1.75	2.10
Contract workers	1.90	2.10	2.35	2.52

There were in 1898 in the mines of the State, all in St. Louis county, 4,431 persons, and in 1901, 8,500 persons. The report makes some allusion to the scarcity of fatal accidents, but the figures are probably incorrect.

*Sparta Iron Company.*—This company is starting to ship considerable Sparta grade ore to Chicago by rail, and will continue all winter. The ore comes directly from the shaft. This is the first time any such shipment has been made from the Mesabi range.

IRON—MESABI RANGE.

(From Our Special Correspondent.)

A portion of the large ore body found in the northeast part of section 12, T. 27, R. 21, which was under lease from the State of Minnesota, is found to be in dispute between the State and the Duluth & Iron Range road, and a sale of the tract that was pending has been stopped. The Duluth & Iron Range road

claims the land by virtue of a decision of the Federal Court, that through oversight, or worse, the state attorney-general's office permitted to pass unnoticed until the time for appeal had expired.

The new year begins with exploration active all along the Mesabi. It is utterly impossible for new explorers to get drills from the contracting firms, and it is very hard to get men to run them. Many explorers are buying their own drills.

*Burt.*—A stripping contract has been let to Winston Bros. & Dear, who have done all the stripping at the Mahoning for 8 years. They are now building camps and getting in material. The stripping lies north of the underground workings.

*Kinney-Hawkins Exploration.*—This exploration, covering 160 acres in section 32, T. 57, R. 22, is under negotiation for sale to a large interest at a price said to be about \$900,000. There are some 30,000,000 tons of 56 per cent and better ore. The Eastern Railway of Minnesota will haul the ore. The land is the property of the Mississippi River Lumber Company, and the ore carries a royalty of 20c. a ton. Messrs. Kinney, Hawkins, Pearce and Crosby, all of Duluth, have been exploring for 12 months.

IRON—VERMILION RANGE.

*Section 30.*—According to a press dispatch the United States Supreme Court has decided a contest between the Midway Company and several residents of Minnesota as to the validity of half-breed Sioux scrip. The court holds that they were valid, thus affirming the decision of the Supreme Court of Minnesota. Edward Burns, who discovered the property in 1883, is said to be keeping a store in Chicago. The litigation and other expenses for the past 18 years are said to amount to about \$1,000,000. The Midway Company is controlled by A. M. Miller, of New York City.

MISSOURI.

JASPER COUNTY.

(From Our Special Correspondent.)

*Joplin Ore Market.*—The week has been very active. The milder weather allowed work to go on full blast, and the output was correspondingly large. The price of zinc ore has fallen \$4 per ton from the \$34 per ton mark during Christmas week. It is stated that the American smelters secured 40,000 tons of zinc ore for the winter run, and are now laying back until spring weather allows operations to resume full blast.

The highest price reported for zinc ore during the past week was \$30 per ton, upon a straight bid. The highest assay price reported was \$27 per ton for 60 per cent ore. Some ore was sold upon a straight bid which would average almost \$30 per ton for 60 per cent zinc ore.

The lead ore market remains unchanged at \$21 per 1,000 lbs. delivered. The product is up regularly each week with the local smelters the heaviest buyers.

Compared with the corresponding week of last year zinc ore is up \$3 per ton, and lead ore is down \$2 per 1,000 lbs. The shipments are greater by 1,542,880 lbs. of zinc ore, and 243,530 lbs. of lead ore, and the valuation is \$34,438 greater.

Following is the turn-in by camps of the Joplin District for the week ending January 11:

	Zinc lbs.	Lead lbs.	Value.
Joplin	1,914,260	486,740	\$39,163
Galena-Empire	1,286,890	138,570	19,684
Cartersville	1,709,570	365,780	29,760
Webb City	738,400	40,690	10,823
Oronogo	836,190	26,300	10,719
Neck City	406,340	.....	6,095
Aurora	390,900	23,370	11,942
Zincite	370,080	12,800	5,820
Spurgeon	230,700	136,520	5,751
Carl Junction	404,210	.....	6,063
Granby	220,000	56,000	3,104
Central City	116,000	12,130	1,821
Cave Springs	87,940	21,610	1,817
Roaring	84,650	8,720	1,283
Stotts City	342,440	.....	4,965
Duenweg	44,640	56,040	1,757
Wentworth	90,000	.....	1,305
Total	9,873,210	1,383,200	\$161,827
Total Corresp'd week, 1901.	8,330,330	1,139,760	\$127,434

Zinc value last week.....\$131,583; lead value.....\$30,289  
Total, 2 weeks.....18,142,140 2,816,340 \$309,712

*Dumars & Wagner.*—This mine at Duenweg has started its mill, and at the trial run produced 20,000 lbs. of zinc ore a shift.

*Hoo Hoo.*—This mine at Alba made a remarkable run last week, producing 145,100 lbs. of zinc ore, and 532,900 lbs. of lead ore from one shaft.

*La Tosca.*—This mine at Oronogo in 1901 produced 4,284,201 lbs. of zinc ore.

*New Mining District.*—A company of Webb City mining men have purchased and leased 140 acres of virgin land 4 miles northwest of Joplin, and of 5 shafts being sunk, 3 are in fine ore.

LAKE COUNTY.

(From Our Special Correspondent.)

*New Find of Lead Ore.*—The fifty acre farm of George W. Jones 2 miles east of Liberty, Mo., has

been leased by operators from the Joplin District, and shafts will be started before April 15. Fine specimens of both lead and zinc ore have been taken from a well at 14 ft.

MONTANA.

BEAVERHEAD COUNTY.

*Crystal Graphite Company.*—This Kansas City, Mo., company located 8 claims near Van Camps Canyon, about 15 miles from Dillon, in 1900. In 1901 it opened another deposit about 1 mile distant to a depth of 25 ft., and has started a tunnel now in 133 ft., to cross-cut the vein at a depth of 65 ft. The company has shipped sample lots of graphite east to test its suitability for crucible manufacture. Pearl S. Smith is president of the company.

FERGUS COUNTY.

(From Our Special Correspondent.)

*Central Montana Mines Company.*—The difficulties among the stockholders are still unsettled. Six weeks ago Judge Knowles, of the Federal Court, sitting at Helena, made an order in the case of A. S. Wright vs. this company, virtually suspending the receivership and allowing the officers of the company to assume control of the property under a stipulation agreed on by both sides in the belief that they could thus settle their troubles. Both sides have asked the court for an extension of time until January 20. This has been granted.

JEFFERSON COUNTY.

(From Our Special Correspondent.)

*Gray Eagle.*—Gus Friburg, of Basin, has opened a new stope of 4 ft. of shipping ore. Mr. Friburg recently secured a lease and started an upraise from tunnel No. 3. The first round of holes exposed ore which had been overlooked by the former management. Ten men are taking out a car a day.

LEWIS & CLARKE COUNTY.

(From Our Special Correspondent.)

*Arnold.*—This copper property, on Snowshoe Creek, 10 miles from Elliston, is worked under a \$40,000 bond by John F. Cowan and others of Butte. In sinking a 25-ft. winze and drifting 20 ft., 1,300 sacks of copper ore were taken out. The ore is a carbonate in lime. It is owned by Dr. G. E. Blackburn, of Butte. Machinery is to be put on the mine as soon as the roads are in shape for hauling.

*Big Ox.*—This property, 4 miles from Marysville, reports a strike of ore in the lower tunnel. The ore was found at the face, 50 ft. in. The ore sampled 200 oz. silver, 15 per cent lead.

*Columbia Gold Mining Company.*—This company, operating at York, under the management of C. L. Fredericks, has ordered a complete cyanide plant from San Francisco.

*Vauter.*—Beattie Brothers, of Helena, have given a lease and bond on this mine, 9 miles above Rimini, to D. J. Tallant and John Peterson, of Great Falls. A steam hoist and other machinery have been placed on the property. Sinking to the 300 ft. is one of the requirements of the bond. A cross-cut at that depth will be driven to cut the vein.

*Winscott.*—The Allis-Chalmers people have contracted to complete the 60-stamp mill ordered for this property by August. The mill will be placed on Big Indian Creek some distance below the present 10-stamp mill. A tunnel will connect the new mill with the mines.

POWELL COUNTY.

(From Our Special Correspondent.)

*Brown Iron Mine.*—This iron property, owned by Frank G. Brown, of Anaconda, is sending 40 tons of iron flux to the Montana Ore Purchasing Company's smelter at Butte daily.

*Northwestern Gold and Sapphire Mining Company.*—The capital stock has been increased to 150,000 shares, par value of \$1. The increase was made to enable the company to purchase more ground on the Big Cottonwood, and to equip the property with a hydraulic outfit.

SILVER BOW COUNTY.

*Carlisle.*—A syndicate of Butte and Helena men has bonded this property on the flat east of Butte City. The Butte & Anaconda Copper Company had secured an option on a bond of this mining property some time ago, but defaulted in the first payment, which was due January 1. J. H. Bigger, of Helena, secured an extension of the option on the same basis as that held by the company, and the first payment of \$6,000 has been made. The property is located just east of the McQueen placer. William Thornton, Patrick Mullins and other Butte mining men, Robert Bell, Dana Boyington, J. H. Bigger and others, of Helena, are interested.

*Nipper.*—Judge Harney has refused to grant a restraining order to the Anaconda Copper Mining Company against Heinze's Nipper Company to prevent the latter from working the Nipper Mine owned jointly by the Anaconda Company and Heinze. In refusing the order the Judge established a new rule to apply to the Amalgamated companies and mining liti-



gation generally that insolvency must be charged before a restraining order is granted. Much chagrin was manifested on account of the ruling from which there is no appeal. An application for an injunction will be heard on January 20, and meantime Heinze will be permitted to take out as much ore as he can.

In the noted Minnie Healey case, in which the judge was charged with corruption and immorality by the Amalgamated attorneys, and upon which they based a demand for a new trial, a motion for a rehearing has been submitted. Judge Harney took the matter under advisement.

(From Our Special Correspondent.)

**Boston & Montana.**—The mines of this company at Butte will resume active work January 15. Ore train crews on the Great Northern Railway started moving ore to the smelter at Great Falls on January 14. A total of 1,500 tons per day will go forward.

**Ophir Mining and Development Company.**—W. G. Young, Fred. Harris and Anthony Black, of Butte; J. T. Morrison, of Racine, Wis., and Wm. Neuberger, of Chicago, Ill., are the incorporators. The company is to work the Ophir claim in the southern section of Butte. The capital stock is \$200,000.

**Saratoga.**—It is reported that New York people have bought this claim in the foot-hills southeast of Butte. The reported price paid is \$75,000. M. Renig, of Helena, has owned the property for a number of years. The mines Corporation of New York is the reported purchaser.

**Speculator.**—Judge Harney has granted a new trial in the suit of ex-United States Senator Lee Mantle vs. Lulu F. Largey, administratrix of the estate of P. A. Largey. The interest claimed by Mr. Mantle is a 1-16th, valued at \$63,000. The first trial resulted in a verdict for the estate.

NEVADA.

WHITE PINE COUNTY.

(From Our Special Correspondent.)

**Ely Mining and Milling Company.**—Electric drills have recently been received. The installation has been delayed by the shortage of electric power in this camp, necessitating the use of a special gasoline driven generator.

**McKinley Mining and Smelting Company.**—Suit has been entered in the District Court against this company to recover title to the Saxton claim. As the development work has been almost wholly confined to this claim the result of the suit is awaited with interest. The shaft is down 157 ft., at which point it is reported small stringers of ore give promise of ore bodies with greater development. On the Aultmann claim, preparations are started for sinking a new shaft. Engineers have reported that the vein of the Revenue claim, as shown by the workings in the Chainman Mine, apexes on the Aultmann claim, thus giving this company title to all ore on the former.

NEW JERSEY.

HUDSON COUNTY.

**Arlington Copper Company.**—The large plant and the mine of this company at Arlington, have closed indefinitely. It is said that the sulphuric acid leaching process used was not a success. Owing to the nature of the ore or the formation of slimy iron compounds, it is stated, the crushed ore in the large lixiviation tanks was almost impervious to the acid. In fact it is reported that at the first trial the solutions penetrated the material for only 6 inches.

NEW YORK.

ESSEX COUNTY.

**Witherbee, Sherman & Co.**—The Lackawanna Iron and Steel Company recently purchased the Sherman interest in the mines, railroad property and furnace of this company at Port Henry. The members of the Sherman family, George D. Sherman, George K. Sherman and John R. Sherman, held a third interest, the balance being controlled by Frank S. Witherbee, Walter C. Witherbee and Wallace E. Foote, Jr. The company owns the ore property on Lake Champlain with a magnetic concentrating plant now being doubled. The railroad from Mineville to Port Henry is owned jointly with the Port Henry Iron Ore Company. On Lake Champlain, Witherbee, Sherman & Company have extensive ore dock property. Lately the company has made shipments of ore to the furnaces on the Hudson River, to the Lehigh and Schuylkill Valleys, and also to the Dominion Iron and Steel Company, at Sydney, N. B. By canal or by rail the Port Henry mines can ship cheaply to Buffalo, where the Lackawanna Iron and Steel Company is building a very large plant.

OHIO.

ATHENS COUNTY.

**Twin Vein Coal Company.**—This company, of Columbus, has been chartered in Ohio, by W. C. Bates, M. F. Bates and others, to operate the Twin Vein Mine at Broadwell.

JEFFERSON COUNTY.

**Ohio & Pennsylvania Coal Company.**—The new

coal works of this company, near Amsterdam, are to be ready to ship coal by May. The shaft will be 100 ft. deep and the sinking will begin soon.

MEIGS COUNTY.

**Hiawatha Coal Company.**—This company, of Toledo, O., has leased the property of the Seneca Coal Company, of Fostoria, consisting of 450 acres of coal land located in the vicinity of Urichsville.

PENNSYLVANIA.

ANTHRACITE COAL.

**Coxe Brothers & Company.**—The big Beaver Meadow-Quakake tunnel to drain this firm's mines in the Beaver Meadow Basin, and some of the collieries south of Hazleton, is practically completed. The tunnel is nearly 1½ miles long, and has been under construction about 2 years.

**Ellen Gowen.**—Two cave-ins in the East Side tunnel of this colliery of the Philadelphia & Reading Coal and Iron Company, at Mahanoy, closed the tunnel for 60 ft. About 200 men and boys are temporarily idle.

**Glennwood.**—This shaft at Jermyon has started after an idleness of over 7 months. The colliery was drowned out after the heavy rains of last May.

**Hillside Coal and Iron Company.**—This company, a branch of the Erie Railroad, recently purchased the workings of the Florence Coal Company at Smithville, and has taken possession of its purchase. The property consists of 1 breaker and 2 shafts.

**Lehigh Valley Coal Company.**—Judge Bechtel has refused a new trial to 1½ plaintiffs in the ejectment suit against this company, who contend they are the heirs of Burkhart Moser. In his opinion Judge Bechtel says that only one of the heirs, Henry Moser Pyle, of Pottstown, established his relationship with Burkhart Moser. The fact that 80 years passed before suit was brought makes it impossible for the plaintiffs to prove claims.

**Mount Jessop.**—This company's colliery, at Peckville, is closed down for 3 months. Pending repairs over 300 men and boys will be out of employment.

**Natic Anthracite Coal Company.**—The Pittsburg Trust Company, as receiver of this company, recently obtained an order allowing it to extend a lease to the Shamokin Coal Company for a period of 3 months.

BITUMINOUS COAL.

**Atlas Coke Company.**—This Pittsburg company has bought the plant of the Lafayette Coal and Coke Company for \$385,000. The property is located near Smock, and consists of 375 acres of coal with 163 acres of surface and 111 ovens.

**Manufacturers' and Consumers' Coal Company.**—This company, with a capital of \$5,000,000, has been formed at Pittsburg. The corporation is a connection of all J. H. Jones's interests, together with the Pittsburg & Buffalo Coal Company.

The latter, while operating as a separate company, will be managed from the same general office and by the same set of officers. J. H. Jones will be president of the combination, James Jones chairman of the Executive Committee, and H. P. Jones general manager. The total acreage to be controlled will be 25,000 acres, all in the Pittsburg District. The daily output will be about 15,000 tons. The concern will come into direct competition with the Pittsburg Coal Company, but it is said does not intend to contest that company's fields nor injure it in any way.

**National Mining Company.**—The United States Steel Corporation, it is said, has arranged to produce its own supply of coal in the Pittsburg District by developing 50,000 acres. Development will start at once by this subsidiary company, of which President Thomas Lynch, of the H. C. Frick Coke Company, is the head. The company will open its first mine in the Pan Handle field, 14 miles from Pittsburg, in the Chartiers Valley, where 7,500 acres of coal property will be developed. Contracts are placed for electric hauling and other equipment, and the plant is expected to be in operation before the end of the year.

The Steel Corporation plants in the Pittsburg District, aside from the Carnegie Steel Company, consume about 3,500,000 tons of coal annually, and the National Mining Company is to supply this.

**New York, Buffalo & Susquehanna Coal Company.**—This company, with headquarters at Buffalo, N. Y., has been incorporated by W. D. Waterman, E. M. Wilkins and Wm. B. Lynde. The mine will be at Karthaus, Clearfield County, where the company is now putting in a sidetrack to connect with the Beech Creek Railroad.

SOUTH DAKOTA.

CUSTER COUNTY.

(From Our Special Correspondent.)

**Copper Butte.**—The company is prospecting the copper ledge with a diamond drill at various angles.

**Crown Hill Company.**—Eastern men have volunteered to relieve the company of its indebtedness and take over their interest the Spokane lead and silver

mine in this county. The company would still own the Crown Hill group of claims in Lawrence County.

**Old Bill.**—This property is under bond to J. B. Safford and associates, of Chicago. A hoist has been purchased at the Golden Slipper Mine in Pennington County. A shaft is down nearly 100 ft.

**Salmon Group.**—The shaft is down nearly 100 ft., and shows a ledge of quartz and mineralized slates 12 ft. wide. The Gold Fish Mining Company contemplates building a mill below the shaft on Laughing Water.

LAWRENCE COUNTY.

(From Our Special Correspondent.)

**Custer Peak Mining Company.**—A new boarding house and other buildings have been erected, and miners will begin work January 15.

**Dakota Mining Company.**—Seth Bullock, John R. Wilson and Clayton Flower have retired from the directory and are succeeded by Isaac Clemenson, of Dubuque, Iowa, and J. M. Rickel and S. V. Noble, of Deadwood. J. B. Empson, chemist at the cyanide plant, has been elected secretary. The company has lately been treating custom ore from the Bordeaux property at Terraville, which is worked under lease. The greater portion of the ore comes from the Vulcan at Portland.

**Glover Gold Mining Company.**—Ore has been encountered in the company's shaft, 3 miles west of Lead, in Nevada Gulch, at 225 ft.

**Hidden Fortune.**—The new working tunnel is over 1,050 ft. long. It is 7 by 10 ft. in the clear and has 2 tracks.

**Iron Hill.**—Ore is being taken from the 200-ft. level by W. A. Remer, lessee. Silver-lead ore is shipped to Denver. The working force is soon to be increased.

**John B.**—A vein of mixed quartz and talc is being opened. The group is owned by J. E. Carleton, of Sioux Falls.

**Monarch.**—George Bachman, lessee, is taking out rich ore, and is shipping in sacks to a smelter. The ground belongs to the Deadwood & Delaware Smelting Company, and is 3 miles from Deadwood.

**Queen Bee Mining Company.**—A vertical of free-milling ore, 18 in. wide, is being opened. The ground is on Elk Creek.

**Recovery Gold Mining Company.**—Material is being ordered for a new 200-ton cyanide plant on the old Deadbroke Mine on Blacktail Gulch. Work on the new tunnel will start this month.

**Windsor.**—A new shaft has encountered a body of gold ore carrying copper. The claim is in Bear Butte District and is owned by Charles R. Sanwick.

TEXAS.

BREWSTER COUNTY.

(From Our Special Correspondent.)

**Dr. F. D. Coltrin** has leased a section of mineral land and put a force of men to work.

**Lindheim & Dewees.**—The 45-ton quicksilver furnace recently erected by Robt. Scott, of California, has been fired. This company has a large lot of ore on the dump and a great deal of partly developed and undeveloped territories.

**Louisiana Mining Company.**—This company has about 80 men at work on its claims on sections 38 and 44, Blk. G. 12. Lee Tigner is manager.

**Marfa & Mariposa.**—Work has begun on another 10-ton furnace. The company has been operating a 10-ton furnace for about 18 months and has probably produced about \$100,000 worth of quicksilver. It paid \$122,000 a few months ago for 2 sections of practically undeveloped mineral land that are proving a fine investment.

**McKinney Brothers.**—These parties are reported to be finding better ore, but have not the capital to push development.

JEFFERSON COUNTY.

**William Penn Oil Company.**—This company, organized under the laws of Arizona with a capital stock of \$2,500,000, proposes to build large storage tanks and to construct and operate oil pipe lines in the Beaumont field. The incorporators are all Beaumont men, and the company is said to be really a combination of a number of smaller oil-producing concerns.

UTAH.

(From Our Special Correspondent.)

**Bullion Settlements.**—The settlements at Salt Lake for the week ending January 11 were: Bullion \$80,600; gold bars, \$60,200.

BEAVER COUNTY.

(From Our Special Correspondent.)

**Golden Reef.**—This mine near Frisco has sent a first shipment of silver-lead ore to the Salt Lake Valley smelters. The returns were not as high as expected. The company is arranging with the Horn Silver Company to treat its ore and ship its concentrates in future.

**Harrington & Hickory.**—This is part of the Majestic Company's holdings near Frisco. The shaft is down 400 ft. and some fine silver-lead ore is being

extracted. On the Adelia, about 800 ft. away, the shaft is down 450 ft. and the manager intends drifting through the ore bodies each way.

**Horn Silver.**—Development on the fourth level shows a big body of shipping ore penetrated for 40 ft. and work is still pushed ahead. It is said that this ore body will extend clear to the surface. New discoveries on the other levels are also opening well. Superintendent Rohlfing has charge of the mine. For the week ending January 11, 257,030 lbs. first-class ore were forwarded to the Salt Lake Valley smelters.

**Imperial.**—This company, near Frisco, has taken an option on the Massachusetts group which adjoins its ground and from which some exceedingly rich copper ore has been shipped. A tunnel being run by the Imperial Company, now in 700 ft., will open the new ground; 14 men are regularly employed on it.

**Majestic.**—A further payment of \$10,000 has been made on the purchase price of the Harrington & Hickory group held by this company under bond from A. G. Campbell.

**Royal.**—The capitalization has been increased to 600,000 shares of the par value of \$10 per share. The company owns the Cactus group. Richard Stingley has been appointed as agent at Frisco, vice A. B. Lewis resigned. Development will continue under the direction of Robert J. Coleman, manager for Samuel Newhouse in Utah.

#### JUAB COUNTY.

(From Our Special Correspondent.)

**Tintic Shipments.**—The following are the shipments for the week ending January 11: Ajax, 1 car; Carisa, 13; Crown Point, 7; Eagle & Blue Bell, 3; Eureka Hill, 8; Gemini, 13; Grand Central, 3; Lower Mammoth, 3; Mammoth, 9; May Day, 3; Tesora, 6; Uncle Sam, 5; Yankee Consolidated, 6. Total, 82 cars ore. One bar of gold-silver bullion weighing 2,000 oz. was sent from the Mammoth Mill.

**Carisa.**—The management has decided to curtail shipments from this copper producer located at Eureka while copper remains low. The force is therefore to be reduced.

#### SALT LAKE COUNTY.

(From Our Special Correspondent.)

**Bingham Shipments.**—The shipments for the week ending January 11 were small. The Highland Boy sent forward its usual tonnage to the smelters. The other shippers were Ben Butler, 36,440 lbs. ore; Phoenix, 106,360 lbs.; and New England, 76,310 lbs.

**Bingham Consolidated Mining and Smelting Company.**—This company, with mines at Bingham and Tintic, sent forward the usual quantity of matte from its smelter in Salt Lake Valley for the week ending January 11. The management expects to have the converter turning out blister copper in April next. The material for the 4th furnace is now arriving on the ground and work is progressing fast under Superintendent Nutting.

**Butterfield.**—This mine at Bingham belonging to a French company has passed into the hands of George W. Keel as receiver. The company owns a large group of claims and a great deal of development work has been done. The Queen Concentrating Mill on the property during the last few months has been regularly shipping concentrates to the Salt Lake Valley smelters.

**York.**—A contract has just been let for 200 ft. of drifting in this mine at Bingham during the winter.

#### SUMMIT COUNTY.

(From Our Special Correspondent.)

**Park City Shipments.**—The following are the ore shipments for the week ending January 11: Daly West, 1,771,330 lbs.; Quincy, 1,246,250 lbs.; Ontario, 1,106,350 lbs.; Anchor, 417,850 lbs.; Silver King, 1,800,500 lbs. ore and concentrates.

#### TOOELE COUNTY.

(From Our Special Correspondent.)

**Hennefer.**—There were 61,220 lbs. of first class ore forwarded to the Salt Lake Valley smelters from Stockton for the week ending January 11.

**Utah.**—This mine at Fish Springs forwarded 61,610 lbs. of first class ore to the Salt Lake Valley smelters for the week ending January 11.

### FOREIGN MINING NEWS.

#### ASIA.

##### INDIA—MYSORE.

**Kolar Gold-field.**—The gold output of this district for the 11 months ending November 30 is reported at 461,279 oz. crude, against 449,253 oz. for the corresponding period in 1900, showing an increase of 12,026 oz. The output in 1901 was equivalent to 415,151 oz. fine gold, or \$8,581,171.

#### AUSTRALIA.

##### NEW SOUTH WALES.

**Broken Hill Proprietary Company.**—The refining report for the four weeks ending December 4 shows

an output of 598 oz. gold, 483,799 oz. silver, 5,102 tons lead and 33 tons hard or antimonial lead.

#### QUEENSLAND.

The Mines Department reports the gold output for the month of November as 48,112 oz. fine gold, or \$994,475. This is a decrease of 6,206 oz., or 11.4 per cent, as compared with November, 1900.

#### TASMANIA.

**Mount Lyell Mining Company.**—This company's report for the four weeks ending December 11 shows 18,557 tons of ore smelted, the yield being 809 tons black copper, containing 801 tons fine copper, 47,939 oz. silver and 1,545 oz. gold. The average result was 4.32 per cent copper, 2.58 oz. silver and 0.08 oz. gold to the ton.

#### WESTERN AUSTRALIA.

The gold output for December is reported at 177,165 oz., making a total of 1,679,389 oz. crude for the year 1901, against 1,581,148 oz. in 1900; an increase of 98,241 oz., or 6.2 per cent.

#### BORNEO.

(From an Occasional Correspondent.)

**Mijnboom Maatschappij Kehajang.**—This company, in which the firm of Erdmann & Sielcken, of Sourabaya, is largely interested in developing a gold mine in British Borneo. The engineer in charge is Mr. F. M. Perkins, who is well known as a mining engineer in Australia. A 20-stamp Fraser & Chalmers mill was sent out to the property some months ago and started operations in December. This mill is driven by steam power.

#### CANADA.

##### BRITISH COLUMBIA—BOUNDARY DISTRICT.

(From Our Special Correspondent.)

**Boundary Smelters.**—The ore tonnage smelted during 1901 at the 2 copper smelters is given below. To make the record complete from the time smelting started (in August, 1900), the tonnage treated in 1900 is also given. The B. C. Copper Company's smelter began operations in February of 1901 with a single furnace, which has been running almost continuously since.

In 1900 the Granby Company's smelter at Grand Forks 62,387 tons. The highest daily average was 601 2-3 tons in November. The total tonnage treated in 1901 was 230,928 tons. The largest amount in one month was 21,971 tons in December.

The tonnage treated has materially increased. The figures given scarcely do the Granby Smelter justice without allowance be made for one or two short stoppages for repairs. Leaving these out, the daily average throughout 1901 was about 633 tons, December showing the large average of nearly 709 tons a day.

The British Columbia Copper Company's smelter treated 117,505 tons in 1901, running 11 days in February and 23 in August. In December, 13,098 tons were treated averaging 422½ tons daily. Calling its active operation 10 months, its daily average tonnage for that period was 383 tons. The December average is remarkable for a furnace of a nominal capacity of only 250 tons. The results seem to demonstrate that Boundary ores are remarkably self-fluxing and that much skill has been displayed in the construction and operation of the works.

##### NOVA SCOTIA—HALIFAX COUNTY.

**Brookfield Gold Mining Company.**—W. L. Libbey, of Boston, Mass., the principal stockholder in this company, has sold his gold mine at North Brookfield to R. G. McMeekin, of the Vulcan Copper Company, New York City. McMeekin has paid \$30,000 and has 6 months in which to pay the balance.

##### ONTARIO—LAKE OF THE WOODS DISTRICT.

(From Our Special Correspondent.)

**Anthony.**—At this mine, north of Tache, a contract has been let for sinking 75 ft. The fine stamp mill originally set up in the Steep Rock Lake country is being removed to the Shore Mine. Other mining machinery is being taken in, and quite a number of teams are on the road.

**Black Eagle.**—The new mill is running, but no details are given yet.

**Mikado.**—On the 9th level of No. 1 shaft another body of exceptionally rich ore has been struck, and appears to be of considerable size. Bullion worth \$6,000 was recently brought to Rat Portage.

**Olympia.**—This mining location a little south of the Mikado has come under the control of some American mining men from the West. The erection of camps will begin at once and a contract for sinking will be let.

**Wendigo.**—Funds to pay the arrears of miners' wages, etc., have arrived.

#### CENTRAL AMERICA.

##### COSTA RICA.

(From Our Special Correspondent.)

**Abengarez Gold Fields, Limited.**—This company, operating on the Pacific side, has now for its manager

C. H. Colburn, of San Francisco, Cal. It is opening at lower levels than heretofore the mines known as Tres Amigos and Tres Hermanos. Its production with a 10-stamp mill is \$8,000 to \$10,000 per month. Arrangements have been perfected to increase the number of stamps to 40. The extraction is by amalgamation and cyanide, and averages 90 per cent.

**Aguate Gold Mining Company.**—A consolidation of the Sacra Familia, the Los Castros and the Aguate mines, all lying in the Aguate Mountains, near the center of the Republic, is being arranged, under a reorganization company capitalized at \$5,000,000. After 12 years' idleness these rich properties are to be worked again. Tunnel driving has begun at 2 points, and extensive development of all the properties at the lowest possible tunnel level, is being arranged. The new company includes several of the leading business men of San Jose, Costa Rica, though it has at its head an American, Mr. F. O. Popenoe. The properties included are estimated to have produced \$7,000,000 up to the time work ceased; but the extraction by the crude processes used was approximately only 33 per cent. Don Francisco Yglesias, president of the Costa Rica Senate, and his father before him, have been the leading spirits in these mines for 80 years.

**La Union.**—The mines known as La Union, near Miramar, on the Pacific side, having been idle for a year incident to a serious "cave-in," are working again through new and lower tunnels. A 20-stamp mill, with chlorination annex, is used. The ore is low grade, about \$8 per ton, but occurs in large bodies.

**Rio Grande Gold Mining Company.**—El Porvenir Mine, the history of which dates back of present records, is being worked by this new company, composed mostly of Americans. John H. Reubelt, of Cleveland, O., is manager. The mine is situated on the Machuca River, 12 or 15 miles from the Pacific Coast, and is at present producing ore valued at from \$40 to \$60 per ton.

**Thayer Mining and Milling Company.**—This company has purchased the mines and mills of the Bella Vista Mining and Milling Company and is operating 2 20-stamp mills. The directors have purchased 40 more stamps, and propose operating the properties as one, with an 80-stamp mill.

#### MEXICO.

**Guanajuato Consolidated Mining and Milling Company.**—The stockholders have elected the following directors: A. Bleecker Banks, Donald McLean, R. H. Beach, Charles N. King, Charles B. Holman, William Bouldin, Jr., New York City; George A. McGlone, Charleston, W. Va.; E. A. Wiltsee, Denver, Colo., and C. V. Rensselaer Cogswell. At a meeting of the directors, Wm. Bouldin, Jr., formerly vice-president of the company, was elected president, vice Frederick G. Corning, resigned, who remains with the company as consulting engineer. C. Van Rensselaer Cogswell was re-elected secretary and treasurer.

#### SONORA.

(From Our Special Correspondent.)

**Copete.**—The smelter, which has been shut down some time for necessary repairs, is now producing to its full capacity.

**Las Planchas de Plata.**—The Big Mountain Mining Company has recently been organized, to work these historic mines, with headquarters in Nogales. It is the intention of the new company to erect extensive reduction works, and to develop the mine on a large scale. The company is capitalized at \$5,000,000.

**Mulatos.**—Extensive cyanide tests are being made, with a view of determining the size of the contemplated plant. Development is also being pushed in the Voladero workings to uncover the ore in this part of the mine, known to be especially adapted to the cyanide process.

**Sonora Mining and Milling Company.**—A 50-ton smelter was recently purchased in Los Angeles, Cal., by Con O'Keefe, president and general manager, to be erected immediately.

#### NEW CALEDONIA.

**Canala.**—Some work is being done on the nickel mines of this district. Work has also been begun on the cobalt deposits of Bogotha Peninsula. It has been, however, very difficult to secure workmen.

**Kouaoua.**—Work is to be suspended for the present on these mines, the working force having been transferred to other mines belonging to the Societe Le Nickel.

#### SUMATRA.

(From an Occasional Correspondent.)

**Redjang Lebong Gold Mine.**—The production of this mine in November was 1,593 oz. gold and 9,344 oz. silver. This was less than in October, because heavy rains prevented the operation of the mill for part of the month. The mill has also been running on low-grade ore most of the time. The new slimes plan will be completed early in January.



MINING STOCKS.

Complete quotations will be found on pages 126 and 127 of mining stocks listed and dealt in at:

Boston.	Salt Lake City.	Toronto.
Colo. Springs.	Spokane.	Mexico.
New York.	St. Louis.	Paris.
Philadelphia.	London.	
San Francisco.	Montreal.	

New York. Jan. 16.

The mining stock market is in an unsettled condition owing to the weakness of the commercial metals, notably copper and silver. Stock quotations, with very few exceptions, are far below those of last year. In fact, the fall is so important that we give below a comparison of the quotations of leading stocks in the week ending January 17:

	1900.		1901.	
Copper:	High.	Low.	High.	Low.
Amalgamated	\$92.25	\$90.25	\$70.50	\$67.62½
Anasconda	47.25	46.00	30.25	29.75
British Columbia	22.50	20.00	8.50	8.50
Tennessee	19.00	16.50	13.75	12.50
Gold and Silver:				
Standard, Cal.	4.30	4.15	3.60	3.60
Portland, Colo.	3.30	3.20	2.50	2.50
Elkton, Colo.	1.85	1.85	1.15	1.12
Isabella, Colo.	.75	.69	.32	.29
Horn Silver, Utah	1.15	1.15	2.00	2.00
Con. Cal. & Va., Nev.	2.20	1.90	1.55	1.50

This table shows a marked fall in copper share values, Amalgamated alone losing nearly 25 points. The fluctuations in the gold and silver shares were proportionately large, and only one, Horn Silver, of Utah, shows an improvement.

Of the other copper stocks, Union, of North Carolina, suffered heavy declines this week, selling down to 27½ on curb. White Knob, of Idaho, weakened from \$17 to \$16½, and Greene Consolidated, of Mexico, from \$32½ to \$30¼.

The Cripple Creek, Colo., shares were unsteady and lower. Portland, after declaring the usual 6c. quarterly dividend, weakened to \$2.50. Interest is centered in the annual meeting on February 3 in Council Bluffs, Iowa, when a good report of the property is expected. Elkton is suffering from a bear raid in the western market; in a little over a month it has lost 38 points, selling down to \$1.12. Isabella, in anticipation of an unfavorable annual report on January 21, continues to sag, bringing only 29c. this week. This is a drop of 36c. since the last annual meeting. In recent years the dividends paid by the company have been discouraging, the rate being cut from 12 per cent per share in 1899 to 1 per cent in 1901, on a capital of \$2,250,000.

In the Comstock section sales are chiefly between traders. Consolidated California & Virginia gained 5c. at \$1.55, Hale & Norcross, 4c. at 34c., while Mexican sold off 1c. at 33c. During January the assessments of 8 companies become delinquent, aggregating \$46,850, which compares with 4 companies, \$26,042, a year ago; showing an increase of \$20,808, or over 40 per cent in 1902.

In the industrial list the steel stocks are firmer, but Standard Oil shows a marked decline, as speculators anticipate a lower dividend rate next month.

Auction sales were 250 shares Playa de Oro Mining Company at \$250 for lot; \$16,000 New England Gas and Coke bonds at 56½@57, and 50 preferred shares Joseph Ladue Gold Mining and Development Company at \$1.75 per share.

Boston. Jan. 15.

(From Our Special Correspondent.)

The last cut in copper had a very depressing effect on copper shares. Support was utterly lacking and stocks that had to be marketed went at a sacrifice from previous quotations. Calumet & Hecla dropped 20 points Tuesday to \$560, with recovery to \$570 to-day. Talk on the street is that something is going to happen in Calumet, but what cannot be learned. It is believed that the Amalgamated people have succeeded in coercing all but this company into restricting production. At the same time it is doubted if 11 cent copper has succeeded in stimulating demand. Some wonder is expressed that the Lake Superior producers are rushing copper to the East.

Trimountain mining gave a sort of pyrotechnic exhibition Saturday with its jump of 10 points to \$45 with a \$2 assessment attached. The tip was put out by Lawson early in the forenoon but the advance was purely manipulation. As control of the stock is held practically by Lawson and Berrage it is not a difficult nor expensive matter to mark the price up. The stock later reacted to \$43, but closed at \$45½ to-night. Reports from the Lake state that the rock being put through the Arcadian mill is running 2 per cent mineral, while rumor to-day told of 3 per cent mineral.

Mohawk has been particularly weak, touching \$27; this is a 3 point decline during the week. The mat-

ter of an assessment will soon be taken in hand by the management. Wolverine was particularly soft, recording a break of \$7½ to \$42, with recovery to \$45. Nothing was said relative to the decline, but considerable stock was offered in a weak market which precipitated the decline. As an indication of the times the Mass Mining Company has discharged 125 men. Considerable wonder is expressed at the selling price of Franklin, namely, \$12½, as it has rapidly increased its product of late. The mine produced 375½ tons of mineral for December, and 2,719 tons for 1901. The company has an up-to-date mill, yet the property is small and the ore lean.

Deposits of Baltic and Copper Range were about 95 per cent of the total. Owing to the unfavorable conditions prevailing the underwriters of the new stock were obliged to take about three-fifths of the issue. Both stocks are heavy in the market. Montreal & Boston mining has been bidding for favor in this market and really has been one of the most active stocks on the list, varying from \$3¾ to \$4¼. The property is adjacent to the British Columbia mine and consists of four claims. There are 600,000 shares par \$5. Close to \$500,000 has been spent in development work. There are two shafts, one down 280 ft. and the other 400 ft. Assays of the ore are said to run from \$12 to \$15 per ton in value, while the cost is about \$1.60 per ton. The company has purchased a smelter close by. The stock is being well handled in the market.

Reports from Butte indicate that the Amalgamated mines will soon be producing copper again in the usual amounts. Guanajuato mining acts heavy at \$4¼@5. The dividend on 1,000 shares for the current year sold at 50c. per share to-day, and the same is bid for 9,000 shares more. Mr. Wm. Bouldin, Jr., has been elected president of this company to succeed F. G. Corning, and Mr. E. A. Wiltsee takes Mr. Corning's place as director. The story that Director A. C. Burrage, of the Amalgamated Copper Company, has \$5,000,000 in government bonds indicates his keen appreciation of the copper situation.

Colorado Springs. Jan. 11.

(From Our Special Correspondent.)

On January 15 the new building erected by Mr. W. S. Stratton, the prominent mine owner, of Cripple Creek, was opened for occupancy by the Colorado Springs Mining Stock Association. Its cost is upwards of \$300,000.

The business of the Exchange in 1901 aggregated 152,831,834 shares, having a cash value of \$21,031,119, which compares with 197,551,213 shares valued at \$31,065,359 in the previous year.

Salt Lake. Jan. 11.

(From Our Special Correspondent.)

For the week ending January 11 the total sales were 374,496 shares of stock for \$210,246. The market was slumpy throughout, Ajax, Carisa, May Day, Uncle Sam, California and Century being the only active stocks traded in.

The Daly-West Mine of Park City has come forward with its usual monthly dividend of 40c. per share, or \$60,000.

The Yankee Consolidated Mine, at Tintic, has posted its maiden dividend of 5c. per share, or \$25,000.

The May Day Mine, at Tintic, has declared a monthly dividend of 1c., or \$4,000.

The Quincy Mine, at Park City, has paid the monthly dividend of \$125,000 for January, being \$1 per share on issued stock.

The annual meeting of shareholders of the California Mine, at Park City, was held on January 8, 263,000 shares being represented. Messrs. James Farrell, M. V. Rice, Henry Newell, W. I. Snyder and Thomas Roscamp were elected directors.

The Silver King Mine at Park City has declared its usual monthly dividend of \$100,000 for January.

San Francisco. Jan. 11.

(From Our Special Correspondent.)

The mining stock market is about as usual, with moderate sales and small fluctuations. We have not seen so far any of the animation which was promised with the new year.

Some quotations noted are: Consolidated California & Virginia, \$1.65@1.70; Ophir, 89@91c.; Silver Hill, 46c.; Hale & Norcross, 26@28c.; Sierra Nevada, 22c.; Potosi, 16c.; Crown Point, 10c.; Gould & Curry, 6@7c.

On the Producers' Oil Exchange business has been only moderate and sales have not been large. Some prices noted are: San Joaquin Oil and Development, \$6.75; Kern River, \$6; Kern Oil, \$5.25@5.50; Home, \$3.45; Four Oil, 50c.; Reed Crude, 35c.; California Standard, 34c.; Junction, 20c. The principal transactions were in California Standard and Junction.

London. Dec. 31.

(From Our Special Correspondent.)

There has been a great increase in the business done in the mining market during the past week. Most of the South African gold shares have been buoyant on account of the general resumption of work on the Rand, but the most active market of all has been De Beers and the other diamond shares. The announcement at the annual meeting at Kimberley that the life of the mines belonging to the De Beers Company was estimated at no less than 144 years. This quite unexpectedly large figure coupled with the great demand for the stones all over the world, brought many buyers forward, and the shares touched the record price of £42. Shares in other diamond companies advanced also. It is confidently expected that in the new year the South African market both in gold and diamonds will be very brisk.

The activity in South Africans has been shared to some extent by West Africans and West Australians, but the rise did not continue for long, and the only share on these two markets that is healthily active is Great Fingalls. As mentioned last week, this mine in the Murchison District of West Australia has been extremely successful, and the £1 shares now stand at £14. Judging from the firm tone, the quotation may go still higher.

The long expected report by Mr. Frecheville on the Le Roi Mine has been published, and it fully confirms his cable sent a few weeks ago when Mr. Macdonald's suppressed report was published by one of the financial papers. You will be publishing this report at length in another part of the Journal, so it is not necessary to go into details here. It may be mentioned, however, that Mr. Frecheville estimates that there are 483,872 tons of shipping ore in sight averaging 0.35 oz. gold, 0.6 oz. silver, and 1.33 per cent of copper, a total of \$11.75 per ton. The total costs at the mine and smelter is given as \$10.72 per ton. Mr. Frecheville is very outspoken with regard to extravagant management all along the line, and considers that with economical management at the mine and smelter a satisfactory profit can be made, while the future, after these ores are exhausted, will depend on developments at depth on the middle vein. The group of people who ousted Whitaker Wright and obtained control are not at all satisfied with the results of the examination and are desirous of selling out their shares that they bought only a few

ASSESSMENTS.

Name of Company.	Location.	No. Delinq.	Sale.	Amt.
Alpha Con.	Nev.	Jan. 30		.03
App. Con.	Cal.	1 Feb. 6	Mar. 5	1.00
Chollar	Nev.	Jan. 17	Feb. 12	.05
Comstock	Utah	Jan. 20	Feb. 8	.10
Crown Point	Nev.	Jan. 2	Jan. 28	.05
Dudley	Cal.	13 Jan. 13	Feb. 4	.02
Garibaldi	Cal.	1 Jan. 21	Feb. 15	.01¼
Gould & Curry	Nev.	Feb. 2	Feb. 24	.10
Hale & Norcross	Nev.	Jan. 7	Jan. 28	.10
Inyo Marble	Cal.	35 Jan. 15	Feb. 10	.05
Julia Con.	Nev.	Jan. 17	Feb. 12	.03
Marina Marsicano	Cal.	26 Jan. 6	Jan. 27	.04
Mohican	Cal.	2 Jan. 4	Feb. 3	.05
National Con.	Cal.	15 Dec. 26	Jan. 23	.05
Ophir	Nev.	Dec. 27	Jan. 29	.05
Orleans Con.	Cal.	1 Dec. 28	Jan. 30	.02
Potosi	Nev.	61 Jan. 6	Jan. 28	.20
Sailor Con.	Cal.	14 Jan. 17	Feb. 7	.01
Savage	Nev.	Feb. 2	Feb. 27	.05
Seg. Belcher & Mides Con.	Nev.	Jan. 6	Jan. 27	.03
Union Con.	Nev.	Jan. 31	Feb. 24	.10
Yuba Con.	Cal.	5 Jan. 27	Feb. 17	.03

DIVIDENDS.

Name of Company.	—Latest Dividend—			Total to Date.
	Per Date.	Per Share.	Total.	
†Alaska Treadwell	Jan. 28	.37½	75,000	4,895,000
†Amalgamated Copper	Jan. 27	\$1.00	\$1,538,879	\$17,348,307
Am. Iron & St. com.	Jan. 20	.15	5,100	489,200
*Bald Butte, Mont.	Jan. 15	.06	15,000	1,132,148
Cal. & Hecla Copper	Jan. 29	10.00	1,000,000	78,350,000
*Central Oil, Cal.	Jan. 25	.03	24,000	169,247
*Doe Run Lead, Mo.	Jan. 15	1.50	15,000	492,072
*Gold Coin, Colo.	Jan. 25	.03	30,000	990,000
*Homestake, S. Dak.	Jan. 25	.25	52,500	10,768,750
†Homestake, extra	Jan. 25	.25	52,500	
*Helena, Oregon	Jan. 25	.00½	6,000	122,500
†Iowa, Colo.	Jan. 15	.01	16,767	220,168
†Mary McKinney, Colo.	Jan. 10	.03	30,000	360,000
May Day, Utah	Jan. 15	.01	4,000	22,000
*New Zealand, Colo.	Jan. 25	.01	7,650	53,550
*N. Leadville Home, Colo.	Jan. 20	.005	12,500	250,000
†Parrott, Mont.	Jan. 27	.50	114,925	5,772,925
†Parrott, Mont.	Jan. 27	.05	114,925	5,772,925
†Pittsburg Coal, pf.	Jan. 25	1.75	500,000	4,718,168
†Portland, Colo.	Jan. 15	.08	180,000	4,207,080
*Quincy, Utah	Jan. 15	1.00	125,000	850,000
*Silver King, Utah	Jan. 19	.66¾	100,000	4,850,000
*Standard, Idaho	Jan. 25	.05	25,000	2,490,000
†Susq. I. & St.	Jan. 27	.15	45,000	627,500
†Tenn. C. I. & R. R., pf.	Feb. 1	2.00	4,000	267,840
†Texas & Pac. Coal	Jan. 25	1.50	30,000	1,950,000
†Union Oil, Cal.	Jan. 15	1.35	71,107	189,618
†Vindicator, Colo.	Jan. 25	.03	33,000	752,000
Vindicator, extra	Jan. 25	.05	55,000	
Yankee Con., Utah	Jan. 15	.05	25,000	25,000

Monthly. †Quarterly. §Semi-annual.



months ago. The price they paid was £6 to £7 per share, and the quotation now is only £4. They are naturally averse to selling at the present low figure, and will wait their time to clear out. It is thus obvious that there will be a damper on the market in these shares for some time to come. It was thought in many places that the new controllers would try to adopt or influence the report for their own purposes, and the event has come as a surprise to these. The outlook at present points to a quiet time for the shares even after the new controllers have sold out.

Another of the Whitaker Wright companies that have changed hands recently has just published a report. This is the Nickel Corporation, which owns properties in New Caledonia. Representatives of the Carnegie people recently acquired the London & Globe holding, as has already been mentioned in these columns, and the directorate has been remodelled. The new proprietors were naturally desirous of setting their house in order as speedily as possible, but when they came to investigate matters they found them in a state of confusion. It has been impossible to obtain complete amounts of expenditure, and the accountant has had to go to New Caledonia to straighten things out. It is found also that there is a mortgage due to the London & Globe Company amounting to £33,000, and that the original vendor, Mr. Bernheim, has not yet been paid in full, the outstanding debt being £47,000. It appears that of the latter sum £27,000 is due on January 9, 1902, and that Mr. Bernheim holds a vendor's lien on the property, which entitles him to a complete return of the property if the instalment is not paid. It became urgently necessary therefore to provide funds to meet this instalment, and this has been arranged privately. From the point of view of the United States Steel Corporation, the bargain has been a rather expensive one, and had they known that the property was on the point of reverting to the original vendor they would probably have awarded developments and made their own bargain with Mr. Bernheim. As it is, however, the English shareholders are in a very favorable position, and their shares have suddenly become of value.

Paris. Jan. 4.

(From Our Special Correspondent.)

The Bourse is quiet and the settlements at the close of the month are looked for with some anxiety. Money is abundant, but credits are looked after very closely by bankers. They are, moreover, accumulating cash in anticipation of the issue of the new loan, to which I have heretofore referred.

The main excitement at present is in copper. The abrupt fall in prices has affected the copper shares, and our operators are uncertain how far the decline will go. One still hears a great deal said about the copper market which is wild—not to say absurd. Some of our wise men who have been magnifying the Amalgamated Company as all-powerful, are now going to the other extreme, and predicting that this company will be powerless hereafter. This talk, of course, is not to be seriously considered.

The zinc and lead shares, like copper, are depressed, low prices and small demand affecting them generally. The Spanish lead companies have lost considerably.

The activity in the South African gold stocks in London has caused a somewhat similar movement here. In great part, however, it is fictitious, and there is no real disposition to buy; nor is there much desire to sell, holders preferring to wait for further developments.

The French metallurgical stocks are generally depressed, and there is but little business in this class of securities. The same may be said of the coal shares, which are showing declines for the first time in several years.

The Russian group shows still further depression. The industrial crisis in the empire is now affecting the coal mines. At first these showed little change, but they are now beginning to feel the decrease in the demand for fuel from the furnaces and factories. The shipments of coal from the mines are falling off, and there seems to have been an over-production, the results of which are not encouraging.

There is some hope that business will improve when the new year holiday is over; but the outlook is not altogether encouraging. There are too many uncertainties for 1902 to make a very buoyant market.

AZOTE.

#### COAL TRADE REVIEW.

New York. Jan. 17.

ANTHRACITE.

The mines have about recovered from the December floods and coal is coming forward more freely than in a month. Car supply, however, is short with all the anthracite roads, and is not likely to improve very much for some weeks. This shortage of cars continues to restrict the output. Very little, if any, coal is being stored by the large producers. The market, though fluctuating with weather conditions, is generally strong and active and readily takes the current output of the collieries.

In the northwest buying has been quite brisk and the movement of coal from the docks at the head of the lakes is steady. In Chicago territory demand is seasonably good for dock coal, the movement of which is free. All rail coal is arriving in larger amounts than a few weeks ago, and in the territory using it demand is less active. The total amount of coal on the docks at Chicago on January 1 is estimated at 170,000 tons less than in January 1, 1901, but 57,000 tons more than on January 1, 1900. The supply is probably sufficient to last till navigation opens unless the weather during the late winter is exceptionally severe. At inland points eastward and in Canadian territory demand is good, particularly for chestnut and the steam sizes. Along the Atlantic seaboard there is little change in the market except for the fluctuations of buying with temperature changes. Demand in all-rail trade and at points beyond Cape Cod continues good. The recent advances in prices of steam sizes by the Reading was probably due largely to a shortage in supply. Prices of Lackawanna and Wyoming Valley steam sizes were advanced a month or more ago and these grades remain at old quotations.

#### BITUMINOUS.

The Atlantic seaboard bituminous trade shows some improvement, conditions generally being better than a few weeks ago. The main line roads after cleaning up all the loaded cars along their tracks have given a better supply of empties at the mines. So far the coal loaded is coming through more promptly than in a long time. A lot of coal has got to tidewater, relieving many consumers who were in distress. Still no producers are yet able to furnish coal up to their contracts or their desires, but further improvement is anticipated.

Talk of contracts for the new year is heard now and then. Opinions as to prices vary widely. Nothing definite can be said until the railroads have expressed their intentions on freight rates, through charges, etc. It appears that some producers are taking exception to the dominating policy of the Pennsylvania Railroad and are threatening to make trouble.

The far East is calling for considerable coal and is receiving comparatively fair shipments. Along Long Island Sound trade conditions have been relieved somewhat by the improved service given by the railroads in getting coal to tidewater. At New York Harbor points the supply of coal is nearly sufficient and speculative prices have dropped to about regular figures. All-rail trade is calling for a great deal of coal, but producers are still cutting down the orders received.

Transportation from the mines to tidewater during the past week has been fairly good. Car supply at the mines is about 75 per cent of the demand. In the coastwise vessel market, vessels are in fair supply, but loading at the lower ports is very slow. We understand that at the further lower ports vessels not infrequently are 2 weeks in getting cargoes. We quote current coastwise freights from Philadelphia as follows: Providence, New Bedford and Long Island Sound, \$1; Boston, Salem and Portland, \$1.15; Portsmouth, \$1.20.

Birmingham. Jan. 13.

(From Our Special Correspondent.)

The coal production in Alabama is at its height, and there is demand for every ton that is being mined. Contracts have been secured by the operators, which will take the better part of the production in this State until at least the middle of the summer.

Work has started on the branch railroad to the Flat Top Mountain mines, in Walker County, which will be operated by the Sloss-Sheffield Company with the convicts moved from Coalburg. The road is to be finished within six months and by that time the company will be ready to begin shipments. The Underwood Coal and Coke Company, which has large mines in Blount County, has increased its capital stock \$100,000, and will develop further in that neighborhood. The construction of a railroad line from Jasper, in Walker County, to Decatur, in Morgan County, will cause the development of coal lands. The survey for the line is now being run.

Cleveland. Jan. 15.

(From Our Special Correspondent.)

The domestic coal trade has been moving a little more freely during the past week than formerly because of a very slight relief in the car situation. This relief is in part accounted for by the reports which come from the mercantile houses that since the first of January business has been very much easier that it was during December. The lighter movement of general merchandise has done a great deal to relieve the conditions on the coal roads and therefore to enable the companies to handle the coal with better results. The relief, however, is only commensurate with the increased consumption during the cold snap which set in a few days ago and does not go to the extent of permitting the collection of any surplus amounts of fuel. The dealers, therefore, are still doing business in a hand to mouth

fashion. The slight relief in the car situation has also eased up the coke situation to a certain extent, and while the producers have not been able to forward enough to the valleys to relieve the furnaces, sufficient has been shipped to permit some of the stacks to return to blast and it is now believed that the worst part of the delay on account of the shortage of coke has passed. This week the Columbus, Sandusky and Hocking Railroad announced that it proposed to make quite an extension to its coal docking property at Sandusky by installing faster loading machines and by making more room for boats. This is in the interest of a larger lake coal movement next summer.

Pittsburg. Jan. 15.

(From Our Special Correspondent.)

Coal.—The coal trade in this district never was better than at the present time. All the mines are in operation and there is less difficulty as to transportation than at any time since the car shortage began to affect shipments. The annual convention of the coal miners of the Pittsburg district of the United Mine Workers of America opened in this city on Monday and will remain in session all week. Reports show the organization to be in a flourishing condition. The attendance is larger than at any previous convention, indicating that the miners have had a prosperous year. In former years many local unions were unable to defray the expenses of delegates to conventions. Suggestions are to be made of changes desired in the new annual wage agreement. These will be recommended by the delegates to the national convention which opens in Indianapolis next Monday. The present pick mining rate of 80 cents a ton seems to be satisfactory, but the delegates to the convention desire an advance in the rate for loading coal after the machines. One suggestion made provides for an advance of 6½c. a ton, equal to an increase of about 12½ per cent. No difficulty is anticipated in arranging the new scale, which goes into effect on April 1.

Connellsville Coke.—There is less difficulty as to transportation facilities and shipments are greater than for several weeks. Additional contracts were made this week for coke at the advanced price, \$2.25 for furnace and \$2.75 and \$3 for foundry. The production last week was 208,260 tons, a gain of 38,019 tons compared with the previous week. The shipments for the week aggregated 9,940 cars distributed as follows: To Pittsburg and river tipples, 3,298 cars; to points west of Pittsburg, 4,956 cars; to points east of Connellsville, 1,686 cars. This was an increase of 1,375 cars compared with the shipments of the previous week.

Foreign Coal Trade. Jan. 16.

There is nothing specially new in the export coal trade. Conditions remain practically the same as last week, through supplies of coal are coming to the seaboard somewhat more freely.

Exports of coal and coke from Germany for the 11 months ending November 30 were, in metric tons:

	1900.	1901.	Changes.
Coal .....	14,111,409	13,891,696	D. 219,713
Brown coal .....	50,990	20,586	D. 30,404
Coke .....	2,040,026	1,928,303	D. 111,723
Totals .....	16,202,425	15,840,585	D. 361,840

The chief items in coal exports this year were 5,131,618 tons to Austria, 3,644,505 tons to Holland, 1,582,463 tons to Belgium, 950,456 tons to Switzerland, 789,738 tons to Russia and 745,467 tons to France. The chief items of coke exports were 692,298 tons to Belgium and 558,310 tons to Austria.

Imports of coal and coke into Germany for the 11 months ending November 30 were, in metric tons:

	1900.	1901.	Changes.
Coal .....	6,845,263	5,790,918	D. 1,054,345
Brown coal .....	7,206,636	7,489,332	L. 282,696
Coke .....	447,243	362,337	D. 84,906
Totals .....	14,499,142	13,642,787	D. 856,355

Of the coal imported this year the chief items were 4,791,645 tons from Great Britain, 446,122 tons from Austria and 418,185 tons from Belgium. The brown coal was all from Austria; the coke chiefly from Belgium.

Messrs. Hull, Blyth & Co., of London and Cardiff, report under date of January, that prices for Cardiff descriptions of coal remain about unaltered; Monmouthshire sorts are slightly easier, while small coals are very firm. Quotations are: Best Welsh steam coal, \$4.08@4.20; seconds, \$4.02; thirds, \$3.96; dry coals, \$4.02; best Monmouthshire, \$3.72@3.84; seconds, \$3.54; best small steam coal, \$2.88; seconds, \$2.40; other sorts, \$2.28.

The above prices for Cardiff coals are all f. o. b. Cardiff, Penarth or Barry, while those for Monmouthshire descriptions are f. o. b. Newport, exclusive of wharfage, but inclusive of export duty, and are for cash in 30 days less 2½ per cent discount.

The freight market is more active again, but rates show little alteration. Mediterranean perhaps slightly firmer than last quotations. Some rates quoted from Cardiff are: Algiers, \$1.30; Marseilles, \$1.35; Genoa, \$1.26; Naples, \$1.32; Port Said, \$1.26; Singapore, \$2.76; Las Palmas, \$1.44; St. Vincent, \$1.62; Rio Janeiro, \$2.64; Santos, \$2.94; Buenos Aires, \$2.34.



**IRON MARKET REVIEW**

New York, Jan. 16.

Iron market conditions continue good. There seem to be fewer large contracts on the market, but small orders continue abundant. Purchases of pig iron made by the leading interests show that they do not anticipate any falling off in business. The railroad conditions show some improvement and deliveries of finished material from the mills and of ore and fuel to furnaces are being more promptly made.

A meeting of the iron interests was held this week, the first results of which appear in an advance in the price of wire nails.

The order for 105,000 tons of rails for Mexico has been divided, German mills taking about one-half, while the other half goes to concerns in the United States. Some more selling of German steel billets is reported; the price is said to be \$27.50 delivered in the Pittsburg District.

The production of pig iron, as determined by the weekly capacity of furnaces in blast, shows a drop from about 325,000 tons a week on December 1 to 290,000 tons on January 1. This is due entirely to the unfavorable railroad conditions. The *Iron Age* report shows a further decrease in stocks of pig iron unsold, which were only 216,137 tons on January 1, against 223,462 tons December 1 and 387,329 tons on August 1.

Birmingham, Jan. 13.

(From Our Special Correspondent.)

The pig iron market continues strong. There is a good demand for the product, while inquiries looking to future deliveries are being received right along. The shipments are healthy, the railroads finding it was a difficult matter to supply the demand for cars. The production is not so strong as it has been. The Sloss-Sheffield Steel and Iron Company has blown out one of its furnaces in the Sheffield District. The bessemer furnaces of the Tennessee Coal, Iron and Railroad Company are making a record in production.

During the past week papers were filed in the Probate Judge's office here by the Woodward Iron Company, increasing the capital stock of the company from \$1,000,000 to \$2,000,000. During this month the furnace of the Northern Alabama Coal and Iron Company at Talladega will be put in operation.

Quotations are firm, the advance noted week before last being maintained strictly and no concessions being made to secure business. The following prices prevail: No. 1 foundry, \$12@12.75; No. 2 foundry, \$11.50; No. 3 foundry, \$11; No. 4 foundry, \$10.50; gray forge, \$10.25@10.50; No. 1 soft, \$12@12.75; No. 2 soft, \$11.50.

The demand for finished iron and steel continues brisk in this section. The rolling mills are getting down to steady work. The statement is made that the Republic Iron and Steel Company, which concern owns and operates the larger rolling mills in this State, has orders on hand which will necessitate their operation for six months to come. The steel plant at Ensley is working hard. Foundries and machine shops are actively engaged with a number of orders on hand.

Buffalo, Jan. 14.

(Special Report of Rogers, Brown & Company.)

There is a fair degree of activity in pig iron buying. The large majority of consumers in this section have now covered for the first half of the year, and, to a certain extent, for the last half, so that the volume of business in this locality cannot be expected to be as large in the near future as it has been in the past. The many circumstances which have contributed to a reduction in the production of pig iron are still in existence and affect this field as well as others in the supply of pig iron for prompt shipment. Such deliveries still command a premium over future deliveries and every effort is being made by the furnaces to put out the largest possible product. The melting of iron in the foundries and mills is at a rate unusual, if not unprecedented, at this season of the year. The railroad situation appears to be easing up somewhat, but coke is extremely difficult to obtain and many foundries have been on the ragged edge while a few have had to shut down for a time to await the arrival of fuel to melt their iron. Prices are strong at the figures given below, which are on the cash basis f. o. b. cars Buffalo: No. 1 strong foundry coke iron, Lake Superior ore, \$16.75; No. 2, \$16.25; Southern soft, No. 1, \$17; No. 2, \$16.50; coke malleable, \$16.50; Lake Superior charcoal, \$18.50.

Cleveland, Jan. 15.

(From Our Special Correspondent.)

**Iron Ore.**—A meeting of the Ore Association was held in this city the latter part of last week at which the matter of coming to an understanding on not only old range bessemer ores, but all others, was discussed. A committee was appointed to take the matter under

advisement and as soon as the question has been decided the committee will report back to the association and some action will be taken. There is a general tendency now toward a much higher list of prices on old range non-bessemer ore and bessemer and non-bessemer Mesabi ores. So many contingencies have arisen as to make the outcome of this discussion entirely problematical. The question of season rates has not been discussed much of late, but what talk has been going indicates that transportation charges between Duluth and Ohio ports will approximate 90c. a gross ton.

**Pig Iron.**—Bessemer iron for delivery during the second quarter of the year has been sold during the last week on the basis of \$15.75 in the Valleys, a reduction therefore from the price prevailing for the remainder of the first quarter of 25c. The Bessemer Association is ardently adhering to the principle of conservatism and the lower rate for the second quarter is in the interest of that principle. Not much iron has been sold at that price. Basic iron has been sold during the week at \$15.75 for delivery during the first half and the producers do not seem inclined to force another change. Some of the furnaces, which have been banked for a while, are now resuming operations as there is a slight increase in the amount of coke received. Foundry grades are in good demand at \$16.50 and \$16 for Nos. 1 and 2 respectively, although the material is scarce.

**Finished Material.**—An effort has been made, without success so far, to advance the price of bar iron. The big demand of late is in part responsible, although it is hinted that some mills are creating this discussion to stimulate buying. The majority of the producers are against the increase and it will not be made. Prices hold firm therefore at 1.50c. Pittsburg for iron and bessemer steel bars and 1.60c. Pittsburg for open-hearth steel bars. Structural material is also in good demand, the buying seeming to increase as the spring season approaches. Most contractors are covering their needs heavily in expectation of an enormous trade when the spring opens. Prices hold firm at 1.70c. for beams, channels and angles. Plates are also in better demand now than they have been, especially in sheared plates, as the buying has been in excess of production for some time and the sales are increasing on the output rather than falling back to an even plane with it or lower. The quotation does not change from 1.70c. Steel rails are slightly easier just now. The big buying has about covered the possible needs of the principal systems and electric line construction is likely to be curtailed through some financial distress among the promoters here. The curtailment, however, will not be as serious as was generally supposed. Rail prices are still \$28. Sheets are in excellent demand and the outlook is particularly bright with the mills rushing material through in anticipation of enormous buying later on. Prices hold at 3.35@3.50c. on No. 27 out of store.

**Old Iron.**—The scrap market is steady with no change in prices, the quotations being: Old iron axles, \$22; old iron rails, \$22; heavy steel, \$17; steel rails, \$17; wrought turnings, \$12.25; cast scrap, \$13; No. 1 wrought, \$16.

Philadelphia, Jan. 15.

(From Our Special Correspondent.)

**Pig Iron.**—Those who consider themselves behind the scenes profess to have some private information to-day concerning certain large transactions in the interior and western part of the State. Our local people do not speak positively. Eastern consumers of iron are doing comparatively little, considering what has been done in the past two months. The advance in prices made last week are more or less nominal here, and yet certain transactions can be mentioned which were made at the advance. Bessemer is very strong and will likely go higher. That which we are particularly interested in here at present is gray forge and No. 1 foundry. The probabilities are that there will be only a moderate amount of buying for the next two or three weeks, as far as pig iron is concerned.

**Bar Iron.**—The bar iron makers are very busy, but have not added much business since the first of the month, and they are not making any efforts to do so.

**Plates.**—There is a strong disposition to get fractional advances on plates, although the managers of that interest have officially declined to advance prices. Small lots ranging from 20 to 100 tons have been booked here within a few weeks. There is something going on within the plate interests which is carefully guarded. It is supposed to be a probable reduction in prices.

**Steel Rails.**—Steel rails are not active, as far as official utterances go, but those associated with railroad projects say that the early spring will witness a heavy demand if the mills will be able to meet it.

**Old Rails.**—A decline of 50c. is reported in old iron rails to-day, but there are very few to be had.

**Scrap Iron.**—The demand for scrap is light, not only for light stuff but heavy, owing to a change of views among the consumers of scrap. Heavy steel is under a good deal of inquiry and so is choice railroad, but the sources of supply are bare of immediate material.

Pittsburg, Jan. 15.

(From Our Special Correspondent.)

Heavy purchases of bessemer pig iron, active buying of finished material and an easing up of the freight congestions are the features of the iron and steel market this week. Shipments of coke to the Valley furnaces were more nearly up to the requirements than for several weeks, and as a result, with but few exceptions, all are again in blast and the tonnage is increasing daily. There is now no possibility of lower pig iron prices this year, as sales have been made for delivery as late as September at a higher price than the minimum rate last week. Some difficulty will be experienced under most favorable conditions in filling all orders booked for the first quarter before May 1. Iron that was ordered for delivery in December is being shipped this month. The United States Steel Corporation is placing orders almost daily for all grades of pig iron, and so far this week has contracted for 100,000 tons of bessemer and likely will secure 50,000 tons additional before the end of the week. It is reported that some of this was obtained at \$15.75, Valley furnaces, but \$16 is now considered a low figure for delivery any time during the year. The increased price of iron carries with it a corresponding advance in steel, as the big corporation has a number of large contracts based on the selling price of bessemer pig iron. Gray forge is unusually active and prices are higher. Foundry iron is also in demand, but there is very little to be had and all sales made were at a higher figure than last week.

Despite the increased cost of raw material prices in all finished lines remain unchanged, although in many instances large premiums are paid for early deliveries. The meeting of the steel plate pool last week resulted in continuing the ruling prices and no change will be made for a month at least. Some of the independent producers, it is understood, urged an advance but were overruled by the controlling interest. The bessemer steel billet market continues quiet, only small lots being sold at the prevailing rates. All finished lines are strong and a considerable amount of new business was received during the week, particularly in structural material.

A meeting of wire interests was held here yesterday afternoon at which the leading concerns of the country were represented. The object was to form a pool or enter into a price agreement and the result was satisfactory. Prices were advanced \$1 a ton on all grades of wire and wire nails. The base price of wire nails per 100 lbs. was advanced from \$2 to \$2.05, and the ratio of increase was carried out through the various grades of wire and nails.

The bi-monthly examination of the sale sheets of the Republic Iron and Steel Company, on which the wages of the puddlers and finishers in the union rolling mills of the country are arranged under the Amalgamated Association sliding scale, was made on Monday. It was shown that the average sales of bar iron for November and December was 1.5c., which fixes the pay of the puddlers for January and February at \$5.75 a ton, an advance of 25 cents, and the finishers get an increase of 2 per cent.

**Pig Iron.**—The sales of bessemer pig iron within the past three days aggregated 175,000 tons at prices ranging from \$16 to \$16.50, Valley furnaces. It is reported that some iron was secured at \$15.75 for delivery throughout the first half. Sales were made for delivery into the third quarter at \$16@16.25. Of this large tonnage the United States Steel Corporation secured 100,000 tons and will contract for 50,000 tons additional before the close of the week. Gray forge is unusually active and prices have advanced to \$16.25@16.50, Pittsburg. Foundry iron is scarce and cannot be had at less than \$16.50@16.75, Pittsburg.

**Steel.**—The market in all finished lines is firm and a great deal of new business has been placed for delivery during the first half. Makers of bessemer steel billets are consuming nearly all they produce and only a few small sales are recorded at \$27.50@28. Steel plates are firm at 1.60c. and bars remain at 1.50c.

**Sheets.**—The market is a trifle stronger this week, although prices which ruled above the quotations of the American Sheet Steel Company since the strike last summer have gradually declined to the combine's figures. The mills have business booked throughout the first quarter. No. 28 gauge is still quoted at 3.10@3.20c. and galvanized sheets at 70 and 5 per cent off.

**Ferro-manganese.**—There is no change in prices, the leading producer continuing to quote 80 per cent domestic at \$52.50.

New York. Jan. 17.

**Pig Iron.**—The market is strong with prices of foundry iron higher. We quote for tidewater delivery: No. IX foundry, \$17@17.50; No. 2 X, \$16.25@16.75; No. 2 plain, \$15.75@16.25; gray forge, \$15.15@15.40. For Southern iron on dock, New York, No. 1 foundry, \$16.25@16.50; No. 2, \$15.75@16; No. 3, \$15.25@15.50; No. 4, \$14.75@15; No. 1 soft, \$16.25; No. 2, \$15.75.

**Bar Iron and Steel.**—The market is in good condition and demand is active. Prices are the same as for the past two months. We quote 1.58c. for common bars in large lots on dock, refined bars, 1.63@1.68c.; soft steel bars, 1.68c.

**Plates.**—The demand for plate is strong and steady. Prices for certain specifications are higher, but basis prices are unchanged. Eastern mills quote for tidewater delivery in car-loads: Tank, 1/4-in. and heavier, 1.78c.; flange, 1.88c.; marine, 1.98c.; universal, 1.78c.

**Steel Rails and Rail Fastenings.**—Mills are so busy that part of the Mexican Central awarded to American companies may be turned over to English concerns. Standard sections are still quoted at \$28 at Eastern mills; light rails at \$28@30, according to weight. Spikes are 1.80c.; splice bars, 1.55c.; bolts, 2.60@2.70c.

**Structural Material.**—Buying continues active. We quote for large lots at tidewater as follows: Beams, 1.75c.; tees, 1.80c.; angles, 1.75c.

CHEMICALS AND MINERALS.

(For further prices of chemicals, minerals and rare elements, see page 128.)

New York. Jan. 17.

Further contracts for this and next year's delivery have been booked at unchanged prices. Raw materials continue firm and high, causing some uneasiness in manufacturing circles.

**Heavy Chemicals.**—Domestic high test alkali for shipment is quoted at 80@82 1/2 c. per 100 lbs., in bags, f. o. b. works, while prompt orders can be booked at 85c. Caustic soda for immediate delivery is limited in supply, and is held at \$2 per 100 lbs., f. o. b. works for high test, while contracts for 1902 and 1903 shipments are noted at \$1.90@1.95 f. o. b. works. Comparatively little is doing in foreign products. Sal soda of domestic make is in good request for spring delivery at 55c. per 100 lbs. f. o. b. works, while foreign is quoted at 70c. in New York. Bleaching powder is worth \$1.75@1.85 per 100 lbs. for foreign on spot, while domestic is offered at \$1.37 1/2 @ \$1.62 1/2, according to test. Contracts for prime Liverpool bleach are still being taken at \$1.75@1.80. Domestic chlorate of potash continues to be booked on contract at \$7 1/2 @ \$7 3/4 per 100 lbs., f. o. b. works, while prompt deliveries stand at \$8@8 1/8.

**Acids.**—Contract deliveries are satisfactory. New orders for oxalic can be placed at \$4.75@4.87 1/2 per 100 lbs. for German, and \$5 1/2 @ \$5 3/4 for English. Blue vitriol is easier. The European consuming season is near at hand, and already there are signs of heavier shipments from America. In the four months from January to April, 1901, the exports from the United States amounted to 37,498,764 lbs., being the busiest period during the year. Judging from reports abroad, the demand in 1902 is expected to be very large.

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

Acetic, com'l 28%.....\$1.80	Oxalic, com'l.....4.15 @ 5.12 1/2
Blue vitriol.....4.25 @ 4.50	Sulphuric, 50 deg., bulk.....14.00@16.00
Muriatic, 18 deg.....1.50	Sulphuric, 60 deg.....1.00
Muriatic, 20 deg.....1.62 1/2	Sulphuric, 66 deg.....1.20
Muriatic, 22 deg.....1.75	Sulphuric, 66 deg., bulk.....18.00@20.00
Nitric, 36 deg.....4.00	Sulphuric, 66 deg., bulk.....21.00@23.00
Nitric, 38 deg.....4.25	
Nitric, 40 deg.....4.50	
Nitric, 42 deg.....4.87 1/2	

**Brimstone.**—Best unmixed seconds on spot continue high at \$24@25 per ton, and shipments at \$23.25@23.50. Best thirds are \$2.50@3 per ton less than seconds. Trading is uninteresting.

**Pyrites.**—Consumption is regular, and deliveries are chiefly on contract. Charters from Huelva, Spain, to Atlantic ports are being booked at 9s. 9d. (\$2.34). Imports at New York this week were 4,864 tons Spanish iron pyrites.

Quotations are f. o. b.: Mineral City, Va., lump ore, \$4.90 per ton, and fines, 10c. per unit; Charlemont, Mass., lump, \$5, and fines, \$4.75. Spanish pyrites, 12@14c. per unit, delivered ex-ship New York and other Atlantic ports. Spanish pyrites contain from 46 to 51 per cent. of sulphur; American, from 42 to 44 per cent.

**Sulphate of Ammonia.**—Moderate demand. Gas liquor, 24@25 per cent is quoted at \$2.82 1/2 @ \$2.85 per 100 lbs., according to position.

**Nitrate of Soda.**—Higher at \$1.97 1/2 per 100 lbs. for both spot and future shipments. The coast market is firmer, as is also the European. Ocean freights from South America are strong at 25@26s.

An interesting yearly statistical review is issued

by Messrs. W. Montgomery & Co., of London, Eng., from which we take the following figures:

	1900.	1901.	Changes.
So. Am. Shipments.....	1,429,000	1,263,000	D. 166,000
Consump. United Kingdom....	135,000	118,000	D. 17,000
Europe, Cont'l.....	921,000	1,036,000	I. 45,000
United States.....	175,000	192,000	I. 17,000
Other countries.....	23,000	18,000	D. 5,000
Total, World.....	1,324,000	1,364,000	I. 40,000

The visible supply on December 31, 1901, including the quantity afloat for Europe and stocks in United Kingdom and Continent, was 642,000 tons, against 794,000 tons in 1900, and 741,000 tons in 1899.

The stocks in Continental ports on December 31, 1901, were the largest since 1897, being 218,000 tons. On the other hand the stocks in United Kingdom ports were less than 1899 and 1900, amounting to 25,000 tons.

It is worthy of note that the consumption throughout the world in 1901 was the largest on record. Moreover prices were very satisfactory to producers.

**Phosphates.**—There is a seasonable demand, and exports in the first quarter this year are expected to be large. Already considerable vessel room has been contracted for, and of the charters taken we note a rate of 10s. 9d. (\$2.58) from Fernandina to Antwerp, Belgium, and to Hamburg or Rotterdam at 7s. 6d. (\$1.80), the latter being net firm, February sailing. Abroad sales of high grade Florida rock for this year's shipment to good United Kingdom ports, have been made at 7d. per unit (\$10.92 per ton). Tennessee rock has been booked on basis of quotations below. South Carolina stuff is offered at 4 1/2 d. per unit (\$5.67 per ton), at which rate, deducting ocean freight, leaves rather a small margin of profit to exporters. In competition with South Carolina rock Algerian is held at 5d. (\$6 per ton).

Concerning the shipments of Tennessee rock from the Mt. Pleasant District over the Louisville & Nashville Railroad, it is learned that in the 11 months ending December 1, 1901, there were 115,337 gross tons for export, and 202,916 tons for domestic consumption; a total of 318,253 tons.

Exports of Tennessee phosphates from Pensacola in December were 8,508 tons, being the largest month since August.

A press dispatch from Mt. Pleasant, Tenn., states that the organizers of the Federal Chemical Company, of Louisville, Ky., have bought a controlling interest in the Southport Field in Maury County. A new corporation with \$200,000 capital is to be formed to operate the property, containing 940 acres of land, which is estimated to show over 500,000 tons high-grade phosphate rock. The Federal Chemical Company will control 51 per cent, and Ruhm Bros., 49 per cent of the land. We may add that the Federal Chemical Company has only lately been organized, and has just paid the first quarterly dividend on its preferred stock, at the rate of 6 per cent annum, on \$1,500,000.

Phosphate shipments by water from Bone, Algeria, in October, 1901, were 27,940 tons, chiefly by the Constantine Company.

Phosphates.	Per ton F. o. b.	C. I. F. Un'd Kingdom or European Ports.	
		Unit.	Long ton.
*Fla. hard rock (77@80%).....	\$7.50	7 @ 7 1/2 d	\$10.92@11.31
*Fla. land pb. (68@73%).....	3.00@3.25	5 @ 6d	7.00@ 8.40
*Fla. Peace Riv. (58@63%).....	2.25@2.50	5 @ 5 1/2 d	6.00@ 6.60
†Tenn.....(78@80%), export.....	3.50	6 1/2 @ 7d	10.53@10.92
†Tenn.....78% domestic.....	3.00@3.25		
†Tenn.....75% domestic.....	2.75@3.00		
†Tenn.....70@72% domestic.....	2.25@2.50		
†So. Car. land rock.....	3.25	4 1/2 @ 5d	5.67@ 6.30
†So. Car. river rock.....	2.75@3.25		
Algerian, rock.....(63@70%).....	6	@ 6 1/2 d	8.04@ 8.70
Algerian, rock.....(58@63%).....	5	@ 5 1/2 d	6.00@ 6.30
Tunis, Gafsa.....(58@63%).....	5	@ 5 1/2 d	6.00@ 6.30
†Fernandina, Brunswick or Savannah. †Mt. Pleasant. †On vessels Ashley River.			

Acid phosphate is quoted at 57 1/2 @ 60c. per unit

Liverpool. Jan. 4.

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

The market for heavy chemicals is steady but rather quiet, export business having hardly yet properly resumed since the holidays. During the past few days the principal feature has been the sudden change in the position of sulphate of copper and sulphate of ammonia. Sulphate of copper after a period of extreme dullness has suddenly developed into activity and prices have advanced fully 20s. per ton during the past few days.

**Soda Ash.**—Steady at usual range according to market. For tierces nearest spot range is about as follows: Leblanc ash, 48 per cent, £5, 15s.@£6; 58 per cent, £6 2s. 6d.@£6 7s. 6d. per ton, net cash; Ammonia ash, 48 per cent, £4 10s.@£4 15s.; 58 per cent, £4 15s.@£5 per ton, net cash; Bags, 5s. per ton under price for tierces.

**Soda Crystals.**—Unchanged and selling at generally £3 7s. 6d. per ton, less 5 per cent for barrels, or 7s. per cent less for bags, with special terms for certain export market.

**Caustic Soda.**—Quiet 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.

**Bleaching Powder.**—Without special feature and held for £6 15s.@£6 17s. 6d. per ton, net cash, for hardwood, with special terms for certain export quarters.

**Chlorate of Potash.**—Firm at 3 1/4 d.@3 1/2 d. per lb., net cash, but there are few inquiries, most buyers having filled themselves up before the recent advance.

**Bicarb. Soda.**—Maintains its position at £3 15s. per ton, less 2 1/2 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.**—Has taken a sudden turn for the better and with a good demand prices have advanced to £11 5s.@£11 7s. 6d. per ton, less 2 1/2 per cent for good gray 24@25 per cent in double bags f. o. b. here.

**Nitrate of Soda.**—Unchanged and quoted on spot at £9 10s.@£9 12s. 6d. per ton, less 2 1/2 per cent for double bags f. o. b. here, while some holders demand a slight advance on the high figure for the finest quality.

METAL MARKET.

New York. Jan. 16.

GOLD AND SILVER.

Gold and Silver Exports and Imports.

At all United States Ports in December and Year.

Metal	December.		Year.	
	1900.	1901.	1900.	1901.
Gold.				
Exports.....	\$410,533	\$4,744,073	\$54,134,623	\$57,729,889
Imports.....	3,386,611	2,410,966	66,740,064	54,381,882
Excess. I.	\$2,976,978	E. \$2,333,107	I. \$12,614,461	E. \$3,348,007
Silver.				
Exports.....	\$7,358,339	\$4,723,982	\$66,221,684	\$55,638,901
Imports.....	3,117,857	2,784,757	40,100,343	31,142,949
Excess. E.	\$4,240,482	E. \$1,939,225	E. \$26,121,321	E. \$24,495,952

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

Gold and Silver Exports and Imports, New York.

For the week ending January 15, 1902, and for years from January 1, 1902, 1901 and 1900.

Period.	Gold.		Silver.		Total Excess Exports or Imports.
	Exports.	Imports.	Exports.	Imports.	
Week ...	\$525,000	\$27,314	\$717,322	\$55,258 E.	\$1,159,750
1902.....	1,294,300	37,861	1,722,334	84,314 E.	2,893,659
1901.....	1,085,612	204,389	1,572,143	208,840 E.	2,544,526
1900.....	1,049,232	136,440	1,691,817	169,119 E.	2,435,550

The gold exported this week went to Germany; the silver principally to London. The gold and silver imported came from Central and South America and the West Indies.

Financial Notes of the Week.

The week has been quiet in a business point of view, though trade continues active at almost all points. Money continues in fair supply in New York. Some more gold exports are probable, in view of the general collection of loans by French bankers.

Exports of merchandise from the United States in December were valued by the Bureau of Statistics of the Treasury Department at \$137,076,815, which is \$8,813,056 less than in December, 1900. The total was, however, greater than for any other month in 1901, with the exception of October. For the full year ending December 31 the statement is as follows:

	1900.	1901.
Exports.....	\$1,477,946,113	\$1,465,514,139
Imports.....	829,149,714	880,405,346
Excess, exports.....	\$648,796,333	\$585,108,793
Add excess of exports, silver.....		24,495,952
Add excess of exports, gold.....		3,485,067
Total apparent balance.....		\$612,952,752

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

The statement of the New York Banks, including the 63 banks represented in the Clearing House, for the week ending January 11, gives the following totals, comparison being made with the corresponding weeks in 1901 and 1900:

	1900.	1901.	1902.
Loans and discounts.....	\$676,238,100	\$808,032,400	\$864,236,800
Deposits.....	749,287,400	885,336,200	926,982,900
Circulation.....	16,316,400	30,970,900	32,013,700
Specie.....	145,296,100	173,157,500	168,222,700
Legal tenders.....	58,763,100	70,574,600	76,481,400
Total reserve.....	\$204,029,200	\$243,732,100	\$244,704,100
Legal requirements.....	187,321,850	221,334,050	231,745,650
Balance surplus.....	\$16,707,350	\$22,398,050	\$12,958,450



Changes for the week, this year, were increases of \$778,500 in deposits, \$139,500 in circulation, \$3,413,900 in specie, \$2,223,600 in legal tenders, and \$5,442,875 in surplus reserve; a decrease of \$5,309,800 in loans and discounts.

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

Table with columns for 1901 and 1902, and sub-columns for Gold and Silver. Rows include N.Y. Ass'd, England, France, Germany, Spain, Netherlands, Belgium, Italy, and Russia.

The returns of the Associated Banks of New York are of date January 11, and the others January 9, as reported by the Commercial and Financial Chronicle cable. The New York banks do not report silver separately, but the specie carried is chiefly gold. The Bank of England reports gold only.

No new features in the silver market have developed the past week.

Futures command a slight premium over spot, but there does not seem much disposition in the market to advance.

Receipts of silver at the United States Assay Office in New York were 91,000 oz. for the week.

Shipments of silver from London to the East for the year up to January 2 are reported by Messrs. Pixley & Abell's circular as follows:

Table showing silver shipments from India, China, and The Straits for 1901 and 1902, with changes.

Arrivals for the week, this year, were £283,000 in bar silver from New York, and £68,000 from Australia; total, £351,000. Shipments were £77,500 in bar silver to Bombay, £7,500 to Madras, £7,500 to Calcutta, and £50,000 to Shanghai; total, £142,500.

Indian exchange is somewhat stronger, owing to a very active demand for money in India, and to better exports from that country. The Council bills offered in London were all taken at 16d. per rupee. There has been also more buying of silver in London on Indian account.

Prices of Foreign Coins.

Table listing prices for Mexican dollars, Peruvian soles, Victoria sovereigns, Twenty francs, Twenty marks, and Spanish 25 pesetas.

OTHER METALS.

Daily Prices of Metals in New York.

Large table showing daily prices for Silver, Copper, and Spelter in New York, including exchange rates and various grades.

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

Copper.—The weak tendency which we have had to report for some time past continues, and prices have again suffered. It is true there is a better inquiry, and the lower values established are beginning to attract the attention of consumers; orders, however, seem to be few and far between, as buyers are more or less at sea as to what to do in view of the uncertain state of affairs. We quote Lake copper at 10 1-2@11c.; electrolytic in cakes, wirebars and ingots at 10 1-4@10 3-4c., in cathodes at 10@10 1-2c.; casting copper at 10@10 1-2c.

The London market, which closed last week at £47, opened on Monday weak at £45 10s. Upon the publication of King Edward's speech, according to which there are some prospects of early peace in South Africa, standard copper rallied again, and the closing quotations on Thursday are cabled as £47 7s. 6d. @ £47 10s. for spot, £47 12s. 6d. @ £47 15s. for three months.

Statistics for the first half of January show an increase in the visible supplies of 60 tons.

Refined and manufactured sorts we quote: English tough, £48 10s. @ £49; Best Selected, £52 10s. @ £53; Strong Sheets, £57 10s. @ £58; India Sheets, £55 10s. @ £56; Yellow Metal, 5@5 1-8d.

Exports of copper from New York, Baltimore and Philadelphia in the week ending January 15 as reported by our special correspondents were as follows: Great Britain, 385 tons; France, 250; Austria, 110; Holland, 76; Italy, 10; Australia, 18; total, 849 tons. Also 110 tons matte to Great Britain.

Imports were 709 tons copper.

Copper production, as reported by Mr. John Stanton, who acts as statistician for the companies, was as follows for December and the 12 months ending December 31, in long tons (2,240 lbs.) of fine copper:

Table showing copper production and exports for U.S., reporting mines, and U.S. exports for 1900 and 1901.

United States production again showed a considerable decrease in December, the output being smaller than for any other month in 1901, and 1,925 tons less than in November. For the year the total United States production showed a decrease of 3,632 tons as compared with 1900. The foreign reporting mines showed for the year an increase of 1,454 tons over 1900.

Tin.—Has developed considerable strength, and the market has advanced steadily throughout the week. Consumptive inquiry is very good, while available supplies seem to be limited, and it is not unlikely that the metal will become scarce for early deliveries. At the close we quote spot and January at 23 3-4@24c; February at 23 1-4@23 1-2c.

The foreign market, which closed last Friday at £103, opened on Monday at the same price, and the closing quotations on Thursday are cabled as £104 2s. 6d. to £104 5s. for spot; £101 7s. 6d. @ £101 10s. for three months.

Lead.—Is steady and quotations are unchanged at 3.85@3.95c., St. Louis; 3.95@4c., New York.

The foreign market is easier, Spanish lead being quoted at £10 7s. 6d. to £10 8s. 9d.; English lead at £10 10s. to £10 11s. 3d.

Spelter.—On account of a somewhat easier ore market, producers have been more inclined to make concessions in prices and the market has eased off. Consumers have not been very eager buyers. The ruling quotations are 4.12 1-2@4.15c., St. Louis; 4.27 1-2@4.30c., New York.

The foreign market is steady, good ordinaries being quoted at £16 12s. 6d. to £16 15s.; specials at £16 17s. 6d. to £17.

Silesian Spelter Market.—Herr Paul Speier reports from Breslau, under date of December 31, that the market has been dull. The closing quotation is 32 to 33 marks per 100 kgs., f. o. b. cars at Breslau. This is equal to an average price of 3.5c. per lb. The following table shows the average prices of spelter in marks per 100 kgs., at works in Upper Silesia for the four quarters of the year for five years past:

Table showing quarterly prices for Spelter in marks per 100 kgs. for years 1897-1901.

Exports and imports in Germany for the 11 months ending November 30 are reported as below in metric tons:

Table showing monthly imports and exports for Spelter in metric tons for 1900 and 1901.

The chief items of spelter exports were 27,350 tons to Austria, 29,134 tons to Great Britain, 20,158 tons to Russia, 4,180 tons to Italy, 3,165 tons to Holland, 2,785 tons to France, 1,940 tons to Sweden, and 1,626 tons to Japan.

Antimony.—Is dull and prices somewhat easier. Cookson's is quoted at 10c.; Hallett's at 8 1-3 to 8 1-4; Hungarian, Italian, Japanese and U. S. Star, 7 7-8 to 8c.

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

Platinum.—Consumption continues good, but prices are a little lower. Ingot platinum in large lots brings \$19.50 per oz., in New York.

Chemical ware (crucibles and dishes), best hammered metal from store in large quantities, is worth 82c. per gram.

Quicksilver.—Prices in New York are a little easier, and the metal can be had for \$48 per flask of 76 lbs. for large orders. For small lots 50c. more is asked. This is a reduction of 50c. a flask from recent quotations. San Francisco quotations, on the other hand, are somewhat firmer, being \$47.25@48 for domestic orders, and \$43.50@44 for export. The

London price is £8 17s. 6d. per flask, with the same figure is quoted from second hands.

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

Table listing prices for various metals and alloys including Aluminum, Ferro-Tungsten, Magnesium, Manganese, Alum-brone, Mangan's Cop, Blamuth, Molybdenum, Chromium, Phosphorus, Copper, red oxide, American, Ferro-Molyb'dum, Sodium metal, Ferro-Titanium, and Tungsten.

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

Average Prices of Metals per lb., New York

Table showing average prices for Copper, Tin, Lead, and Spelter for the months of 1901 and 1900.

The prices given in the table for copper are the averages for electrolytic copper. The average price for Lake copper for the year 1900 was 16.52s.; for the month of January, 1901, it was 16.77c.; for February, 16.90c.; for March, 16.94c.; for April, 16.94c.; for May, 16.94c.; for June, 16.90c.; for July, 16.61c.; for August, 16.50c.; for September, 16.54c.; for October, 16.60c.; for November, 16.333c.; for December, 14.38c.; for the year 1901, 16.53c.

Average Prices of Silver, per oz., Troy.

Table showing average prices for Silver in London, N.Y., and 1890 for the months of 1901 and 1900.

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

UNITED STATES.

Table showing U.S. statistics for November and eleven months, including articles, long tons, and various metals like Antimony, Iron, and Steel.

Table showing U.S. statistics for Minerals including Asphalt, Brimstone, Cement, Coal, Coke, Graphite, Nitrate of soda, Phosphate rock, Pyrites, and Salt.

The figures for copper are those given by the Treasury Department. The statement made by Mr. John Stanton for the Associated Copper Companies will be found monthly in our metal market. These figures give the exports for November as 6,069 long tons, eleven months, 80,195 tons.

Import Duties.

Metals.—The duties on metals under the present tariff law are as follows: Antimony, metal or regulus, 3/4c. a lb. Lead 1 1/2c. a lb. on lead ores; 2 1/2c. a lb. on pigs, bars, etc., 2 1/2c. on sheet, pipe and manufactured forms. Nickel, 6c. a lb. Quicksilver, 7c. a lb. Spelter or zinc, 1 1/2c. a lb. on pigs and bars, 2c. on sheets, etc. Copper, tin and platinum are free of duty. Minerals.—Duties are: Asphalt, crude, \$1.50 per ton, and refined \$3 per ton. Coal, bituminous, 67c. long ton; coke, 20c. ad. val. Cement, Roman, Portland and hydraulic, in bulk, 8c. per 100 lbs., and in packages 7c. Copper sulphate, 1/2c. a lb. Salt in bulk, 8c. per 100 lbs., and in bags, etc., 12c. Brimstone, anthracite coal, graphite, phosphate rock, pyrites and nitrate of soda are free of duty.

STOCK QUOTATIONS.

NEW YORK.

Table of stock quotations for New York, listing companies and locations with columns for par value, shares listed, and sales for various dates from Jan. 9 to Jan. 15.

Coal and Industrial Stocks.

Table of coal and industrial stock quotations, listing companies like Am. Agr. Chem. U.S. and Am. Agr. Chem. pf. U.S. with columns for par value, shares listed, and sales.

PHILADELPHIA, PA. §

Table of stock quotations for Philadelphia, PA, listing companies and locations with columns for par value, shares listed, and sales.

MEXICO.

Jan. 4.

Table of stock quotations for Mexico, listing companies and locations with columns for shares, last dividend, bid, and ask prices.

BOSTON, MASS.

Table of stock quotations for Boston, Mass., listing companies and locations with columns for par value, shares listed, and sales.

Official Quotations, Boston Stock Exchange. Total sales, 80,897 shares. †Ex-dividend. §Ex-asst. paid.

ST. LOUIS, MO. †

Jan. 13.

Table of stock quotations for St. Louis, MO, listing companies and locations with columns for shares, par value, bid, and ask prices.

\*From our Special Correspondent.

SPOKANE, WASH.

Jan. 9.

Table of stock quotations for Spokane, Wash., listing companies and locations with columns for par value, bid, and ask prices.

SALT LAKE CITY.\*

Jan. 11.

Table of stock quotations for Salt Lake City, listing companies and locations with columns for shares, par value, and quotations.

\*Our Special Correspondent. Total sales, 374,496 shares.



STOCK QUOTATIONS.

COLORADO SPRINGS, COLO.

Table of stock quotations for Colorado Springs, Colo. Columns include Name of Company, par value, and prices for Jan. 4, 6, 7, 8, 9, and 10. Includes companies like Acacia, Alamo, Am. Con., Anaconda, etc.

Total sales 586,207 shares.

Colorado Springs (By Telegraph)

Table of stock quotations for Colorado Springs (By Telegraph). Columns include Name of Company, par value, and prices for Jan. 9, 10, 11, 13, 14, and 15. Includes companies like Acacia, Alamo, Am. Con., etc.

MONTREAL, CANADA.

Jan. 9.

Table of stock quotations for Montreal, Canada. Columns include Name of Company, par value, and prices for Jan. 9. Includes companies like Big Three, California, Can. Gold Fields, etc.

LONDON.

Jan. 3.

Table of stock quotations for London. Columns include Name and Country of Company, Authorized Capital, Par value, Last dividend, and Quotations (Buyers/Sellers). Includes companies like Alasks-Treadwell, Anaconda, Copiapo, etc.

c.—Copper. d.—Diamonds. g.—Gold. l.—Lead. s.—Silver. \*Ex-dividend.

PARIS.

Jan. 2.

Table of stock quotations for Paris. Columns include Name of Company, Country, Product, Capital Stock, Par value, Latest Div., and Prices (Opening/Closing). Includes companies like Acieries de Crensoy, Firminy, Huta-Bank, etc.

TORONTO, ONT.

Table of stock quotations for Toronto, Ont. Columns include Name of Company, par value, and prices for Jan. 7, 8, 9, 10, 11, and 13. Includes companies like Ontario, British Columbia, Cariboo Mck., etc.

CHEMICALS, MINERALS, RARE EARTHS, ETC. CURRENT WHOLESALE PRICES.

Abrasive—		Cust. Meas.	Price	Barium—		Cust. Meas.	Price	Graphite—Am. f.o.b. Provi-		Cust. Meas.	Price	Paints and Colors—		Cust. Meas.	Price
Carborundum, f.o.b. Niagara Falls, Powd., F. FF. FFF.	lb.		\$0.08	Oxide, Am. hyd. cryst.	lb.		\$0.02 1/2	dence, R. I. lump.	sh. ton		8.00	Metallic, brown	sh. ton		\$19.00
Grains	"		.10	Sulphate (Blanc Fixe)	"		.02	Pulverized	"		30.00	Red	"		16.00
Corundum, N. C.	"		.07@.10	<b>Barytes—</b>				German, som. pulv.	lb.		.01 1/4@.01 1/2	Ocher, Am. common	"		9.25@10.00
Chester, Mass.	"		.04 1/2@.05	Am. Crude, No. 1	sh. ton		9.00	Best pulverized	"		.01 1/4@.02	Best	"		21.25@25.00
Barry's Bay, Ont.	"		.07 1/2@.09 1/2	Crude, No. 2	"		8.00	Ceylon, common pulv.	"		.02 1/2@.03 1/2	Dutch, washed	lb.		.04 1/2
Crushed Steel, f.o.b. Pittsburg	"		.05 1/2	Crude, No. 3	"		7.75	Best pulverized	"		.04@.08	French, washed	"		.01 1/4@.02
Emery, Turkish flour, in kegs	"		.03 1/2	German, gray	"		14.50	Italian, pulv.	"		.01 1/4	Orange mineral, Am.	"		.07 1/2@.08
Grains, in kegs	"		.05@.05 1/2	Snow white	"		17.00	<b>Gypsum—</b> Ground	sh. ton		8.00@8.50	Foreign, as to make	"		.08 1/4@.10 1/2
Naxos flour, in kegs	"		.03 1/2	<b>Bauxite—</b> Ga. or Ala. mines:				Fertilizer	"		7.00	Paris green, pure, bulk	"		.12 1/2
Grains, in kegs	"		.05@.05 1/2	First grade	lg. ton		5.50	Rock	lg. ton		4.00	Red lead, American	"		.05 1/2
Chester flour, in kegs	"		.03 1/2	Second grade	"		4.75	English and French	"		14.00@16.00	Foreign	"		.06 1/4@.08 1/2
Grains, in kegs	"		.05@.05 1/2	<b>Bismuth—</b> Subnitrate	lb.		1.40	<b>Insufiorial Earth—</b> Ground	"		20.00	Turpentine, spirits	gal.		.40 1/2@.41
Chester flour, in kegs	"		.03 1/2	Subcarbonate	"		1.65	American, best	"		37.50	White lead, Am., dry	lb.		.04 1/2@.04 3/4
Grains, in kegs	"		.05@.05 1/2	<b>Bitumen—</b> "B"	"		.08 1/2	French	"		40.00	Foreign, in oil	"		.05 1/4@.05 3/4
Peekskill, f.o.b. Easton, Pa., flour, in kegs	"		.01 1/2	"A"	"		.05	German	"		40.00	Foreign, in oil	"		.07 1/2@.09 1/2
Grains, in kegs	"		.02 1/2	<b>Bone Ash</b>	"		.02 1/4@.02 1/2	True	"		2.45	American, red seal	"		.00 1/2
Crude, ex-ship N. Y.; Abbott (Turkey)	lg. ton		26.50@30.00	<b>Borax</b>	"		.07 1/4@.07 1/2	Oxide, pure copperas col.	"		.05@.10	Green seal	"		.07
Kuluk (Turkey)	"		22.00@24.00	<b>Bromine</b>	"		.40	Purple-brown	"		.02	Foreign, red seal, dry	"		.05 1/4@.08
Naxos (Greek) h. gr.	"		.26.00	<b>Cadmium—</b> Metallic	"		1.40	Venetian red	"		.01@.01 1/2	Green seal, dry	"		.06 1/4@.06
Garnet, as per quality	sh. ton		25.00@35.00	Sulphate	100 lbs.		2.00@2.50	Scale	"		.01@.03	<b>Potash—</b>			
Pumice Stone, Am. powd.	lb.		.01 3/8@.02	<b>Calcium—</b> Acetate, gray	"		1.25	<b>Kaolin—</b> (See Clay, China.)				Caustic, ordinary	"		.04 1/2@.06
Italian, powdered	"		.01 1/2	" brown	"		.85	<b>Kryolith—</b> (See Cryolite.)				Elect. (90%)	"		.06 1/2
Lump, per quality	"		.04@.40	Carbide, ton lots f.o.b. Niagara Falls, N. Y. or Jersey City, N. J.	sh. ton		75.00	<b>Lead—</b> Acetate, white	"		.07 1/4@.08	<b>Potassium—</b>			
Rottenstone, ground	"		.02 1/4@.04 1/2	Carbonate, ppt.	lb.		.05	Brown	"		.06	Bicarbonate, cryst.	"		.08 1/4
Lump, per quality	"		.06@.20	Chloride, com'l.	100 lbs.		.75@.80	Nitrate, com'l.	"		.06 1/2	Powdered or gran.	"		.14
Rouge, per quality	"		.10@.30	Best	"		1.00	True	"		.08 1/2	Bichromate, Am.	"		.08 1/4
Steel Emery, f.o.b. Pittsburg	"		.07	<b>Cement—</b>				<b>Lime—</b> Com. abt. 250 lbs.	bbi.		.80	Scotch	"		.08 1/4@.09
<b>Acids—</b>				Portland, Am., 400 lbs.	bbi.		1.70@2.00	Finishing	"		.90	Carbonate, hydrated	"		.04@.04 1/2
Boric, crystals	"		.10 1/4@.11	Foreign	"		1.65@2.25	<b>Magnesite—</b> Greece.				Calcined	"		.03 1/2@.03 3/4
Powdered	"		.11 1/4@.11 1/2	"Rosendale," 300 lbs.	"		.95	Crude (95%)	lg. ton		6.50@7.00	Chromate	"		.35
Carbonic, liquid gas	"		.12 1/2	Slag cement, imported	"		1.65	Calcined	sh. ton		14.00@15.00	Cyanide (98@99%)	"		.24@.25
Chromic, crude	"		.20	<b>Cereseine—</b>				Bricks	M		170.00	Kaifit	lg. ton		9.05
Hydrofluoric, 36%	"		.06	Orange and Yellow	lb.		.12	Am. Bricks, f.o.b. Pittsburg	"		175.00	Manure salt, 20%	100 lbs.		.66
4%	"		.05	White	"		.13 1/2	<b>Magnesium—</b>				Double Manure salt, 48@53%	"		1.12
Best	"		.25	<b>Chalk—</b> Lump, bulk	sh. ton		2.45	Carbonate, light, fine pd.	lb.		.04 1/2	Muriate, 80@85%	sh. ton		1.83
Sulphurous, liquid anhy.	"		.08	Ppt. per quality	lb.		.08 1/2@.06	Blocks	"		.06@.07	95%	"		1.86
<b>Alcohol—</b> Grain	gal.		2.55	<b>Chlorine—</b> Liquid	"		.30	Chloride, com'l.	"		.01 1/2	Permanganate, pure cryst.	lb.		.12 1/4@.13 1/4
Refined wood, 95@97%	"		.60@.65	Water	"		.10	Fused	"		.20	Prussiate, yellow	"		.13 1/2@.13 3/4
Purified	"		1.20@1.50	<b>Chrome Ore—</b>				Nitrate	"		.60	Red	"		.37@.37 1/2
<b>Alum—</b> Lump	100 lbs.		1.75	(50% ch.) ex-ship N. Y.	lg. ton		24.75	Sulphate	100 lbs.		.75@.95	Sulphate, 90%	100 lbs.		2.11
Ground	"		1.85	Sand, f.o.b. Baltimore	"		33.00	<b>Manganese—</b> Powdered,				96%	"		2.14
Powdered	"		3.00	Bricks, f.o.b. Pittsburg	M		175.00	70@75% binoxide	lb.		.01 1/4@.01 1/2	Sylvinit	unit		.35 1/2
Chrome, com'l.	"		2.75@3.00	<b>Clay, China—</b> Am. com., ex-dock, N. Y.	lg. ton		8.00	Crude, pow'd.	"		.01 1/2@.02 1/4	<b>Quartz—</b> (See Silica.)			
<b>Aluminium—</b>				Am. best, ex-dock, N. Y.	"		9.00	75@85% binoxide	"		.01 1/2@.02 1/4	Salt—N. Y. com. fine	sh. ton		2.00
Nitrate	lb.		1.50	English, common	"		12.00	85@90% binoxide	"		.02 1/4@.03 1/4	N. Y. agricultural	"		1.50
Oxide, com'l, common	"		.06 1/2	Best grade	"		17.00	90@95% binoxide	"		.03 1/4@.05 1/4	<b>Saltpetre—</b> Crude	100 lbs.		3.50@3.55
Best	"		.20	Fire Clay, ordinary	sh. ton		4.25	Carbonate	"		.16@.20	Refined	"		4.37 1/2@4.62 1/2
Pure	"		.80	Best	"		6.00	Chloride	"		.04	<b>Silica—</b> Best foreign	lg. ton		10.00@11.00
Hydrated	100 lbs.		2.60	Slip Clay	"		5.00	Ore, 50%, Foreign	unit		.22@.23	Ground quartz, ord.	sh. ton		6.00@8.00
Sulphate, pure	"		1.50@2.00	<b>Coal Tar Pitch</b>	gal.		.08	Domestic	"		.30	Best	"		12.00@13.00
Com'l.	"		1.15@1.25	<b>Cobalt—</b> Carbonate	lb.		1.75	<b>Marble—</b> Flour	sh. ton		6.00@7.00	Lump quartz	"		2.50@4.00
<b>Ammonia—</b>				Nitrate	"		1.50	<b>Mercury—</b> Bichloride	lb.		.77	Glass sand	"		2.75
Aqua, 16°	lb.		.03	Oxide—Black	"		2.20@2.30	<b>Mica—</b> N. Y. gr'nd, coarse	"		.03@.04	<b>Silver—</b> Chloride	oz.		.65
18°	"		.03 1/2	Gray	"		2.28@2.40	Fine	"		.04@.05	Nitrate	"		.3 1/2
20°	"		.03 1/4	Smalt, blue ordinary	"		.20	Sheets, N. C. 2x4 in.	"		.30	Oxide	"		85@.110
28°	"		.05 1/2	Best	"		.20	3x3 in.	"		.80	<b>Sodium—</b>			
<b>Ammonium—</b>				<b>Coppers</b>	100 lbs.		.30@.35	3x4 in.	"		1.50	Bichromate	lb.		.06 1/2
Carbonate, lump	"		.08 1/4@.08 1/2	Chloride	lb.		.18	4x4 in.	"		2.00	Chlorate, com'l.	"		.08 1/4@.08 3/4
Powdered	"		.09@.09 1/2	Nitrate, crystals	"		.35	6x6 in.	"		3.00	Hyposulphite, Am.	100 lbs.		1.60@1.65
Muriate, grain	"		.05 1/2	Oxide, com'l.	"		.19	<b>Mineral Wool—</b>				German	"		1.70@1.80
Lump	"		.08 1/2	<b>Cryolite</b>	"		.06 1/2	Slag, ordinary	sh. ton		19.00	Peroxide	lb.		.45
Nitrate, white, pure (99%)	"		.12	<b>Explosives—</b>				Selected	"		25.00	Phosphate	"		.02 1/2
Phosphate, com'l.	"		.06	Blasting powder, A	25 lb. keg		2.65	Rock, ordinary	"		32.00	Prussiate	"		.10 1/4@.11
Chem., pure	"		.60	Blasting powder, B	"		1.40	Selected	"		40.00	Silicate, conc.	"		.05
<b>Antimony—</b> Glass	"		.30@.40	"Rackarock," A	lb.		.25	<b>Nickel—</b> Oxide, No. 1	lb.		1.00	Com'l.	"		.01
Needle, lump	"		.05 1/4@.06	"Rackarock," B	"		.18	No. 2	"		.60	Sulphate, com'l.	100 lb.		.77 1/2
Powdered, ordinary	"		.05 1/2	Judson R. R. powder	"		.10	Sulphate	"		.20@.21	Sulphide	lb.		.01 1/2
Best	"		.08 1/2	Dynamite (20% nitro-glycerine)	"		.13	<b>Oil—</b> Black, reduced 29 gr.:				Sulphite crystals	"		.02 1/2
Oxide, com'l white, 95%	"		.09 1/2	(30% nitro-glycerine)	"		.14	25@30, cold test	gal.		.09 1/4@.10 1/4	<b>Sulphur—</b> Roll	100 lbs.		1.85
Com'l gray	"		.07	(40% nitro-glycerine)	"		.15	15, cold test	"		.10 1/4@.11 1/4	Flour	"		1.90
ulphuret com'l.	"		.16	(50% nitro-glycerine)	"		.16 1/2	Zero	"		.11 1/4@.12 1/4	Flowers, sublimed	"		2.15
<b>Arsenic—</b> White	"		.08 1/2@.09 1/2	(60% nitro-glycerine)	"		.18	Summer	"		.09 1/4@.09 3/4	<b>Talc—</b> N. C., 1st grade	sh. ton		13.75
Red	"		.06 1/2@.07 1/2	(75% nitro-glycerine)	"		.21	Cylinder, dark steam ref.	"		.08 1/4@.10 1/4	N. Y., Fibrous, best	"		10.20
<b>Asphaltum—</b>				Glycerine for nitro (32 2-10° Be.)	lg. ton		13@.13 1/4	Dark, filtered	"		.11 1/4@.15 1/4	French, best	100 lbs.		1.25
Ventura, Cal.	sh. ton		32.00	<b>Feldspar—</b> Ground	sh. ton		8.00@9.00	Light filtered	"		.14 1/4@.17 1/4	Italian, best	"		1.62 1/2
Cuban	lb.		.01 1/4@.03 1/4	French, Best	lg. ton		11.75	Extra cold test	"		.21 1/4@.26 1/4	<b>Tar—</b> Regular	bbi.		1.90
Egyptian, crude	"		.05 1/4@.06	<b>Fluorspar—</b>				Gasoline, 88°@90°	"		.14@.19	Oil brastels	"		3.80
Trinidad, refined	sh. ton		35.00	Am. lump, 1st grade	sh. ton		\$14.40	Naphtha, crude, 68°@72°	bbi.		9.05	<b>Tin—</b> Crystals	lb.		.20@21 1/4
San Valentino (Italian)	lg. ton		16.00	2d grade	"		13.90	"Stove"	gal.		.12	Oxide	"		.42
Seyssel (French), mastic	sh. ton		21.00	Gravel and crushed, 1st gr.	"		13.40	Linseed, domestic raw	"		.60	<b>Uranium—</b> Oxide	"		2.25@3.00
Gilsonite, Utah, ordinary	lb.		.03	2d grade	"		12.40	Bolled	"		.62	<b>Zinc—</b> Metallic, ch. pure	"		.07@.09 1/2
Select	"		.03 1/2	Ground, 1st grade	"		17.90	Calcutta, raw	"		.85	Carbonate	"		.15