

The Engineering and Mining Journal

WITH WHICH IS CONSOLIDATED "MINING AND METALLURGY."

Vol. LXXIV.

NEW YORK, SATURDAY, NOVEMBER, 22, 1902.

No. 21.



PUBLISHED EVERY SATURDAY.

261 BROADWAY, NEW YORK.

TELEPHONE 6866 CORTLANDT. P. O. BOX, 1833.
CABLE ADDRESS "ENGINJOUR" NEW YORK.

W. I. JOHNSTON, President. F. J. PRATT, Treasurer.

BRANCH OFFICES:

CHICAGO, ILLINOIS, Telephone, Harrison 3326, 520 Monadnock Block
CLEVELAND, OHIO, Telephone, Cuy. C. 379, 327 Garfield Building
DENVER, COLORADO, 206 Boston Building
SALT LAKE CITY, UTAH, 408 Dooly Building
BUTTE, MONTANA, 19 & 20 Owsley Block
SAN FRANCISCO, CALIFORNIA, Mills Building
VANCOUVER, BRITISH COLUMBIA, Molson's Bank Building
LONDON, ENGLAND, 20 Bucklersbury, E. C.
DORTMUND, GERMANY, Arndt Strasse 56

FREDERICK HOBART Associate Editor
ROSSITER W. RAYMOND, Ph.D., M.E. Special Contributor

SUBSCRIPTION payable in advance \$5.00 A Year of 52 numbers INCLUDING POSTAGE IN THE UNITED STATES, CANADA, MEXICO, CUBA, PORTO RICO, HAWAII or the PHILIPPINES. To FOREIGN COUNTRIES, INCLUDING POSTAGE, \$7.00; or its equivalent: £1. 8 s. 9 d.; 28 Marks; 35 Francs; or 35 Pesetas.

ADDRESSES CHANGED WHENEVER DESIRED
In requesting change of address give OLD as well as new address.

NOTICE TO DISCONTINUE
Should be WRITTEN to the New York Office in every instance.

ADVERTISING COPY
Should reach NEW YORK office by MONDAY morning of issue week; CHANGES OF COPY by the PRECEDING THURSDAY.

Remittances may be made by P. O. Order, Express, Draft on New York or Registered Letter at our risk.

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

CONTENTS.

Editorial Notes	671
Anthracite Strike Commission	672, 676
Price and Production of Coal	672
Market Conditions	672
Some Mineral Statistics of Brazil	673
The Briquetting of Minerals	R. Schoor, 673
*Lignite Deposits of North Dakota	Frank A. Wilder, 674
Conditions of Labor and Life in Anthracite Mining F. L. Hoffman	675
Coal Statistics of Great Britain	677
*Tail Rope Haulage System in a Coal Mine	678
Manufacture of Hypochlorite of Soda	Edward Walker, 679
*Iron Making in Brazil	H. K. Scott, 680
Sault Ste. Marie Canal Traffic	680
*The Latest New Zealand Gold Dredge	681
Recent Decisions	682
Abstracts of Official Reports	682
Books Received	682
Books Reviewed	683
Correspondence	683
Questions and Answers	684
*Christy Box Car Loader	684
Lake Navigation Improvement	684
*Smokeless Calorific Furnace	685
*Turbine Equipment at Sault Ste. Marie	685
Mechanical Stokers in Steel Mill Service	686
*Improved Hose Coupling	686
*Patents	686

* Illustrated.

DEPARTMENTS

Assessments	698
Chemicals: New York and Foreign	696
Coins, Foreign	697
Dividends	698
Financial Notes	697
Industrial Notes	686
Markets: Coal, United States and Foreign	694
Iron and Steel	695
Metals: Gold, Silver, Copper, Tin, Lead, Snelter, Antimony, Platinum, Quicksilver, etc.	697
Mining News: United States and Foreign	687
Mining Stocks	693
Obituaries	686
Personals	686
Prices—Current	700
Schools, Technical	686
Societies	686
Stock Market Review: United States and London	693
Stock Quotations	699
Trade Catalogues	687

TO ENGINEERS VISITING NEW YORK

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



THE FIGURES given on another page show that the Lake Superior traffic passing through the Sault Ste. Marie Canal for the season up to November 1 reached the great total of 30,931,213 net tons, a gain of over 25 per cent on the extraordinary movement of last year. More than two-thirds of the freight this year—21,524,409 tons—was iron ore. Unless navigation should close at an unusually early date, which does not now seem probable, the freight movement for the season will reach a total of 35,000,000 tons; while the iron ore shipments will be not far from 25,000,000 tons, or more than 70 per cent of the total. It is evident that the Lake mines will this year supply even more than their usual proportion of the blast furnaces of the country.



THE EXTRAORDINARY congestion of traffic on the leading railroads is, of course, a sign of the great activity of trade and of the producing industries of the country. Most of the leading lines have spent large sums during the past two or three years in buying new equipment and in improvements intended to facilitate the handling of traffic. These do not seem to have been sufficient, however, and the blockades on many important lines are said to be the worst on record. The delays in moving traffic are working serious injury to the iron and coal trades, as shown elsewhere in our columns. It is quite possible that some lines have not done as much as they might. At any rate, the complaints from mines and furnaces are numerous, and relief does not seem to be in sight.



GOLD SHIPMENTS from the Canadian Yukon, so far as reported, have kept up well this year. The report of Mr. J. A. Matthews, Comptroller of the Yukon Territory, shows that the shipments began in May with 1,326 ounces of bullion. In June the gold taken out in the winter made its appearance, 236,673 ounces being reported; while for July, August and September the record was 154,208 ounces, 145,033 ounces and 146,455 ounces, respectively. The total for the five months was 683,695 ounces. As the Yukon bullion is valued uniformly in the Canadian reports at \$15 per ounce, the total was equal to 496,160 ounces fine gold, or \$10,255,618. This report covers the greater part of the open season, though considerable additions may still be made to the quantity. It does not, however, cover the metal which escapes record in one way and another; nor that retained in circulation in the region, which may reach another considerable amount. Upon the whole, it looks as if the production would not be far behind that of last year.

STATE MINERALOGIST LEWIS E. AUBURY, of California, is continuing his active fight against the so-called "scrippers" who have been locating large tracts of land in that State, chiefly under the Forest Reservation law. Mr. Aubury has had some of his assistants making examinations in northern California, and finds that in Butte, Plumas and other counties over 250,000 acres have been located as forest lands, a considerable portion of this territory being really mineral land. Moreover, investigation has developed the fact that a large portion of this land has, by means of various subterfuges, been located by two or three parties. He has made an appeal to the Land Office at Washington to have all these locations investigated, and if necessary to have a number of them set aside. Mr. Aubury will have the assistance of the State Miners' Association in this matter, and it is to be hoped that the whole business will be thoroughly sifted. The State Mineralogist certainly deserves much credit for his active work in the matter.



AN IMPORTANT conference is now going on in Great Britain, the object of which is to reach some agreement as to the regulation of coal miners' wages in the South Wales District. The parties to the agreement are the South Wales & Monmouthshire Coal-owners' Association on the one hand, and the South Wales Miners' Federation on the other; each party being represented by a committee of 24 persons. The new wage contract is to take the place of a sliding scale system, based on the selling price of coal, which has been in operation for several years. The points which the coal-owners want to secure are the stopping of unnecessary suspensions of work; the exercise of greater care by miners in the separation of coal from waste in the mine; and the taking into account, in settlements of the rate of wages, of the general conditions and prospects of trade as well as the actual selling price at a given time. The last point is the one to which special objection is made by the miners. The South Wales field has been for a year past much disturbed over the wage question, and while there has been no strike there have been frequent short suspensions of work at different collieries for various causes. At one time also the miners agreed among themselves to work only half time, their reason being that short supply of coal would maintain the selling price. This plan was carried out for a time, notwithstanding strong objections by the operators.



A DECISION of some interest has been given by Judge W. W. Morrow in the United States Circuit Court with regard to the so-called salt trust. It will be remembered that some time ago the Federal Salt Company arranged for the purchase or consolidation of a number of companies manufacturing salt on the Pacific Coast. These concerns operated chiefly in Alameda County, though two or three were located in San Diego County. The affidavits presented to the court showed that the Federal Salt Company had secured control of the business of

seven other companies and forty-four firms and individuals manufacturing salt, the object of the arrangement being to put a stop to competition, which had been very sharp, and to regulate the price of the product. Salt which was sold two years in San Francisco at about \$4 a ton now costs the consumer \$18 or over, and no purchasers can obtain the salt from any other parties, so that competition is practically at an end, and the Federal Company has a monopoly of the business. Upon an *ex-parte* presentation of the case the court granted a temporary injunction on October 15. A further hearing was had on November 10, and after testimony and arguments on both sides had been presented the court decided that in this case there had been clearly a violation of the Sherman Trust Act of 1894. Upon that ground a permanent injunction was ordered to issue against the Federal Salt Company and the other parties to the case.

This is, we believe, the first action decided under the Sherman law on the Pacific Coast. In view of the importance of the decision there is very little doubt that an appeal will be taken, and it remains to be seen whether the higher courts will sustain Judge Morrow's decision.



THE ANTHRACITE STRIKE COMMISSION.

THE PROCEEDINGS of the Anthracite Strike Commission are cited elsewhere. The report includes abstracts of several of the statements presented by the companies. It will be observed that all of these statements concur in a positive refusal to negotiate with the Miners' Union in its present form. On the other hand, the Miners' Union is an obvious and necessary party to the proceedings, and to reconcile these bodies will be a somewhat difficult matter for the commission. The statements of the different companies while varying somewhat in form are very similar. The Lackawanna, the Delaware & Hudson and other companies obviously follow the lead of the Reading statement with some variations required by local circumstances. Perhaps one of the most interesting statements was that of the Lehigh Coal and Navigation Company. This company is the only large operating concern, which is not also the owner of the railroad over which its coal is transported from the mine. It is also an old company, its coal lands having been purchased in the early days of the trade, when they were obtainable at a low price. It has also been about the only company which has steadily paid dividends from its coal operations alone. Some of its statements, especially as to the condition of its employees, are of much interest. It will be observed that this company, while concurring with the others in their refusal to deal with the United Mine Workers, expressed its willingness to accept any organization which its employees might form among themselves. Its objection is to the present association and not to all unions.

Up to the present writing, Mr. John Mitchell has been the only witness on the stand before the commission. He has proved an extremely sharp and adroit witness, answering promptly the questions put to him by the commission and parrying skillfully the sharp thrusts which the counsel for the coal companies made on his criticisms. From present appearances it is probable that he will remain on the stand for the greater part of the week.

PRICE AND PRODUCTION OF COAL.

The question of the cost of production of coal enters very largely into that of the development of manufactures for home consumption, as well as for foreign trade. In view of this the British Board of Trade has recently made studies into the cost of production of coal in different countries. The actual cost is difficult to obtain, but in some tables recently published the average selling price at collieries has been taken as at least an approximate indication. To this has been added a statement showing the average output per miner per year. The following table shows these figures for a number of coal producing countries:

	Price at pit.	Tons per miner.
United States	\$1.335	548
Great Britain	2.255	278
Germany	2.255	264
France	2.880	206
Belgium	3.345	177
Austria-Hungary	1.780	163
India	1.030	70
Australia	1.520	430

The lowest selling price shown is for India, where the output per miner was also lowest. In that country, however, wages are very far below the American or the European standard. The United States shows by far the greatest production per miner, which is due in part to the greater efficiency of labor, but in part also to the more extensive employment of machinery. The figures are intended to apply to the year 1901.

According to these Board of Trade figures the average selling prices of British coal have shown much wider variations than those in the United States. In both countries the price in recent years was lowest in 1897 when the extreme of the long period of depression, which began in 1893, was reached; but in the United States the increase has been gradual, but steady, since that time, while in Great Britain there was a very sharp advance in 1900, followed by a considerable fall last year. The average selling price at mines has been, according to these tables, as follows, for six years past:

	United States.	Gt. Britain.
1896	\$1.145	\$1.405
1897	1.110	1.420
1898	1.060	1.525
1899	1.113	1.820
1900	1.275	2.595
1901	1.335	2.255

The difference between the highest and lowest prices in the United States was only 27.5 cents, while in Great Britain it was \$1.19, or more than four times as great. The changes are the more striking, as in this country the improvement has not been altogether due to better trade and larger demand; it has been helped by the changes in ownership of mines and railroads, which have done much towards diminishing competition and checking the cutting of rates. It is generally understood, however, that the larger part of the improvement in prices to consumers has accrued to the railroads and not the mine operators.

The greater variations in the British market are further shown by the fact that while in 1896 the British selling price was only 26 cents a ton more than the American, in 1900 the British coal operator received more than double the price paid in the United States, the difference being \$1.32 a ton.

During the present year the average selling price at mine has undoubtedly shown an increase in the United States. In Great Britain there has been a decrease, notwithstanding the speculative rise in prices caused by the purchases of coal for the United States, made in consequence of the anthracite min-

ers' strike. That was a temporary rise only, and has passed away as quickly as the cause for it.

We may add here that three countries produced more than 80 per cent of all the coal mined and used in the world. The production of those countries for two years past was as follows, reduced to metric tons for purposes of comparison:

	1901.	1902.	Changes.
United States	243,414,163	266,078,668	I. 22,664,505
Great Britain	228,772,886	223,551,696	D. 5,221,190
Germany	149,551,058	152,628,931	I. 3,077,873
Totals	621,738,107	642,259,295	I. 20,521,188

The total output of the world, as estimated by *The Mineral Industry* was, in round figures, 765,000,000 metric tons in 1900; while in 1901 it was 790,000,000 tons. The greater part of the increase was from the United States.



MARKET CONDITIONS.

Iron and Steel.—We have again to report the iron markets seriously embarrassed by transportation conditions. Notwithstanding the pressure upon them for material the furnaces in western Pennsylvania and Ohio are almost at a standstill in consequence of the short supplies of coke, while at the same time the coke plants in the Connellsville region are unable to store their production, owing to all the available ground being occupied by coke waiting for shipment. Deliveries of finished material are extremely irregular. The block in the vicinity of Pittsburg is said to be the worst ever witnessed, and while the railroads claim they are doing all they can to relieve the tension the work proceeds very slowly indeed. The consequence is that a number of furnaces and mills have been obliged to shut down, still further postponing deliveries on which they were already behind.

New business is not reported in large volume, and, in fact, many manufacturers are waiting to see what turns up before placing any further contracts. In the South, however, the blast furnaces are beginning to take some orders for delivery for the second half of 1903, which they have heretofore avoided doing to any extent. The prices made on these contracts are generally fully up to the figures made in the first half of the year.

Foreign material continues to come in in considerable quantities, although fewer orders for German iron and steel billets are reported from abroad.

Copper.—The copper market remains quiet and rather dull, with no material change in quotations to be reported.

The report of Mr. John Stanton, who acts as statistician for the companies, shows that the production of copper in the United States continues large. The total reported for October was 26,252 tons, which is 464 tons more than in September, and 2,154 tons more than in October, 1901. For the 10 months the total United States production is reported to be 244,533 tons, which is a gain over the corresponding period for 1901 of 20,811 tons, or 9.3 per cent. The output of the foreign reporting mines, which include the principal European mines, was 9,707 tons for October and 90,122 tons for the 10 months, the increase over last year being 7,404 tons. The exports from the United States showed a decrease of 668 tons, as compared with September, but are still very large, and were more than twice as great as those of October, 1901. For the 10 months the total exports are reported at 147,826 tons, which is an increase of 73,700 tons, or 99.4 per cent over those of

the corresponding period last year. The balance remaining in this country for consumption was 96,707, while last year at the corresponding date the balance was 149,598 tons. The difference in this figure is a striking one, especially when we remember that the consumption this year has been very large.

Other Metals.—Tin has been somewhat weaker from the effects of large spot supplies and a weaker market abroad. Some unfavorable effect on consumption has resulted from the enforced closing of a number of tin-plate mills in the West on account of short supplies of fuel.

Lead continues quiet and unchanged in prices, but no falling off is reported in the steady consumptive demand.

Spelter has been somewhat weaker, consumers taking less, while supplies now seem to be sufficient for all requirements. The price this week is again somewhat lower.

Silver remains dull, and there has been a still further fall in the price of the metal. With the considerable stocks reported on hand both here and in London, and with a steady production going on there seems to be no opportunity for a rise.

Coal.—The Western coal markets are still demoralized. With only three or four weeks of navigation remaining, and with the railroads blocked in every direction, the Lake shippers have given up all hope of filling their season contracts, and are only endeavoring to do the best they can in the short time which remains to them. The supply of coal at the mines is abundant, but cars and motive power are lacking, and a number of vessels have been obliged to go up the lakes without cargoes, because it was altogether uncertain when their quotas of coal could be secured at the lower ports. In the larger Western cities, such as Cleveland and Chicago, supplies continue to come in slowly, and dealers are still unable to begin the accumulation of stocks for the winter. Anthracite is going West very slowly, and many coal dealers have concluded that it is no use to expect stocks of hard coal, and are turning their attention to those grades of bituminous which are best adapted for household use.

The Seaboard bituminous coal trade, while it has passed the speculative stage, is still somewhat unsettled. The diversion of a large quantity of soft coal to the cities in place of the anthracite has made the furnishing of stocks to the New England ports unusually late, and there is a rush to get coal to market. In this trade, also, there are many complaints as to the delays in railroad transportation to tidewater.

The anthracite trade has not as yet approached its normal condition. Coal is being mined in considerable quantities and forwarded to those points where needs are apparently the greatest. Clamors for supplies, however, are coming from all quarters and the railroads are embarrassed in arranging their deliveries to the best advantage. It is probable that no stocks will accumulate anywhere, but that the trade will be on a hand-to-mouth basis for the greater part of the winter.



SOME MINERAL STATISTICS OF BRAZIL.

Through the courtesy of Senor Antonio Olyntho, we have received the following statistical information pertaining to the production of gold and manganese ore from the States of Minas Geraes and Bahia.

The exports of gold from the State of Minas Geraes for five years have been: 1896, 1,989 kilo-

grams; 1897, 2,234; 1898, 3,090; 1899, 4,192; 1900, 4,305; 1901, 4,012 kilograms. Thus a progressive increase was shown up to last year, when there was a small decline.

Exports of manganese ore from the State of Minas Geraes for the year 1901 were 97,667 metric tons; for the first half of 1901 they were 81,658 tons.

Exports from the State of Bahia in 1901 included 23 kilograms gold and 10,470 tons of manganese ore.

The total exports of mica from Brazil in 1901 were 29,500 kilograms. The exports of crystals reached a total of 29,700 kilograms for the year.

THE BRIQUETTING OF MINERALS.

By ROBERT SCHORR.

The value of briquetting in connection with metallurgical processes and the manufacture of artificial stone is well understood and appreciated. In smelting plants there is always more or less flue-dust, fine ores and sometimes fine concentrates to be treated, but the charging of such fine material directly into a furnace would cause trouble and irregularities, and would lessen its capacity also. As mineral briquetting cannot be effected without considerable wear upon the machinery and without quite appreciable expense in binder, labor and handling, many smelters try to avoid it.

The financial question, however, is not as serious as it may at first appear, and taking the large output of modern briquetting machines in consideration, the cost for repairs amounts only to a few cents per ton of briquetted material. The total cost depends in the first place on the cost of labor, power and the binder and in most American smelters it varies between \$0.65 and \$1.25 per ton of briquettes.

Ordinary brick presses, with clay as a binder, were used in Europe as well as in this country, but they are too slow and expensive for larger propositions and the presence of clay is usually undesirable.

The English Yeadon (fuel) press has also been used for some years at the Carlton Iron Company's Works at Ferryhill in England, and at the Ore and Fuel Company's plant at Coatbridge in the same country; also by some continental firms. Dupuis & Sons, Paris, furnished a few presses which are mostly used for manganese, iron ores and pyrites. In some localities coke dust is added. The making of clay briquettes or mud-cakes is the crudest form of briquetting; but while heat has to be expended to evaporate the 40 to 50 per cent of moisture in it, and while considerable flue-dust is made, it is better than feeding fine-ore or flue-dust directly into the furnace.

The only other method of avoiding briquetting is by fusing ore fines in slagging reverberatory furnaces and by adding flue-dust in the slagging pit, thus incorporating it with the slagging ore. This is practiced sometimes in silver-lead smelters, but in connection with copper or iron smelters it is not practicable.

In briquetting minerals a thorough mixing and kneading is of the first importance. If this is done properly a comparatively low pressure will suffice to create a good and solid briquette, which after 6 to 8 hours of air drying or after a speedier elimination of the surplus of moisture in hot-air chambers, will be ready for the furnace-charge. A good briquette should permit transportation without excessive breakage or dust a few hours after being made, and it should retain its shape in the furnace until completely fused so as to create as little flue-dust as possible. The briquette should be dense, otherwise it will crumble under the influence of bad weather.

The two presses on the American machinery market are the presses built by the Chisholm, Boyd & White Company, of Chicago, and the briquetting machine manufactured by the H. S. Mould Company, of Pittsburg. Both are extensively used, and in many metallurgical plants it will pay well to adopt them.

From 4 to 6 per cent of milk of lime is generally used as binder, and this has a desirable fluxing influence also. A complete outfit comprises, besides the press, a mixer for slacking the lime, and a feed-

pump which discharges the liquid in proper proportion into the main mixer wherein the ore fines, flue-dust or concentrates are shoveled.

The Chisholm, Boyd & White Company's press makes 80 briquettes per minute which, with a new disk, are of 4 inches diameter and 2½ inches height, thus giving about 872 cubic feet of briquette volume per 10 hours, or 50 to 80 tons, depending on the weight of the material. With the wear of the disk the height of the briquettes is reduced and consequently the capacity of the machine also. The disk weighs about 1,600 pounds, and as most large smelters have their own foundries it can be replaced with little expense. About 30 effective horse-power is usually provided for driving the apparatus. The machine is too well known to metallurgists and engineers as to require further comment or description.

The H. S. Mould Company has also succeeded in making its machines a thorough practical success. This machine is a plunger-type press. The largest press built employs 6 plungers, and at 25 revolutions it makes 150 briquettes of 3 inches diameter and 3 inches height, or 1,080 cubic feet per 10 hours. Its rated capacity is 100 tons per 10 hours.

In using a plunger-type press the material must be of a commercial dryness and not more than 7 per cent mechanical moisture should be present. If wet concentrates have to be briquetted it is necessary to add dry ore fines or flue-dust to arrive at a proper consistency. The briquettes are very solid and only air drying for a few hours is necessary.

The cylindrical shape of briquettes is very good, as it insures a proper air circulation in the furnace and consequently a rapid oxidation and fusion.

The wear of the Mould Company's press is mostly confined to the chilled iron bushings and to the pistons. Auxiliary machinery consists again of the slacker, the feeder and the main mixer. The press is of a very substantial design, and it is claimed that the cost of repairs does not amount to more than 3 cents per ton of briquettes.

The briquetting plant at the new Anaconda reduction works was started a few months ago, and as both the Chisholm, Boyd & White and the H. S. Mould Company's presses are working there the publication of some data would be much appreciated.

Wear and tear is unavoidable in a crude operation like briquetting; to treat flue-dust, ore fines and fine concentrates successfully, it is almost absolutely necessary to resort to it.

Edison used a number of intermittent-acting presses at his magnetic iron-separation works in New Jersey, but this plant shut down some time ago.

In connection with briquetting in the manufacture of artificial building stones, tiles, grindstones, emery and polishing wheels, magnesia cement is used very extensively as a binder. Its binding quality is very considerable, and it is very plastic and cheap. A very good mixture contains 30 parts of 45 per cent magnesium chloride, 30 parts of 93 per cent magnesia and 60 parts water. About 5 per cent of this mixture is sufficient. The blocks are very solid and harden thoroughly within a few hours.

Germany derives an enormous and cheap supply of magnesia cement from the famous Stassfurt mines.

By adding ochre or ultramarine in proper proportion, very attractively colored building stones are made. In the manufacture of slag brick, which forms a branch of the slag-cement industry, no binder at all, or milk of lime only, is used. Usually the slag is granulated as it runs from the furnace by a water jet which forwards it at the same time to a settling tank. Open-tube presses are employed, and no calcination is required. Ornamental bricks are made also quite extensively from shale.

COAL MINING IN SPAIN.—The Sociedad Huelera Antracita has been formed to mine coal at Fuenteovejuna in the province of Cordoba, Spain, with a capital of 3,000,000 pesetas, in shares of 500 pesetas each.

THE LIGNITE DEPOSITS OF NORTH DAKOTA—I.

By FRANK A. WILDER.

In a series of three articles it is proposed to review the nature and extent of the lignite deposits of North Dakota; their fuel value, and the present state of development of the lignite industry.

Limiting the term "lignite area" to that portion of the State in which lignite seams with a thickness of at least 3 feet and good quality are known or may reasonably be expected to exist, it still includes the entire western half of the State, which represents an area equal to at least half of the State of Ohio. Outside of the State the lignite continues for but a short distance south into South Dakota, but underlies an extensive tract on the west in Montana and to the north in Assiniboia.

The eastern half of the lignite area is covered with glacial drift, and by the moraines of the Wisconsin, or latest ice sheet. The Coteau du Missouri, a mild escarpment of Laramie clays, due to preglacial erosion, forms the edge of the slightly elevated region which constitutes the western half of the State. It trends from northwest to southwest across the center of the State, and is covered with the hill belt of the outer Wisconsin moraine, which is generally 20 miles wide. Along the edge of this escarpment the most eastern exposures of lignite

ing months. It produces luxuriant grasses, and is a natural stock and dairying country, while farming is more uncertain, though often profitable. Under the provision of the law for the reclamation of arid lands, much of this country is destined to become very productive.

The extraordinary exposures of the lignite seams in the bad lands, and in particular along the Little Missouri River and the parent stream, are great aids in studying the lignite problem. Here frequently five, occasionally seven, and in one instance at least nine seams outcrop at a single point, one above another. Vertical sections of Laramie clays and lignite, often 300 feet high and persistent for miles, may frequently be found. In these exposures one lignite seam may be seen to thin out till it gives place to clay, while others develop above or below it, giving continuity of lignite in a diversity of seams. Such observations as are available seem to indicate that this is the nature of the lignite deposits throughout the entire area. The deep wells at Medora and Dickinson reveal 16 seams within 900 feet of the surface, one of them 22 feet thick. The Laramie clays with which all of the workable lignite in the State occur, have a maximum thickness of 2,000 feet, and coal is distributed through the entire series in varying quantities. They lie like a wedge, the thin edge of which reaches to the center of the State.

Sentinel Butte, Billings County, 4 miles south of the Northern Pacific track. Seams 15 feet thick are not uncommon, one of this size being developed at the large mine at Lehigh, near Dickinson in Stark County. Seams 5 feet thick outcrop very frequently, so often indeed, that in the entire western half of the State very few settlers go more than 10 miles to find a good coal bank that is opened with little effort. Very many ranches have lignite at their doors, and the common water-bearing strata from which shallow wells in the driftless area obtain their supply are lignite seams. Since the lignite is free from sulphur, water so obtained is generally potable and often very palatable.

The lignites are generally brown in color, though sometimes a dull black. The woody structure of the vegetable matter from which they were derived is usually well preserved. When green, or fresh from the mine, they are tough, and may be removed in large blocks. Their content of moisture is usually 30 per cent, and on drying they fall to pieces. This so-called slacking does not lessen their fuel value where proper appliances for burning fine coal are used. In the mine the coal retains its moisture, and consequently its toughness, making a very satisfactory mine roof. Often the upper part of a seam consists of slack or soft coal, and at times an entire seam is made up of this material, though such seams



UPPER PART OF 16-FOOT LIGNITE SEAM.



11-FOOT LIGNITE SEAM NEAR WILLISTON.

occur, in the vicinity of Harvey, in Wells County. The topography of the region presents considerable variety. The eastern portion consists of a moderately rolling Wisconsin drift plain beyond which is the moraineic belt of the Coteau. West of the Coteau is the older drift plain, where the topography is mature and the drainage nearly complete. The outer edge of the older drift lies about 50 miles west of the Missouri and follows the trend of the river. Outside of the drift the country is strongly rolling, with high and low buttes marking plainly two ancient cycles of erosion. The increase in elevation is gradual toward the west, Bismarck being 1,670 feet above sea level, while the State line, 200 miles farther west, has an elevation of 2,811 feet. The high buttes rise rather sharply 400 feet above the surrounding country. Along the streams in the driftless area vigorous erosion in soft materials protected by scant vegetation has resulted in deep, steep-sided ravines, which cut the country up into isolated patches, domes, pyramids, and buttes, the so-called bad lands.

The lignite area depends on the Missouri and its tributaries, and the west arm of the Souris or Mouse River for its drainage. Excepting in the region covered by recent drift the streams have cut deeply into the soft clays, revealing many of the interlying lignite seams.

The average annual rainfall for the entire region is about 18 inches, fairly distributed during the grow-

while its greatest thickness is developed at the western boundary. The seams very rarely show great lateral persistence. In the vicinity of Minot, Ward County, a single seam is known to underlie 60 square miles of territory, but this is unusual. The seam worked by the Washburn Mine extends but 3 or 4 miles from east to west, while north and south its existence has been demonstrated for 8 miles. In general, the seams may be said to resemble elliptical lenses, the longer axis often lying north and south. It is highly probable that in the western half of the State there is no point beneath which a lignite seam of workable thickness does not exist. The availability of these seams, however, differs greatly. Hundreds of them lie near the surface and coal is taken from them for local use by stripping away a few feet of overlying clay. The seam at the Washburn Mine lies 60 feet below the surface. The large mines in Ward County take coal from a seam that outcrops near the bottom of Des Lacs River Valley, nearly 300 feet below prairie level. Two mines are endeavoring to reach this seam by vertical shafts of this depth.

The thickness of the heaviest seam that has been carefully measured is 40 feet. This outcrops on Sand Creek, a tributary of the Little Missouri, in Billings County, 30 miles south of the Northern Pacific track. A number of seams having a thickness of 25 feet have been measured, one of them occurring in

are never more than 4 feet thick. The soft lignite is not utilized at present, and is regarded as without value. Lignite generally burns like wood, with great heat and little smoke, and when pure leaves a small amount of gray ash.

Outcrops of lignite that have long been exposed to the air have the appearance of decayed wood, combined with clay. If after drifting in on the seam from a natural exposure for 6 or 7 feet the coal does not improve materially, the entire seam probably consists of slack. In the driftless area the best guide in prospecting is the presence of springs. These almost invariably issue from lignite seams, and may be found abundantly along the draws and coulees in which the region abounds. On account of the moisture that they contain the vegetation remains green longer over a lignite seam than in the surrounding country.

In but one instance has rock been found above the coal which can be used as roof. The practice common at present is to leave from 6 inches to a foot of coal. Sometimes a stiff overlying clay will serve this purpose. In a number of localities lignite seams are burning at present, while at hundreds of points throughout the western half of the State evidence of former extensive fires exist in the masses of burned and half-fused clay, or scoria. Of the burning banks examined nearly all were in the slack seams, and this may have been in a large measure true in the past, since the loose coal of which

they are composed gives greater access to the air that supports the combustion.

The possibility of finding bituminous coal at greater depths has been carefully considered, and the railroad companies, finding that the lignite is too light a coal to burn under locomotives with ordinary equipment, have done some deep drilling. While the analysis of samples secured at considerable depths by this process are not available, from the fact that no development work has been done in consequence of the drilling, it may be assumed that no bituminous coal was found, or that the quantity was small.

Theoretically the reason for expecting a better coal in the Laramie at greater depth in this region are slight. Of the lignites exposed on the surface those near the top of the Laramie series are often as good as those 1,000 feet lower. The lignite in Sentinel Butte, for instance, nearly 3,000 feet above sea level, shows as high a percentage of fixed carbon as that at Minot, at an altitude of 1,600 feet. The Laramie clays are practically horizontal, and this difference in elevation is due to erosion, which has removed 1,400 feet of the once overlying clays from the valley at Minot. If the pressure of these 1,400

feet of undeveloped sites are available for the expansion of the industry, if the known outcrops alone are considered. Except about the Washburn Mine and near Minot no prospecting with drills has been done.

The territory which now offers a market to lignite includes all of North Dakota and parts of Minnesota and eastern South Dakota. At present the mines are not able to cover this territory, although their output has doubled annually for the past four years. The present winter will greatly extend the use of lignite, since the competition of Eastern coal coming by way of Duluth into the Northwest is greatly lessened. When once introduced, and old prejudices in regard to lignite are overcome, it will not readily be crowded back into a narrow field.

Freight rates on lignite average 0.5 cent per ton per mile, and for this reason it is desirable to develop mines as far towards the East as possible. The immense deposits along the Little Missouri River in Billings County, near the western boundary of the State, will for a long time be unavailable on this account. In the drift covered region just west of the "Soo" road, however, where natural

CONDITIONS OF LABOR AND LIFE IN ANTHRACITE COAL MINING.

By FREDERICK L. HOFFMAN.

Underlying all social and socio-economic problems are the fundamental conditions of labor and life which, though at this time but dimly conceived and understood, are the real causes of the widespread social unrest. Any extensive inquiry into the causes of the recent prolonged strike in the anthracite region and any recommendation as to the prevention of future labor difficulties of this kind, must fall short of a practical purpose if they fail to take into account the elementary but all-important conditions of labor and life. While an adequate treatment of this subject would far exceed even the most liberal allowance for space in the *ENGINEERING AND MINING JOURNAL*, it is the purpose of this paper to touch only upon the most important points which it would seem the Anthracite Commission should properly, and to great advantage, take into consideration and incorporate in its report. Against the mass of misleading and inadequate data dealing with the labor and the life of the people of the anthracite region, it is to be hoped that the commission will place a body of trustworthy evidence which will once and for all set at rest points of controversy which are questions of fact, and which can be established without serious difficulty if the means for a comprehensive investigation are available.

The subject will be considered in three sections:

1. Wages, actual earnings, and hours of labor.
2. Economic conditions, family expenditures, cost of living, savings, pauperism, etc.
3. Health and mortality, accident liability, and the waste of productive life and resulting social misery.

PART I.—WAGES, EARNINGS AND WORKING TIME.

The first point of importance is the *number of persons employed* in anthracite coal mining. Opinions differ as to how this average should be determined, but a working method has been devised by the Massachusetts Bureau of Labor Statistics, by which are shown, first, the smallest number employed during the year; second, the maximum number of persons employed in the same establishments; third, the average number determined from returns for every month of the calendar year. A very interesting discussion of methods and means of determining the average of persons employed will be found in the census report on Manufactures.* Illustrating this point by an extract from the report of the Massachusetts Bureau of Labor Statistics on manufactures for the year 1899 (page 107) it is shown that 4,740 establishments gave employment to a maximum number of 413,557 persons to a minimum number of 306,800, and to an average number of 361,031. It may be stated with confidence that a good share of the matter in controversy between the operators and miners lies in the exact difference between the maximum and minimum number of persons employed in anthracite coal mining during the year preceding the recent strike.

The second point deserving consideration, is the *average number of days the mines were in operation*. Here again it may be of advantage to adopt the method of the Massachusetts Bureau of Labor Statistics, according to which for the year 1899 it is shown that the average number of days manufacturing establishments were in operation was 294; the maximum number being 304 days for malt liquor manufactures, and the minimum 214 days for brick and tile work. If such information were obtainable regarding the conditions of employment at each mine in the anthracite region and the consolidated data for all the mines in the different districts, a most useful statement of fact would be contributed towards a more definite knowledge of the problems involved in the controversy. While information regarding the number of days worked is furnished by the reports of the coal mine inspectors for Pennsylvania, the data are not presented in a manner most useful for the object in view nor is an intelligent

* Manufactures, 1900, Part I, pages cvl-exl.



OUTCROP OF A 12-FOOT SEAM OF LIGNITE NEAR THE LITTLE MISSOURI.

feet of sediments during the long interval before erosion did not in any way modify the lignites now exposed at Minot, it is hardly likely that the relatively short time since the erosion was affected has produced a change, or that the few hundred feet lying between the level of Minot and the bottom of the Laramie have been effective. One or two expensive mining ventures have based their effort, however, wholly on the belief that as the depth below the surface increases, the quality of the lignite will improve also.

Mining operations on an extensive scale are necessarily dependent on railroads, and with these the lignite area of North Dakota is not abundantly supplied. The Minneapolis, St. Paul & Sault Ste. Marie Railroad skirts its eastern border, and on this road are situated most of the Ward County group of mines. The Great Northern crosses it from east to west in the northern part of the State, while the Northern Pacific extends across the area further south. The Bismarck, Washburn & Great Falls line runs north from Bismarck 80 miles into a country rich in natural exposures of lignite, and at Bismarck connects with the Northern Pacific and the "Soo" roads. No attempt has been made to build long side tracks to large lignite seams, and all mines now in operation are practically on the railroads. An abun-

exposures are rare, prospecting with a drill should give good results.

The Missouri River, flowing through the center of the North Dakota lignite field, with heavy seams outcropping abundantly in its banks in the center of the State, and flowing into South Dakota, which lacks fuel, at first sight offers a satisfactory solution to the question transportation. A more careful study of conditions, however, shows that river transportation can hardly compete with the railroads. On account of the nature of the river, boats carrying more than 200 tons cannot be handled advantageously, and 12 days are required for the round trip from Washburn to Pierre. The river is closed to navigation also at the time when the coal trade is most active.

Experiments and tests of a theoretical and practical nature, showing the fuel value of the lignite are left for a subsequent paper.

FUEL OIL IN CEYLON.—Extensive experiments with oil to be used as fuel for tea drying in place of firewood have recently been conducted in Ceylon. The fuel used was Borneo oil, and a long series of tests showed that with fuel oil a considerable saving in cost could be made.

tabular analysis presented, which would be necessary for a ready understanding of the facts established by a very large number of individual returns.

The third point of importance is the *regularity of employment* as established by the number of men at work during the different months of the year. The Massachusetts Bureau of Labor Statistics gives a table setting forth this most important information, and to avoid a lengthy description, the table for 1899 is incorporated in this paper:

Months	Persons Employed	Percentages of Employment	Percentages of Unemployment
January	343,586	92.4	7.6
February	349,433	93.9	6.1
March	357,336	96.1	3.9
April	361,199	97.1	2.9
May	361,669	97.2	2.8
June	359,992	96.8	3.2
July	356,977	96.0	4.0
August	359,670	96.7	3.3
September	366,766	98.6	1.4
October	368,436	99.1	0.9
November	371,958	100.0	0.0
December	371,518	99.9	0.1

It is shown by this table that the regularity of employment has varied considerably from month to month, the maximum number employed being returned for November, while the minimum number is returned for January. The maximum number is represented by 100 per cent, and the relative percentages for other months are derived from this basis. Corresponding percentages are calculated for the estimated number of unemployed during each month of the year, and thus an approximately accurate statement is furnished of the state of employment during any part of the calendar year. It will be observed on examination of the table that the percentage of unemployment has been highest during January, when of the maximum number of persons available for employment in manufacturing industries, 7.6 per cent were apparently out of work. This method of presenting the regularity of employment is exceedingly useful, and, on the whole, is as satisfactory as any which has yet been devised to meet the necessity for accurate information.

The fourth point of importance is a statement of *classified weekly earnings*. The usual method of stating average earnings is misleading and serves no purpose. It is not a question of average earnings, but of classified weekly earnings, that is, we should know the number and proportion earning small wages, medium wages and large wages, with proper distinction as to age and sex. Perhaps no point has been a more perplexing element in the recent controversy than the actual wages earned by the miners in the anthracite region. Data should be collected showing the classified weekly earnings in accordance with the method adopted by a large number of labor bureaus in this country, an example of which is given in the following table, also abstracted from the report on manufacturing industries of the State of Massachusetts:

Dollars	Males	Females	Persons Under 21 yrs.	Total
Under 5	3.9	17.8	51.3	14.5
5 to 6	3.8	16.7	22.5	9.9
6 to 7	7.4	20.0	14.8	11.7
7 to 8	9.6	15.7	6.7	10.7
8 to 9	9.8	11.8	2.3	9.2
9 to 10	14.0	8.0	1.4	10.6
10 to 12	15.7	5.9	0.8	11.0
12 to 15	17.8	3.1	0.2	11.4
15 to 20	13.7	0.9	8.4
20 and over	4.3	0.1	2.6
Total	100.0	100.0	100.0	100.0

This table is of exceptional interest in that a proper distinction is made of males and females, and young persons, which term includes all under the age of 21 years. It would be well, however, if this distinction were carried further, and if it were shown what proportion under age 15, from 15 to 25, from 25 to 50, and from 50 and over, earned specified weekly wages. This analysis might be carried still further in that the single should be separated from the married, and ultimately, as will be pointed out in discussing the need of family budgets, the facts could be shown in a somewhat different manner by size of families and number of children, and whether there

was an additional income supplementing the earnings of the husband. It would be possible by means of such a table to show exactly the proportion of adults employed in the coal industry in different occupations earning wages in accordance with the American standard of life and a comparison could readily be made with the earnings of persons employed in general manufacturing industries or in the textile and glass industries on the basis of the Seventh Annual Report of the United States Commissioner of Labor. The last table shows, for example, that of adult males employed in Massachusetts manufacturing establishments, 3.9 per cent earn less than \$5 per week. Of adult females 17.9 per cent earn wages below this amount, while more than half of the young persons earn less than \$5 a week. A comparison of this kind applied to different industries is exact and least likely to mislead, and hence the necessity that the wage problem of coal miners should, as far as possible, be set forth in this manner.

The fifth point of importance, and one of the main points in the controversy between the operators and the miners, is the *daily working time*, or, as it is usually called, the hours of labor. Most of the published statements as to the actual working hours of miners and related employments in the anthracite industry are crude, misleading and often entirely untrue. A miner may readily be overworked for half a year, while absolutely idle during the remainder of the year, and the average working time deduced from such a basis would, of course, be erroneous. A statement should be required of the operators as to the number of persons working specified hours during the day, according to the method adopted for an investigation made by the Massachusetts Bureau of Labor and published in its twentieth annual report, for 1889. The method adopted for this investigation is admirable, and meets exactly the necessities of the case. To avoid a lengthy explanation the method is set forth in tabular form as follows:

	Factories	Per cent.
Under 7 hours	45	0.2
7 hours	17	0.1
Between 7 and 8 hours	1	..
8 hours	697	3.0
Between 8 and 9 hours	24	0.1
9 hours	552	2.3
Between 9 and 10 hours	96	0.4
10 hours	19,228	82.0
More than 10 hours	1,444	6.2
Indefinite	1,327	5.7
Totals	23,431	100.0

The original table shows results for 23,431 manufacturing establishments, and proper distinction is made as to adult males, women and children, and of all persons on Saturdays. For our purpose, however, it is only necessary to consider the employment of adult males. Briefly stated, in 82 per cent of the factories the daily working time was 10 hours, while in 6.2 per cent the daily working time was in excess of 10 hours. It would be desirable in any inquiry regarding coal miners to extend the classification to 12 hours and upwards to ascertain more accurately the degree of excessive hours of toil which it has frequently been asserted prevails in the anthracite region.

The sixth point about which accurate information is required is the *real or net earnings* of miners in the anthracite region; that is, the total annual income available for family expenditures after proper deduction for the expense of powder and tools has been made. While much has been written on this aspect of the problem it has not been made clear by just how much the gross annual income from nominal wages is diminished by the operating expenses, which, it is claimed, fall heavily upon the miner and decrease materially his apparent earnings. A general statement does not establish the real incidence of this operating expense since the expenditure for powder, etc., varies according to the character and depth of the veins mined. The only practical method by which this point can be determined is by means of family budgets, setting forth in detail the family expenditures, including the cost of powder, tools, etc. Thus, inclusive of the cost of powder, Mr. Roberts estimates the incidental expenses of a miner for tools, oil, fuses, etc., at \$2.09 per month. This method of

investigating labor problems by means of family budgets has been fully developed, and illustrations of their practical value will be found in Rowntree's book on "Poverty," the Thirty-second Report of the Massachusetts Bureau of Labor, and in the Sixth and Seventh Annual Reports of the United States Commissioner of Labor.

These suggestions for a comprehensive statistical inquiry have the sanction of many similar investigations into industrial conditions by labor bureaus of the different States, and they can readily be carried into effect without considerable expense. It will be next to impossible to otherwise accurately determine whether "the present rate of wages of anthracite miners is lower than is paid in any other occupation requiring equal skill and training"; and, further, whether "the average annual earnings in the anthracite coal field are much less than the average annual earnings in the bituminous coal fields for substantially similar work." The nominal earnings of the anthracite miner may be high enough, but it is entirely a question as to whether the *actual* annual income is sufficient for the maintenance of the American standard of life. The data thus far published and derived from either private or official sources are inadequate and, in a measure, misleading.

THE ANTHRACITE COAL STRIKE COMMISSION.

The briefs of the anthracite mining companies, as filed with the Strike Commission, are all similar in tone, and there is little practical difference in the arguments they present. That of the Delaware, Lackawanna & Western Company may be taken as typical. It is signed by W. H. Truesdale, president of the company, who says that the company owns 25 anthracite collieries and employs 12,000 workmen in this branch of its business. Mr. Truesdale, like Mr. Mr. Baer, objects to making the recognition of the union one of the issues to be considered by the Commission, saying that in the proposition made by the company for arbitration one of the express conditions was that "the findings of the Commission should govern the conditions of employment between it and its employees." He adds:

"This company unequivocally asserts that it will, under no condition, recognize or enter into any agreement with the association known as the United Mine Workers of America or any branch thereof. Nor will it permit said association or its officers to dictate the terms and conditions under which it shall conduct its business."

Referring to the recent strike, Mr. Truesdale says that he is reliably informed that 80 per cent of its employees were opposed to the strike, but were forced to enter upon it by a majority vote of the Mine Workers in other fields. Mr. Truesdale follows closely the lines of Mr. Baer's argument as to the dissimilarity between the work in the anthracite mines, and that in bituminous mines. He declares that it is impossible to adopt a uniform rate to be paid to the miners for a unit of coal mined at all mines. The declaration also is made that the anthracite miners as a rule do not work as many hours a day as do the bituminous miners, and the opinion is advanced that if the wages of the anthracite miners had been less than that of other workmen they would have found employment elsewhere, which they did not do. On the point of general prosperity he says that prior to the introduction of agitators and mischief-makers the anthracite workers were on an average as prosperous, comfortable, and contented as any body of workers in similar employment in this country. The wages, it is added, are such that frugal employees have saved a substantial amount every year.

Mr. Truesdale resists the demand for a reduction of 20 per cent in hours of labor, saying that no branch of business employing thousands of men can hope to compete successfully in the markets of the world if its hours of labor are restricted. He declares that there is no unjust discrimination in the weighing of coal, as it is measured rather than weighed, and he asserts that the demand is "out of all reason, and its effect, so far as this company is concerned, is a demand for an additional increase in

the wages now paid miners of from 5 to 40 per cent." The present method of measurement is declared to be the result of long usage, and is fair to all concerned.

President Olyphant, of the Delaware & Hudson Company in his reply declares that the wages paid by his company are just and adequate. He also says that "those of its employees who perform contract or piece work, as a matter of their own volition, work only about six hours a day and take numerous holidays, without the consent or approval of this respondent, and their earnings, by hours of actual work, are, therefore, much higher than those in any similar employment."

Denial is made of all the allegations in connection with the demand for shorter hours, and it is contended that such a reduction necessarily would increase the price of coal. While admitting the mine owners sell their coal by the ton, he says that the coal thus sold is a very different article from that taken out of the mine. Hence, he contends against the change from the present system of payment to that of paying by the ton.

President Olyphant also takes exception to the proposition to arbitrate the question of the recognition of the miners' union. This opposition is placed on the ground that the organization seeks to control the entire fuel supply of the country; that as the union is unincorporated, it is incapable of making a binding contract, and that the association has shown its inability to control its own members. He says his company has no desire to discriminate against members of the union.

The brief of the Lehigh Coal and Navigation Company has a special interest as it is presented by an operating company which does not operate railroads also, unlike most of the large anthracite companies. The answer declares the demand of the employees for an increase of 20 per cent is unjustifiable. It says the company owns and controls about 14,000 acres of coal lands, which are estimated to contain over 500,000,000 tons of available unmined coal. Its employees number about 6,000, and its capacity of production is over 200,000 tons a month. Its capital stock and funded debt amount to upward of \$32,000,000. All of its capital stock and bonds were issued for full value. The dividends upon its capital stock to date average only 4.02 per cent. The profit on coal mined by the company during the 10 years ended December 31, 1901, has averaged 11.09 cents per ton, after charging off taxes on coal lands and depreciation, but not including any charges for royalty, which represents the value of the coal in the ground. Nor were the rates of freight upon the railroad exorbitant, as is shown by the fact that the company operated its own canal, but it found it advantageous to send the coal to market over the railroad rather than by the canal. Speaking of the wages paid, the statement says:

"In 1901 for a day of 10 hours contract miners earned an average of \$3.14 per day, skilled laborers \$2.31, unskilled laborers \$1.83, boys \$1 for work underground. The rates for outside labor average as follows: Skilled labor, \$1.96; unskilled labor, \$1.28; boys, 77 cents. The average annual earnings of adults were \$475.25."

Concerning the employees of the Lehigh Coal and Navigation Company figures are given to show that most of them are able to live in comfort and even save money. The statement says: "The company owns and rents to its employees 671 houses, at an average rental of \$4.75 a month. The character of these houses is fully up to the average in any part of the country occupied by any other class of workmen. It has been the policy of the company to sell surface rights to those of its employees who desired to put up their own houses, and for many years there has been a steady demand on this account.

"The families of the employees have ample school accommodations, with capable teachers, and over 3,000 children are in attendance, while over 75 per cent of the whole fund expended in the region is derived from taxes paid by this company on its coal estate."

Regarding the employment of boys, the statement says:

"Slate picking is a very easy occupation compared to the work done by the boy upon a farm, and many are needed to take care of the mine mules and other light work, and in this way the wages of the household are largely and legitimately increased. Since 1887 more than 250 young men have gone from Lansford and other villages in the neighborhood to normal schools and colleges, and become mining engineers, attorneys, chemists, dentists, architects, ministers and priests.

"Some of the foreigners prefer to live in a very niggardly and squalid manner, so that they may accumulate the larger part of their earnings and return to Europe to live in idleness, but those who have their permanent home in the region have at least \$1,000,000 on deposit in the banks and savings funds in the vicinity, saved from the wages earned in the employment of this company. The annual remittance to their families and friends abroad, through agencies in the region and vicinity, amounted to \$150,000 or more. In 1884 the company established a beneficial fund, to which it has contributed the sum of \$196,889 and the employees \$154,768."

Regarding the demand for shorter hours of labor, the company says:

"The claim for a reduction of 20 per cent in the hours of labor, without any reduction in earnings, for all employees paid by the hour, day or week would be peculiarly absurd if enforced as against this company. In point of fact, the breakers of the company are able to run only nine hours a day and not ten. The miners work only from five to seven hours a day, and the real difficulty in the region is that contract labor prices are too high, as the men get an amount sufficient for their wants by working less than three-quarters of a day. As illustrating the influence of the excessive rates paid for contract work, it may be said that during normal conditions in April of this year the men working by contract earned only an average of \$3.02 a day, but when it became probable that a strike would be ordered the same men earned an average of \$4.46 a day."

The company says that payment by weight is impracticable at its mines, as each mine constitutes a distinct problem and the conditions vary from month to month. The only method which has ever given satisfaction at the company's workings, it is asserted, is payment for cutting coal by the lineal yard. The rate of payment can only be determined in each particular case between the superintendent and the miner.

The company emphatically protests against the miners' demand that there shall be an agreement with the United Mine Workers of America, and in this connection the answer says:

"While this company has no objection to its own employees organizing among themselves, it has always objected and does object to organization which includes other anthracite fields, working under different systems of compensation, as a result of which its men are ordered upon strikes by reason of controversies in which they have no interest. It would be still more inexcusable that any outside authority should assume to interfere in the discharge of an employee."

The sessions of the Commission began November 14, the opening one being chiefly occupied by an address from Mr. Mitchell, opening the case for the Miners' Union. It was chiefly an amplification of the brief filed with the Commission, but contained the following additional suggestion for the settlement of future differences:

"For the information of the Commission, we here-with outline more specifically a plan of procedure which, if adopted, would prevent local strikes and preserve peace and harmony during the time covered by the award which you are empowered to make.

"First—The rate of wages, the hours of labor, the method of weighing and paying for the product of the miners' work should be incorporated in an agreement between the representatives of the various coal companies and the representatives of the organization of which the complainants in this case are members.

"Second—There should be a committee of con-

servative representative mine workers selected by the employees at each colliery. It should be the duty of this committee to co-operate with the mine foremen in the adjustment of local disputes which cannot be settled between the mine foremen and the mine worker or mine workers involved.

"Third—Should the mine foremen and mine committee fail to adjust the grievance complained of, the matter in dispute should be referred to the company's superintendent and a general grievance committee, which should be constituted of representative mine workers from each colliery operated by any one company. Should this fail to adjust it, it should be referred to the general manager of the coal companies and the district president of the miners' organization, and should they fail to adjust it they should call upon the services of some disinterested person, whose decision should be final. Pending an adjustment in the manner set forth, the mines and the miners should continue at work."

Mr. Mitchell was the first witness formally put on the stand. He was questioned by the Commission and cross-questioned by the counsel for the different companies, the whole examination occupying several days. In the cross-examination a number of questions were asked as to the treatment of non-union miners, and the action—if any—taken by the Union towards those members who were concerned in attacks upon men outside of the Union. It must be said that most of these questions were evaded rather than answered. Outside of this the testimony developed no new points.

At the hearings the Miners' Union is represented by several lawyers, besides the officers. The anthracite companies are all represented by counsel. The Commission has agreed to give special hearings to the independent operators.

COAL STATISTICS OF GREAT BRITAIN.

We have heretofore published the preliminary figures of coal production in Great Britain. We have now the complete statement as prepared by Dr. C. Le Neve Foster, which contains many interesting details. The full statement of coal production in 1901 is as follows:

Country.	From mines. Tons.	From quarries. Tons.	Total. Tons.
England	153,451,070	9,214	153,460,284
Wales	32,686,631	201	32,686,832
Scotland	32,796,510	290	32,796,800
Ireland	103,029	....	103,029
Total, 1901	219,037,240	9,705	219,046,945
Total, 1900	225,170,163	11,137	225,181,300

Of the total coal mined in 1901 only 2,565,462 tons, 1.2 per cent, was classed as anthracite. Of this 2,254,066 tons were mined in Wales, 224,780 tons in Scotland, and 86,616 tons in Ireland.

The total coal exported, including coal equivalent of coke and briquettes, was 44,196,243 tons; shipped for use of steamers engaged in foreign trade, 13,586,833 tons; total shipped, 57,783,076 tons, or 26.3 per cent of that mined. The quantity left for home consumption was 161,263,869 tons, being 3.88 tons per head of the population.

The average value at the colliery of the coal mined in 1901 is given at \$2.25. The highest value in any district was in South Wales, \$2.80; the lowest was in Scotland, \$1.89 per ton. The general average price of coal was 34 cents per ton less than in the previous year.

The average quantity of coal mined per person employed underground was 350 tons in 1901, which compares with 374 tons in 1900. Although the output of coal was less last year than in 1900, more persons were employed in and about the mines; the men, on the whole, did not work so hard in 1901 as they did in 1900.

Dr. Foster, in his introduction, points out that the value of the coal output during the year represented 88.8 per cent of the total value of the British mineral output. Compared with the figures for the previous year, the statistics show a drop of more than 6,134,355 tons in the output of coal, the first interruption in the steady rise since the great strike of 1893, if we except the trifling diminution which occurred in 1898.

A TAIL-ROPE HAULAGE SYSTEM IN A COAL MINE.

Wire rope haulage systems may be arranged in three general classes.

1. The inclined plane, which consists simply of a slope on which the load is raised or lowered by winding and unwinding the rope on a drum. This system is naturally limited in its action, and can in no sense be considered capable of general application.

2. The endless rope system. This consists of a wire rope spliced endless, working over a drum located at any point of the haul. The rope is kept tight, and by means of special grips the load may be attached or detached at any point. As applied to a single track, the motion of the rope is reversed for the return of an empty train, but by means of a double roadway, the load may be received on one

half the cost of the old operations. To-day the mine is being drawn and the haulage system extends about 5,500 feet along the main tunnel. A feature of this tunnel is the heavy grades. From a practically level run of 1,500 feet, there is an undulating fall of 45 feet in 2,000, followed by an equal rise in 1,000 feet. The grade varies greatly, reaching a pitch of 10 per cent in places. The main rope is 1 inch in diameter, the tail rope $\frac{3}{4}$ inch, both of six strands, with 19 wires to the strand, with a hemp center. The regular haul is 20 cars, carrying 1 ton each, the weight of the cars averaging 850 pounds. They are delivered at the bottom of the shaft, hoisted and dumped. We are indebted to the Broderick & Bascom Rope Company, of St. Louis, which installed the plant, for the accompanying description

inch paper friction rollers to aid in gradual starting and stopping. The necessity for the larger engines for the southern haul is found in the fact that the heavy grades are met with cars loaded, while to the north the grade is mounted with the empty train.

The loaded cars are hauled to the main station, and there weighed and switched to the coal hoist, where they are dumped. A feature of the workings is the automatic coal hoist. The coal is dumped into a hopper at the bottom of the shaft, the descending box loading from it automatically. A reverse action at the top of the hoist dumps the coal on the screens. By this means the necessity for hoisting the cars is obviated.

The north tunnel and side entries are equipped with $\frac{3}{4}$ -inch main and tail ropes, with the exception of the east entry. The grade, as shown, brings the entire pull of the loaded train on the tail rope and a 1-inch tail rope is used for this entry. The south tunnel and entries have 1-inch main and $\frac{3}{4}$ -inch tail ropes. All ropes are of 6 strands, with 19 wires to the strand, with a hemp center.

The main rope runs on rollers fixed between the rails at intervals varying from 10 to 16 feet. The rollers are of maple, 4 inches in diameter and 18 inches long on $\frac{7}{8}$ -inch iron axles. The axles have a bearing in cast-iron keyed journals set in 3 by 4-inch blocks. By occasionally reversing the rollers between bearings and shifting the blocks, the wear caused by the rope is distributed over the roller, prolonging its usefulness. The tail rope is supported along the side of the tunnel on 10-inch cast-iron sheaves supported on brackets of 4 by 6-inch oak wedged tightly between the floor and roof. Binding sheaves are used at intervals to prevent the rope leaving its support under sudden strains or on account of any lifting tendency at the foot of a slope.

On curves a special arrangement is introduced to carry either rope across the track, a series of horizontal cast-iron guiding sheaves, 6 inches in diameter, is used. The return wheels at the end stations are cast iron sheaves 48 inches in diameter, set vertically, secondary 30-inch wheels being used to lift the return rope to the roof of the tunnel.

On curves a special arrangement is introduced to carry the main rope. The side pull is resisted by a



CHAIN CONNECTION, WOODEN ROLLER AND METHOD OF SUPPORTING TAIL-ROPE.

track and returned on the other, the rope moving in one direction only.

3. The tail rope system. This consists of two ropes winding on separate drums, which may be located at different points, but which generally work on the same shaft. The main rope runs along the ground and is attached to the front of the loaded train. The tail rope is supported along the walls or roof of the tunnel, extending to the end of the haul, where it passes over a return wheel, and is returned along the ground, being attached to the rear of the train. The main rope is then wound on its drum, hauling the load followed by the tail rope. For the return trip the motion is reversed, the tail rope is wound on its drum and the empty cars are drawn to the end of the haul, dragging the main rope.

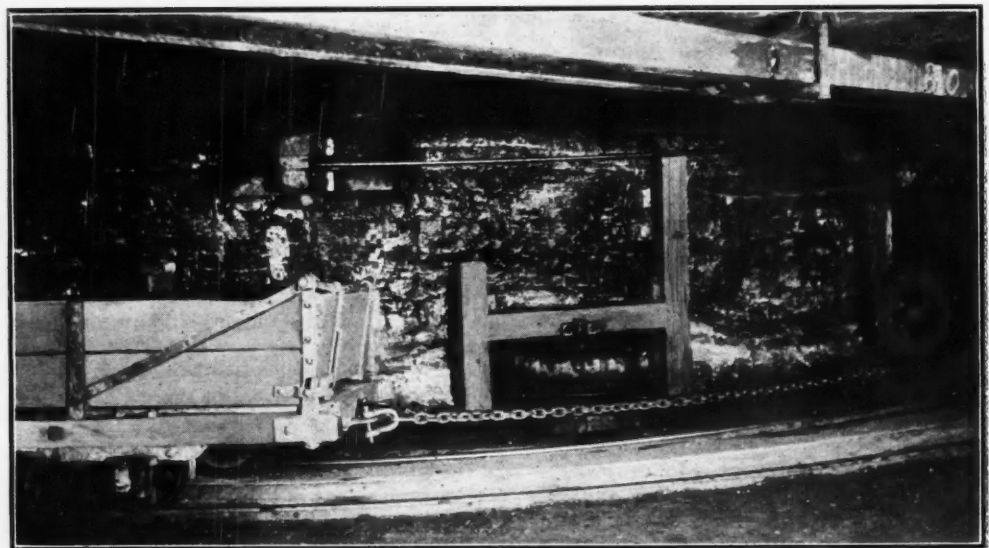
Of the endless and tail rope systems, the latter is capable of more general application. The endless rope must be kept constantly tight, necessitating heavier rope and causing greater friction on its supports. Less rope is required than in the tail rope system, but the added expense for mechanical treatment more than offsets the saving. Curves and entries particularly, are sources of difficulty. There are very few conditions under which the tail rope system, properly handled, does not exhibit advantages. It is easily applicable to a straight or curved run of any length and of any variation of grade, and side entries may be worked as easily as the main tunnel.

The tail rope system has been in operation in the workings of the Coal Valley Mining Company, of Sherrard and Cable, Illinois, for 20 years. Mr. Robert Lee, superintendent for the company, has established a system of haulage, which operates very smoothly.

The mine at Cable is the older of the two controlled by the company. A number of years ago it was abandoned as incapable of further output on a paying basis, under old methods. A tail rope system extending into the workings for $1\frac{1}{2}$ miles was the means of immediately doubling the output at one-

and illustrations of the system, adopted at the Cable and Sherrard mines.

The hauling machinery is located above ground, the ropes running over sheaves down the shaft and into the tunnel. A pair of 12 by 16-inch engines ag-



HEAD OF TRAIN ROUNDING A CURVE.

gregating 75 horse-power is used, working the same shaft.

The Sherrard field is of such a nature as to make operations desirable in all directions from the main shaft, differing in this respect from the field at Cable, the latter extending in one general direction with no great width in the mine.

The engine room is located near the bottom of the main shaft. Its equipment consists of a pair of 12 by 18-inch, 40 horse-power engines, working main and tail rope drums for the south tunnel, and a pair of 8 by 10-inch 25 horse-power for the north. The drums are 48 inches in diameter, provided with 20-

series of wooden drums, 30 inches in diameter, set on vertical axles with their nearest points about 18 inches from the inside rail to allow room for passage of the cars. These drums are of barrel form, built up of alternate staves of maple and pine. The rope may run on the ground rollers placed beneath the drum while the train is some distance from the curve, but as the load approaches, the rope is drawn against the drums.

In working up a side entry, the ends of both main and tail ropes of the side line lie conveniently near the outer end of the entry. The ropes of the main line are brought to the proper position and uncoup-

plied. The ends of the side ropes are substituted, and the entry ropes run as continuous with the main line. The coupling used is the invention of Mr. Robert Lee, and is a convenient and practical application of the swivel type.

The ropes are attached to front and rear of trains by means of clevis couplings, a short length of chain being used next the cars to aid in taking up any slack. At the rear of the train a special knock-off hook is used instead of a clevis pin, to aid in uncoupling with a strain on the rope.

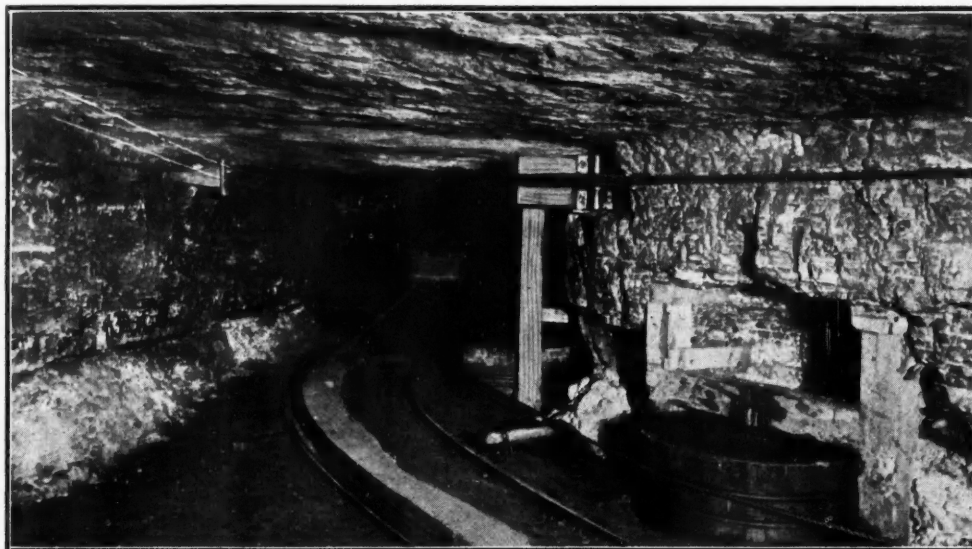
When mounting grades a safety device known as a drag is used. This is simply a sharpened iron bar attached loosely by one end to the rear of the train so as to drag freely on the ground. In case of any sudden breakage or slackening of the rope, the point of the drag is driven into the ground by the weight of the train.

The commonest argument used against wire rope as a medium for underground haulage, is its rapid deterioration. The argument has no foundation if certain common sense principles are applied in properly caring for the rope and reducing friction to a minimum. In the workings described, there is rope in use to-day which has been worked constantly for more than eight years, the amount of deterioration being inappreciable.

The rope is never allowed to touch the ground while running. The wooden rollers are so placed as to effectually prevent this occurring, even for a

pounds each) on a reasonably level track. This would be reduced to two on 4 or 5 per cent grades, and to one car on grades approximating 8 or 10 per cent. At the common rate of travel the average trip in this mine would be 1¼ miles in 30 minutes. The present output is 1,000 tons per day, which would require, with above average of time and amount of delivery, 63 mules in active service. Allowing for one-half this number in reserve, a total of 90 would be necessary. The following conservative statement will exhibit our comparison:

<i>For Installation of Mule Haulage.</i>		
90 Mules, at \$80.00.....	\$7,200.00	
60 Sets harness, at \$10.00.....	600.00	
Total	\$7,800.00	
<i>For Maintenance and Operation.</i>		
Feed and care, 90 mules, at \$5.00 per month.....per day	\$15.00	
60 Drivers, at \$2.25.....per day	135.00	
Total	\$150.00	
<i>For Installation of Wire Rope Haulage.</i>		
130 H-P. boiler	}	\$4,000.00
Pair 25 h-p. engines, with drums		
Pair 40 h-p. engines, with drums		
6,000 Feet 1 inch main rope		
16,500 Feet ¾ inch tail rope		
600 Wood rollers		
500 Cast iron sheaves		
10 Return sheaves		
15 Drums		
Total .....			$7,400.00
<i>For Maintenance and Operation.</i>		
2 Engineers, at \$55.00 per month.....per day	\$4.50	
2 Firemen, at \$1.50.....per day	3.00	
2 Trip riders, at \$2.10.....per day	4.20	
2 Coupling men, at 2.50.....per day	5.00	
Repairs and Incidentals	2.00	
Total	\$18.70	



GUIDING SHEAVE AND ARRANGEMENT ON CURVES.

short time. Mine dust, mud and water have a much more injurious effect than the same elements above ground, owing to their powerful chemical properties. The entire rope, including the hemp center, is kept constantly lubricated and never allowed to work shiny. The rope grease is applied with a brush, it having been found that better penetration between the wires is obtained in this way. Careful provision is made for gradual stopping and starting, thus avoiding sudden jerks. The ropes are kept taut while running to avoid kinks or twists. All drums and return wheels are large enough to keep the bending well within the limit of flexibility of the rope.

The tunnel end of the rope undergoes more hard usage than the drum end, so the entire rope is reversed after a time in order to distribute the wear. Friction is reduced by using large sheaves. Carrying sheaves are all 8 inches in diameter, and ground sheaves 6 inches. These sizes are greater than necessary for the mere support and guiding of the rope, but their greater circumference reduces the number of revolutions and consequently the friction and wear on axles and journals. Return wheels and curve drums are also made as large as practicable.

The following statement of the cost of equipment and maintenance of such a mine as that at Sherrard, both with mule and wire rope haulage has been compiled from actual experience. It may be safely estimated that a mule could haul three loaded cars (2,850

It will be seen that the cost of installation is practically the same in both cases. In operating expenses there is a daily saving of \$130 effected by the wire rope system for the present output. In the establishment of such a system, however, it must be borne in mind that it is wise economy to provide for future increase of output when the plant is first established. The above equipment is capable of handling an output of twice the given amount without further expenditure either for equipment or maintenance. If mules were used, such an increase would mean a doubling of the first cost and operating expenses, which would result in a saving, through the use of wire rope, of \$8,200 in first cost, and \$280 per day in cost of operating. This may be taken as an extreme case. It is true, however, that the solution of the underground haulage problem as offered in the use of wire rope, is not sufficiently appreciated.

COAL IN CHINA.—Respecting the recently reported discovery of a coal measure on the Weihsein coal-fields, the report of the Commissioner of Customs at Tsingtao for 1901, recently received, states that the seam is 3 meters thick and of sufficient length to warrant the sinking of a shaft, which is now being proceeded with. The coal, adds the Commissioner, is a bituminous gas coal; it burns with a clear flame and comparatively light-colored smoke,

and does not cake like the Japan coal. It is not expected that it will be on the market before the spring of 1903. The boring trials are being continued in the Po-shan Valley with most favorable results.

THE MANUFACTURE OF HYPOCHLORITE OF SODA

By EDWARD WALKER.

Hydrochlorite of soda is used in many parts of the Continent of Europe for bleaching wood pulp, esparto-grass and textile fabrics, and it is made by electrolyzing solutions of common salt. In most cases platinum electrodes are used, and this, of course, adds greatly to the first cost, though in one case a form of carbon electrode is employed. I have recently had the opportunity of inspecting a cell designed for this purpose by Mr. G. J. Atkins, of London, and as it promises well as a commercial proposition your readers will be interested in the details. The cell consists of a semi-cylindrical wooden vat, with axis horizontal, 10 feet long and 2 feet wide. The inside is lined with sheet lead, and on the sheet lead are placed carbon bricks about 2 inches thick, whose inner surfaces form a semi-cylinder concentric with the lead and wood. These carbon bricks are cemented together and to the lead by a waterproof carbon cement. A wooden cylinder covered with lead revolves in the vat within an inch of the surface of the carbons, and the solution of salt fills up the space between. The carbon forms the anodes and the current is distributed to them through the lead. The current is led away from the end of the revolving leaden cathode. The total area of the anode surface is about 20 square feet. The current used varies from 1,000 to 1,500 amperes at from 3 to 4 volts, and the amount of 10 per cent solution of salt acted on varies from 500 to 1,000 gallons per hour, the figures depending on what strength of resulting solution of hypochlorite is required. It may be desirable also to vary the strength of the salt solution according to the class of fiber that is to be treated. The theory of the reactions in making hypochlorite is not altogether settled; chemists do not as yet agree. As far as facts are concerned, in this apparatus the electrolyte on leaving the bath consists of a solution of hypochlorite of soda—NaClO—and some unaffected salt, while the only other product is hydrogen gas given off from the revolving cathode. Owing to the great surface of poles there is very little resistance, so that the electrolyte hardly becomes heated at all, and thus no other reactions are produced and no chlorates are made. Preferably the apparatus is worked at the bleaching works where the solution is at once used in the bleaching vats, as it is not practicable to store and ship the hypochlorite.

No other chemical is required in the bleaching vat as the hypochlorite rapidly gives up its oxygen when it comes in contact with the pulp or textile fabric and passes back to common salt again. The salt can therefore be used over and over again. It is to be noted that no chlorine is liberated in the bleaching process, but the active principle is the atom of oxygen which is carried from the electrolyte cell to the bleaching vat. One of the great advantages of the soda salt over chloride of lime is that there is no insoluble precipitate, such as is the case when chlorine is released from the bleaching powder, and the fabric is therefore kept soft. Hitherto it has been impossible to use bleaching powder in whitening high-class linen for this reason, and also because the chlorine has been too strong for it. At the present time all the best linens of Ireland are sun-bleached. A noted linen firm at Dunfermline, Scotland, has decided that Mr. Atkins' process will be suitable for their best damasks, and is now trying the process. The chief points to be looked to in the practical working of the process will be the permanence of the carbon anodes and the cost of power, but in both these cases there do not appear to be any difficulties ahead.

The process is also of interest metallurgically as a source of chlorine. The addition of sulphuric acid to the hypochlorite solution releases chlorine and oxygen, and forms sulphate of soda. It is probable that it would be a better source of chlorine for chlorination than bleaching powder, and at any mine where fuel, water and salt are obtainable the cell might be

erected for the direct production and use of chlorine both in treating gold ores and in leaching low-grade copper ores. The metallurgist of the Mount Morgan Mine of Queensland is at present investigating the applicability of the process to the ores of that mine, and intends to try an experimental plant.

IRON MAKING IN BRAZIL.*

By HERBERT KILBURN SCOTT.

Although it is said that the furnace of Ipanema, built in 1590, was one of the first erected on the American continent, the iron industry did not make much progress in Brazil, owing to its manufacture being prohibited in the State of Minas, until the beginning of the nineteenth century. In 1817 a French engineer named Monlevade built a Catalan forge at São Miguel de Piracicaba which was very successful, this furnace serving as a model for many others which were subsequently constructed. Many of these interesting old furnaces are in use to-day in places distant from the railway. On the arrival of the Central Railway line at Itabira do Campo in 1888, a small charcoal blast-furnace was erected near the town, and some years later another similar one was constructed near the station of Miguel Burnier. When the old Monlevade works were dismantled, a large plant was laid down to manufacture iron by the American bloomery process. It included a rolling mill, as well as modern American machinery to stamp hoes, etc.; but, as was to be expected, the old-fashioned bloomery process of manufacture did not prove a success.

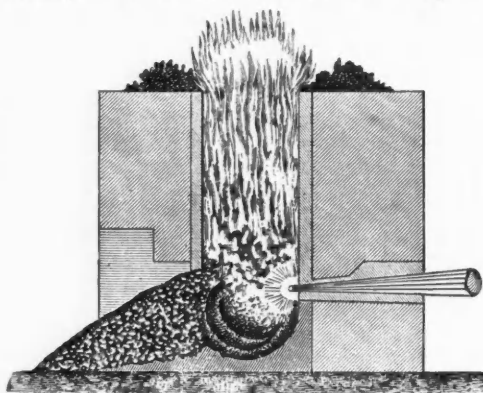
About two years ago a distinguished Brazilian, Mr. Antonio Lage, commenced the manufacture of cupola coke on the beehive system on an island in the bay of Rio, using the small of the Pocahontas coal, of which he imports a large quantity. He is now building a modern blast-furnace in which he will use the surface rubble ores of Minas Geraes with his own coke as fuel.

As the direct methods of iron manufacture adopted by the native workers are rather interesting historically, and they indicate indirectly the high quality and abundance of the iron ore used, it will be interesting to describe the processes in some detail. They are known as: 1. Processo dos Cadinhos (Crucible process); and 2. Processo Italiano (Italian process).

The furnace used in the Crucible process consists of a cylindrical cavity, slightly elliptical, 25 to 30 centimeters wide and 50 centimeters deep. The front wall is open at the bottom, forming an aperture 30 by 35 centimeters, which is filled with small charcoal when the furnace is working, and through which the bloom is drawn when the reduction is complete. Generally these furnaces are built in a series of six or eight, half of which are in blow while the others are being prepared for the next heat, in order to insure continuous working. When commencing work, charcoal is fed into the furnace until near the top and lighted off. The blast is produced by the ancient trompe. About 1 kilogram of ore, generally in a fine state of division, damped slightly to avoid its being blown out by the blast, is added, and as the charge descends more ore and fuel in alternate layers is fed into the furnace until the ore is sufficient to form a bloom of about 50 kilograms. The ore used is either taken from the river bed, or it is the result of the washing off of the softer qualities of the micaceous iron schist, which lies about in such abundance. After washing it averages 94 to 96 per cent of peroxide of iron, and 3 to 5 per cent silica. The bloom when withdrawn from the furnace is hammered under a tilt-hammer driven by an overshot waterwheel. The charcoal is almost always of a very poor quality, owing to the crude methods employed in its production, and the consumption amounts very often to 700 or 800 per cent of the iron produced. As the small quantity of silica contained in the ore causes a very pasty and highly basic slag to be formed, it is difficult to effect its complete separation from the

iron, and a small amount of manganese ore is added, in order to make a more fusible slag.

The Italian process has much in common with that known as the Catalan, the furnace differing principally in the position of the tuyere, which is less inclined and penetrates further into the furnace. The charge is made up of about 99 pounds of ore, the largest piece being about the size of an egg, and it is placed on the opposite side of the furnace to the tuyere. The furnace is then filled with charcoal, lighted off and the blast turned on. More charcoal with a little ore is added from time to time, the pressure of the blast being increased towards the end of the operation. After three or four hours the fire is allowed to fall, and the bloom taken to the tilt-hammer. There are some 100 to 150 furnaces working in the Minas District, and although the

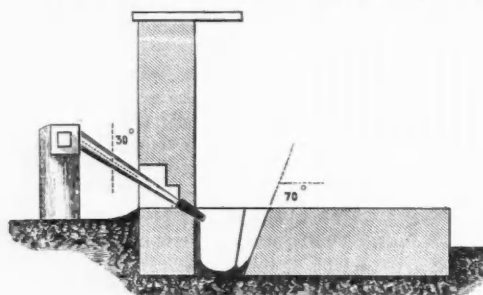


CRUCIBLE PROCESS FURNACE.

Italian process is considered the most economical in fuel consumption, 75 per cent of these furnaces are on the crucible system.

The total production of iron will amount to about 1,600 tons per annum, the whole of which finds a ready sale in the interior, being used for horseshoes and other small articles. Generally speaking, the iron made in these furnaces is of very good quality, but, of course, much depends on the repeated heating and hammering of the bloom in order to free the product entirely from included particles of slag, and prevent cold-shortness.

The Itabira do Campo blast furnace has worked more or less regularly since 1884. It is 10 meters in height and produces five tons of pig iron per day.



ITALIAN PROCESS FURNACE.

The ore used is of the rubble quality found at the foot of the Itabira Mountain at Catta Branca and at Miguel Burnier.

The composition of the charge is as follows: Ore, 45 kilograms; limestone, 20; clay, 20; silica, 3 kilograms; charcoal, 1 cubic meter. In regular work, with the charge as above, a good No. 1 pig iron is produced, which shows on analysis 0.133 phosphorus and 2.409 silicon.

The blast-furnace at Miguel Bernier, known as the Usina Wigg, is practically a reproduction of the one already noticed.

Miraceous rubble ore is used, as at the Esperança, and the phosphorus content is about the same.

The development of the iron industry of Brazil has been principally retarded by the want of satisfactory fuel, for although wood exists in fair quantity in the vicinity of the principal deposits, the production of charcoal is so irregular and expensive (partly due to labor difficulties) that it is difficult with it alone to keep a furnace in blast. Owing to

the blast not being of a sufficiently high temperature and the purity of the ore used, the pig iron generally produced does not contain sufficient silicon or phosphorus for foundry purposes, but a very suitable pig for chill castings is easily produced. A white brand of pig iron made in these furnaces is very successfully used at the Morro Velho Mine of the St. John del Rey Gold Mining Company, for the stamp heads of the mill.

The author is of opinion that the blast furnace at present being constructed in Rio, to use coke made from Pocahontas coal, will be a success, and especially so if care is taken to use only the phosphoric rubble ores, and have a strong hot-blast suitably heated in a modern stove, in order to reduce enough silicon to give a foundry pig that will run well.

In the State of Rio Grande do Sul at St. Jeronymo, a very fair quality of lignite is mined. It is of no use for coke production, but it might be usefully employed as a gas producer. In the State of Bahia bituminous shales exist, and as Brazil is so little explored and the area of carboniferous formations is so large, it is quite possible that a satisfactory fuel will be discovered in the future. In the event of the electrical reduction of the iron being made commercially successful, Brazil should be in a good position to take advantage of the new process owing to its plentiful supply of water power.

SAULT STE. MARIE CANAL TRAFFIC.

The traffic passing through the Sault Ste. Marie Canal this season has far exceeded that of any previous year. The total freight movement for the season up to November 1, as shown by the official reports, was as follows, in net tons:

	1901.	1902.	Changes.
East-bound	19,982,712	26,174,927	I. 6,192,215
West-bound	4,560,898	4,750,286	I. 195,388
Total	24,543,610	30,931,213	I. 6,387,603

The number of vessels passing through the canals was 20,001 this season, against 17,421 to the corresponding date in 1901. The average cargo this year was therefore 1,546 tons, against 1,409 tons last season.

The items of mineral freight included were as follows, the figures being in net tons, except salt, which is given in barrels:

	1901.	1902.	Changes.
Anthracite coal	659,147	124,608	D. 534,539
Bituminous coal	3,318,643	3,904,667	I. 586,024
Total coal	3,975,790	4,029,275	I. 53,485
Iron ore	16,283,109	21,524,409	I. 5,241,300
Pig and manuf. iron	147,430	158,213	I. 20,783
Copper	83,212	97,026	I. 13,814
Building stone	42,884	38,804	D. 4,080
Salt, barrels	396,236	382,519	D. 13,717

Building stone and salt are the only items showing decreases this year. The gain of 32.2 per cent in iron ore is even greater than had been anticipated, and points to a probable total movement of 25,000,000 net tons for the season.

DESIGN OF LEAD BLAST FURNACES.—Dr. M. W. Iles, in his treatise on Lead Smelting, page 40, states that his observation and experience point to the following dimensions as embodying the proportions of an ideal blast furnace for the reduction of silver-lead ore: Area at tuyeres, 48 by 144 inches; at feed floor, 7 by 13 feet; height of jackets, 41 to 48 inches; height of shaft from top of jackets to feed floor, 13 feet; height of charge (tuyeres to feed-floor), 16 to 17 feet; bosh of jackets, 10 inches; volume of crucible, 77 cubic feet; volume enclosed by jackets, 180 cubic feet; volume of shaft from top of jackets to feed floor, 1,243 cubic feet; total internal volume of furnace (up to the feed floor), 1,500 cubic feet. Such a furnace would have good reduction, great speed and long life; it would make but little flue dust and the slags would be good if the charge were correctly calculated and properly watched. With a blast of 3 to 4 pounds and tuyere openings of 3.5 inches the smelting capacity per 24 hours would be 140 to 150 tons of ore, exclusive of fuel, limestone and slag, but inclusive of iron flux. The above dimensions give a hearth area (at the tuyeres) of 48 square feet, and an area of 105 to 112 square feet at the top.

* Abstract from paper read before the Iron and Steel Institute of Great Britain.

THE LATEST NEW ZEALAND GOLD DREDGE.

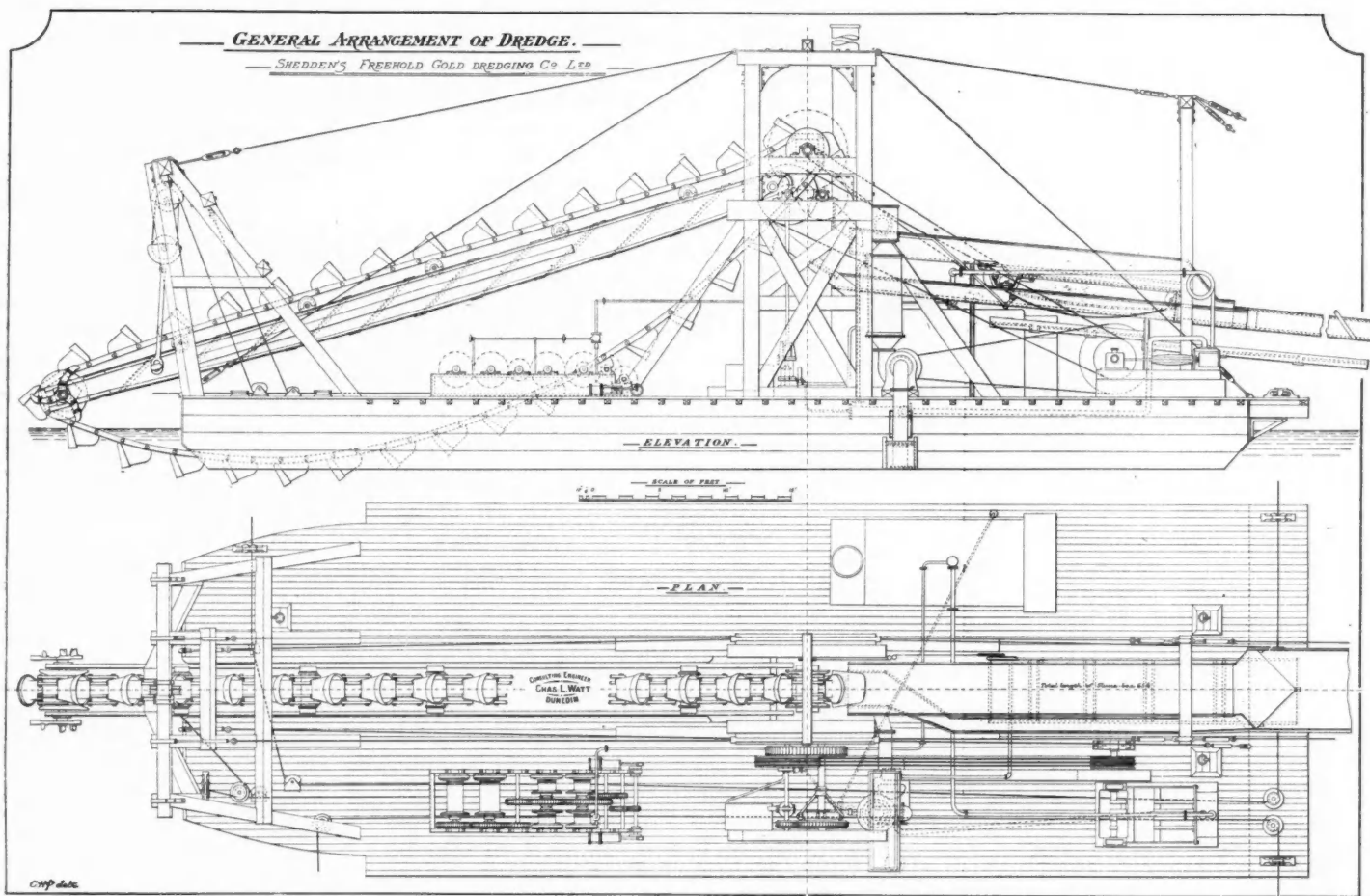
We are indebted to the recently issued report of the Mines Department of New Zealand for the accompanying illustration, which shows a gold dredge designed and built according to the latest practice in that country.

The new dredge for the Shedden's Freehold Gold-dredging Company (Limited), at Waikaka Valley, Southland, is the design of Mr. C. L. Watt, consulting engineer, Dunedin. While the general appearance of the dredge is very similar to many others working on flats, there are several differences in detail. There is a departure in the construction of the bucket-ladder, the bulkheads being placed diagonally. This plan (which is not considered suitable for river work) has been devised for paddock dredging, where grass, tussock, flax and small scrub have to be dealt with, and it is claimed that, owing to the absence of cross-stays

tudinally and transversely, with perforated plates intervening, the usual matting being adopted throughout. An appliance resembling in principle a suggestion embodied in the Department's report of last year has been adopted on this dredge. This consists of an endless belt of matting revolving upon an endless revolving grid-iron made the full width of the box. It is fixed inside the box below the perforated plates, and travels upwards, making one revolution every three minutes. The gold, sands, silt, etc., which pass through the perforated plates fall on the traveling mat, on which jets of water, having a head of from 3 to 4 feet, are made to play. This is plainly shown on the drawing. The sands, gold, etc., washed off the mat fall on the streaming-down tables, which are constructed with boil-boxes something after the style adopted at the Round Hill claims by the late manager, Mr. G. Lee, and introduced by him on some of the

industry in the Donetz District has made a proposal which the Russian Government is about to carry out. The use of wood as fuel is to be given up on the railways, and thereby the disafforestation of many parts of Russia will cease, and the use of oil fuel is to be restricted, while a premium on exported Russian coal is to be granted to shippers. It is believed that by these steps an increased consumption of 800,000 tons of coal may be brought about, while the present over-production amounts only to 480,000 tons.

A RUSSIAN IRON SYNDICATE.—A meeting was held at St. Petersburg September 23, of representatives of Polish and South Russian ironworkers, in order to make final arrangements for the formation of a syndicate. It has been resolved to form it under the title of the First Russian Company for the Iron Trade. So far the syndicate embraces only mills manufactur-



A RECENT NEW ZEALAND GOLD DREDGE.

and bracings, the ladder is kept free from accumulations of *débris*. In the Southland dredging field several machines are fitted with tines connected to the bottom tumbler or its shaft. These act as picks, and cut into the ground so as to loosen it a little in advance of the buckets. Mr. Watt has deviated from the ordinary style of tine by fitting those on the dredge in question with side cutters in addition to the ordinary points, so as to allow the ladder more freedom at the face of work, and admit of its being more easily moved.

There is no revolving screen on this dredge, a sluice box being used. This is on somewhat different lines from the ordinary run of sluice boxes as used on dredges, and is made of iron instead of wood. Reference to the drawing (elevation) will show that there is a considerable drop from the buckets to the shoot in the head of the sluice box, and at about 25 feet down the box there is another drop of 30 inches. Beyond this the sluice box is increased in width to 6 feet for a distance of some 40 feet, the entire length of the box being 65 feet. The upper part (25 feet long) is covered with perforated plates, the lower portion (40 feet long) being fitted with ripple bars laid longi-

tudinally and transversely, with perforated plates intervening, the usual matting being adopted throughout. Provision is made by means of a trough (not shown in drawing) to catch any gold which may find its way through the revolving mat, and carry it forward to the streaming-tables. The "save-all" box or shoot is brought under and to one side of the sluice box, and enters the latter where it widens out.

The water from the centrifugal pump does not enter the sluice box at right angles, as is usually the case, but by deflection in the delivery pipe is made to attack the wash as it falls from the buckets on to the dump plate. A churning action is thus set up which has a tendency to dislodge any particles of gold that may be adhering to the wash. The latter then travels down the sluice box for some 25 feet, where it drops 30 inches, as already stated, and becomes further disintegrated, finally traveling over the ripples and plates in the wide box to its discharge beyond the stern of the dredge. The dredge is working with excellent results.

THE RUSSIAN COAL TRADE.—The Russian Commission which was appointed recently to consider the question of improving the condition of the coal

ing heavy plates, such as boiler plates, large plates for bridge building, and others not lighter than No. 25 Birmingham standard. The capital of the syndicate is to be 500,000 roubles. Besides the South Russian and Polish works, the syndicate includes some works near Moscow, and one in the Ural.

KEEPING COAL UNDER WATER.—The London *Engineer* says: "The question of preserving the calorific properties of coal by immersion has been engaging the attention of the Admiralty, and the Admiral-Superintendent at Portsmouth, after conferring with the Admiralty chemist and other officers, has been requested to report as to whether it is recommended to conduct experiment to ascertain the results of storage under water; if so, to what extent and whether, by immersion on shore in a tank or well or afloat by sinking a lighter full of coal, is recommended; whether it is proposed that the experiments should be carried out; whether wetted coal is considered dangerous for issue to ships, and is it considered that coal so immersed would require to be dried before issue, and if so, how it is proposed to do this."

RECENT DECISIONS AFFECTING THE MINING INDUSTRY.

SPECIALLY REPORTED.

COURTS HAVE NO POWER TO TRANSFER MINING PROPERTY PENDING ACTION.—In an action between adverse claimants for mining property in Alaska the order granting an injunction further ordered the parties in possession to surrender and deliver up to the others the possession of the claims, with all the appurtenances, and commanded them to remove from said premises with their personal property, and further gave permission to such others, upon furnishing an undertaking in the sum of \$5,000 to work and mine the said premises, subject to the orders of court. On appeal the upper court said: The order transferring from the one to the other the possession of the mining claim pending the action, under the circumstances detailed, was not only unauthorized by any statute, but was the exercise of a judicial power unknown to American jurisprudence.—*Lane v. Jordan* (116 *Federal Reporter*, 623); United States Circuit Court of Appeals.

RISKS ASSUMED BY WORKMEN IN STEEL MILL.—A complaint for personal injuries showed that one, 18 years of age, while at work in a steel mill, stepped on the edge of an uncovered vat of molten metal to hammer a cogwheel into place, pursuant to orders, struck and missed the wheel, and was thus forced to swing around and fall into the metal. The negligence charged was the failure to cover the vat and inform employee as to the danger, knowing the same, and that he was without experience, and that a missing blow would throw him into the metal; but it was not alleged that he did not know for what the vat was used, nor that he lacked opportunity to observe it for himself. It was held to show that he assumed an open and obvious risk, notwithstanding the allegations of inexperience and want of knowledge of the danger on the part of the employee.—*Corning Steel Company v. Pohlplotz* (*Southeastern Reporter*, 476); Appellate Court of Indiana.

ABSTRACTS OF OFFICIAL REPORTS.

Mikado Gold Mining Company, Ontario.

The directors' report for the year 1901 says: "The profit and loss account shows a debit balance of £5,052; nearly the whole of which represents allowances made for depreciation and ore exhausted during the year. It will be remembered that the mill was practically shut down from the end of May until August, 1901, and that for the earlier months of 1901 the milling ore taken from a lean zone was dealt with at some loss, in the belief that richer stuff might on any day be met with. The directors much regret that the result of the year's working was not of a satisfactory nature. They desire to point out to the shareholders that the present position of the company is owing to the unexpected fall in the value of the ore which could not be foreseen, as will be understood by those acquainted with gold mining. They would further draw attention to the fact that the cost of working the mine is the lowest in Ontario, and averages for the present year about \$3.50 per ton.

"The mine manager's report for 1901 was circulated among the shareholders on March 8 last, and a letter from the manager, dated September 19 last, which deals with the prospects at the mine up to that date, accompanies this report. From this it will be gathered that it has been necessary to husband resources to the utmost, to close down the mill, and to proceed with only the most vital development of the 9th and 4th levels, in the hope of meeting with fresh payable ore bodies, especially where the 9th level will cut an east and west lode, which was proved by diamond drill during 1901 to be some 20 feet in width and carrying gold. The drive in No. 1 lode in No. 9 level should cut this large vein in about another 100 feet. The latest report from the mine is that No. 4 drift is in pay ore 3 feet wide, and that the ore is improving in the drive, so that indications are encouraging.

"The directors regret that the meeting has not been held at an earlier date, but they have delayed calling the shareholders together in the constant expectation that the developments would disclose better prospects and that it would be possible to give a more cheerful view of the outlook. The cash position at September 30, 1902, is roughly: Amount required to meet liabilities in Canada to September 30, 1902, and to provide working expenses to the end of March, 1903, according to manager's estimate, say, £5,400; total liabilities in London, £1,650; total, £7,050; less amount of calls collectable, say, £3,320; showing a deficit of, say, £3,730. From which it will be readily seen that it will be necessary to consider the best means of raising further working capital.

In the event of the junction of No. 1 and No. 3 lodes when cut by the 9th level disclosing good ore, and if the present favorable development should continue in the 4th level, it will still be necessary to incur considerable expenditure to open ground ahead of the milling before revenue can be earned."

Montana Mining Company, Limited.

The directors' report for the half year ending June 30, as issued from the London office, says that the revenue account shows a net profit for the half year of £1,780, which, with the previous balance of profit amounting to £47,003, gives a total of £48,783 to be carried forward to the next half year. The expenditure of £7,845 during the half year, charged to capital account, relates exclusively to the newly acquired properties in Nevada.

At the Drumlummon Mine, Marysville, Montana, during the half year 40 stamps were employed in reducing 13,200 tons of ore, recovered from various parts of the mine, yielding bullion bars and concentrates which realized \$61,631, or an average of \$4.67 per ton. The expenditure incidental to mining, milling and prospecting amounted to \$72,257; extraneous expenses, including insurance, taxes, legal expenses and traveling absorbed \$5,427, the total expenditure under above heads being \$77,684. There is thus an apparent loss of \$16,053.95, but this loss is more apparent than real, inasmuch as the entire tonnage (13,200 tons) will eventually be subjected to treatment by the cyanide process. The tailings plant resumed operations on April 12, and from that date until June 30, 1902, 31,649 tons of tailings were brought under treatment producing cyanide precipitates which realized, as per smelters' returns, \$66,310, or an average of \$2.09 per ton. The expenditure for transport and treatment of the tailings amounted to \$37,817, or an average of \$1.19 per ton, the net profit obtained being \$28,493, or an average of 90 cents per ton.

The proportionate money value of the precious metals contained in the produce is shown below:

	Ore.	Tailings.	Total.
Tons worked.....	13,200	31,649	44,849
Gold, ounces.....	2,784	2,838	5,622
Silver, ounces.....	13,120	18,342	31,462
Total values.....	\$61,631	\$66,310	\$127,941
Expenses.....	77,684	37,817	115,501
Net or loss.....	L.\$16,053	N.\$28,493	N.\$12,440

The average receipts per ton from the ore milled were \$4.67; from the tailings cyanided, \$2.09.

During the half year the developments in the mine and adjoining claims consisted of 957 lineal feet of drifts, cross-cuts and winzes. No important discoveries were made, but as the result of this development work, 13,200 tons of low-grade ore were extracted from various parts of the mine and passed through the mill, thus affording material relief to the insurance and other fixed charges at the mine.

At the Lucky Girl group of mines, Edgemont, Nevada, the last report acquainted shareholders with the necessity of erecting a cyanide plant to successfully deal with the produce of this property after passing over the plates. The cyanide plant having been erected on July 11 does not come within the purview of the present report, but shareholders will be pleased to learn that, in the interval, mining and milling operations were carried on without interruption. During the half year ending June 30, 8,165 tons of ore were extracted from the mine and passed through the 20-stamp mill producing in its

preliminary stage bullion bars realizing \$30,438, or an average of \$3.73 per ton. The residue will, in due course, be subjected to treatment by the cyanide process, thereby augmenting the above figures. The expenditure incidental to mining and milling amounted to \$26,712, while that for prospecting amounted to \$3,648, or a total of \$30,360.

The directors have not relaxed their efforts to secure another property suitable to the means at their disposal, but so far none of those submitted have stood the test of a rigid examination. The directors would naturally prefer a property near the scene of operations at Marysville, if only with the view of utilizing the valuable pumping and other machinery awaiting employment there, nevertheless they have not been deterred from extending their search to other States. With this object in view, and pending the result of further developments of the Nevada properties, the directors are firmly of opinion that the best interests of shareholders can only be secured by maintaining a strong financial position, and they therefore do not recommend the payment of a dividend.

PRESERVING MINING TIMBERS.—A series of experiments was recently carried out at the Altenburg Colliery, near Saarbrücken, Germany, with lime, tar and carbolineum, to determine the respective value thereof as preservative of mine timber against rot. Lime was found to be of the least value, while coal tar, although insuring perfect preservation of the surface of the timber, failed to protect the interior, which in every instance was found to be seriously attacked by rot. Carbolineum, however, gave excellent results, provided the timber coated had been previously barked and well dried.

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*.

Facts About the South. By Richard H. Edmonds. Baltimore, Md., 1902; Published by the author. Pages, 37.

The Colorado Mining Directory and Buyers' Guide. Denver, Colo.; G. A. Wahlgreen. Pages, 205. Price, \$10.

Nota sui Nuovi Esplosive Italiani di Sicurezza. La Cannel e la Manliante. By Dr. Ugo Alvisi. Turin, Italy; Vincenzo Prona. Pamphlet, 20 pages.

The Origin of Eskers. By W. O. Crosby. Boston, Mass.; Reprinted from the *Transactions of the Boston Society of Natural History*. Pamphlet, 36 pages.

Geology of the City of New York. Greater New York. By L. P. Gratacap. New York; American Museum of Natural History. Pages, 82; illustrated.

Poor's Manual of the Railroads of the United States. Thirty-fifth Annual Number. 1902. H. V. Poor. New York; H. V. & H. W. Poor. Pages, 1638. Price, \$10.

Statistical Abstract for the United Kingdom in Each of the Last Fifteen Years, from 1887 to 1901. Forty-ninth Number. London; H. M. Stationery Office. Pages, 280.

Mines and Quarries: General Report and Statistics for 1901. Part III.—Output. Edited by Dr. C. Le Neve Foster. London; H. M. Stationery Office. Pages, 278; with plates.

Some Additions to the Alumie-Jarosite Group of Minerals. By W. F. Hillebrand and S. L. Penfield. Reprinted from the *American Journal of Science*, Volume XIV, September, 1902. Pages, 220.

The Stereographic Projection, and Its Possibilities, from a Graphical Standpoint. By Prof. S. L. Penfield. New Haven, Conn.; Tuttle, Morehouse & Taylor Company. Pages, 54; with 34 figures and 4 plates.

Smithsonian Institution. Annual Report of the Board of Regents for the Year Ending June 30.

1901. S. P. Langley, Secretary. Washington; Government Printing Office. Pages, 784; illustrated.

Bulletin of the United States Fish Commission. Volume XX, for 1900. Second part. George M. Bowers, Commissioner. Washington; Government Printing Office, 1902. Pages, 429; illustrated.

On the Use of The Stereographic Projection for Geographical Maps and Sailing Charts. By S. L. Penfield. Reprinted from the *American Journal of Science*, Volume XIII, May, 1902. Pages, 376; illustrated.

Register of Mines and Minerals, San Diego County, Cal. Issued by the State Mining Bureau, Lewis E. Aubury, State Mineralogist. San Francisco, Cal.; Published by the Bureau. Pages, 11; with maps. Price, 25 cents.

Western Australia. Report of The Department of Mines for the Year 1901. (With which is Incorporated the Preliminary Report.) H. S. King, Under-Secretary for Mines. Perth, W. A.; Government Printer. Pages, 105; illustrated.

On the Solution of Problems in Crystallography by Means of Graphical Methods, Based Upon Spherical and Plane Trigonometry. By S. L. Penfield. Reprinted from the *American Journal of Science*, Volume XIV, October, 1902. Pages, 284; illustrated.

BOOKS REVIEWED.

It is formally announced by the parties concerned that Mr. Henry C. Meyer has sold the *Engineering Record*, of New York, which he has owned and edited for 25 years past, to Mr. James H. McGraw, owner of the *Electrical World and Engineer*, the *American Electrician* and the *Street Railway Journal*. While no longer actively connected with the *Record*, Mr. Meyer has agreed to act as an adviser in an editorial capacity.

Mr. Meyer built up his paper from a small beginning to its present high standing by hard and intelligent work. His many friends will regret his retirement, but at the same time will congratulate him on his ability to take at last the rest which he has so well earned. Under the management of Mr. McGraw and the able staff associated with him, there is no doubt that the *Engineering Record* will retain the prominent position it holds in its special field; and we wish it a most prosperous future.

The Witwatersrand Gold-fields. Banket and Mining Practice. Second Edition. By S. J. Truscott. London; Macmillan & Company. Pages, 520; illustrated. Price, \$12.

This is the second edition of a well-known book, which was first issued nearly five years ago. Five years in the development of such a progressive gold-field as the Witwatersrand would ordinarily be long enough to render a book of this kind out of date, but, fortunately for the author, the interval consumed by the recent war has sufficed to prevent much change in the industry, and renders this comprehensive account of mining methods as useful to-day as at the time it was first published.

The first chapter is briefly introductory. The second deals with the general geology of the region. The gold-bearing conglomerate or banket is a member of a series of quartzite, sandstones and shales which overlie a quartzite-shale group, and underlie an amygdaloidal diabase; there is an occasional conformity between the banket and the underlying formation, while the diabase is believed to cover the denuded edges of the banket series. The latter form an enormous syncline, the output of which has been traced along an east and west line through Johannesburg for over 50 miles, while the dip has been determined by boreholes and shafts for a distance of 8,565 feet southward, and to a vertical depth of 4,887 feet. The dip at surface is from 50° to 80°, with a flattening which is at first sudden and then gradual; at 5,000 feet the dip averages about 25°. In the Geduld it is only 7°.

The geological age of this great gold-seam has been a matter of disputation. Mr. Truscott summarizes differences of opinion in the statement that the Witwatersrand Beds may be correlated with the Lower Devonian of Europe.

In Chapter III the author gives details of the beds which form the banket series, and in Chapter IV he discusses the structure of the most important group of banket beds, known as the Main Reef series, the source of the great output of the Transvaal. Numerous diagrammatic sections serve to explain the multiple nature of the lodes and to emphasize the variation in thickness of the various members of the conglomerate seams. Chapter V deals with the dislocations caused by dikes, and by faults which are not accompanied by dikes. Curiously enough, the author does not appear to state the rock of which these dikes are composed, nor the possible relation which they may bear to the older flow of diabase.

The study of the structural complications brought about by faulting has a notable commercial value, on account of the aid which it can afford mining operations; the extent of dislocation varies widely, there are small step faults and there are big throws, which extend into a thousand feet and more. There are many reverse faults; moreover, there are displacements along the beds, also accompanied in places by dikes which have intruded between the beds.

It is evident that there is a fine opportunity on the Rand for the application of the most practical kind of geology in the deciphering of the complexities which the author has described in detail.

Chapter VI was contributed by Mr. Hammond. It is a brief discussion of the origin of the gold in the conglomerate, and forms the basis of Mr. Hammond's later contributions on the same subject. The impregnation theory is advocated along the lines first suggested by Messrs. Gardner, Williams and Curtis. It is an ever-fascinating subject which no discussion can stale, and we expect that in the course of the further development of the region there will be much more to be learned, if not regarding the origin then at least concerning the distribution of the gold in the reefs.

Chapter VI deals briefly with prospecting. Chapter VIII covers shafts, shaft sinking and timbering. This is one of the most valuable portions of the book, not only to those engaged in South African mining, but to those who are interested in such technical details in their application to practice elsewhere. To the student this chapter will prove rich in information. If in addition he will get Mr. Leggett's paper on Shaft Sinking, Mr. Behr's on Winding to Great Depths, and Mr. Denny's on Deep Levels, he will possess a Witwatersrand of useful information.

Chapters IX and X deal with further details of equipment, on surface and underground. Chapter XI is given to winding appliances, and will serve as a good introduction to the big discussion which is now going on at Johannesburg and London concerning the best type of engine and the best methods to be introduced in sinking to depths of from 5,000 to 8,000 feet.

Pumping and Development occupy Chapters XIII and XIV. Sampling and Ore Valuation is too tricky a subject for such a short chapter as follows, but it is suggestive. Methods of stoping, air drills and drilling, ventilation and tramping occupy the next four chapters. It gives one a suggestion of the scale of operations on the Rand to learn that in 1897 the consumption of candles was 3,500,000 pounds, which were used up in the course of mining 5,300,000 tons of ore. Candles cost 8 cents per ton of ore.

Chapter XIX is given to ore dressing, a mere introduction to the milling methods, which are not otherwise described. It is, however, a pleasure to note that the author announces his purpose of preparing a supplementary book which will cover the metallurgical practice of the region.

Chapter XX treats of Administration, Labor and Material, while XXI deals briefly with the question of deep levels, a subject which Mr. G. A. Denny has recently expanded into a most interesting book.

In the appendix there are a number of valuable

supplementary data covering various subjects and also a separate account of the Tarkwa gold field. This is a new district in the Gold Coast region, in West Africa, which Mr. Truscott has recently examined. He considers that the reefs of this gold-field have the same structure and occurrence as the Witwatersrand series. The Tarkwa reefs consist of gold-bearing conglomerate forming a syncline which in places is complete. They are found in a sandstone formation which lies on a quartz-diorite, and under clay-slate. Near the reef the sandstone is more strongly consolidated than elsewhere, a fact which is probably due to the action of secondary quartz. It is supposed that the Tarkwa, like the Rand conglomerate, is of Devonian age.

To mining engineers and others who desire to get a good general idea of the methods and conditions obtaining on the Rand we recommend this volume. It has been carefully prepared. It is comprehensive, well written, plentifully illustrated, and comes to the reader in the attractive form which marks the Macmillan books. T. A. R.

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.

Selenium in Gold and Silver Ores.

Sir: Referring to the note by "Mill Manager," in your issue of October 25, on the finding of selenium at the clean-up of zinc slimes from the cyanide process, this may possibly have been derived from the selenides of silver or copper, which are occasionally met with in ores, and both of which I have found to be soluble in cyanide solutions, though very slowly when the percentage of cyanide is small. The resulting solutions were found to contain potassium selenocyanide (KCNS₂), from which selenium is slowly precipitated by the action of zinc shavings or dust.

If the selenium, however, was met with when refining the zinc precipitate with sulphuric acid, it most probably came from the commercial acid, which very frequently contains selenium, originally derived from the pyrites or sulphur burnt in its manufacture. The selenium in dilute sulphuric acid is readily precipitated by zinc shavings or dust, when added in large proportions, and would undoubtedly be precipitated by the metallic zinc remaining in the cyanide slimes.

W. J. SHARWOOD.

Marysville, Mont., Nov. 10, 1902.

Deep Level Mines on the Witwatersrand.

Sir: Various estimates have been made of the gold value of the Witwatersrand main reef lines, down to a depth of 6,000 feet, and a probable average yield of 38s. per ton for an average milling width of 3 feet has been assured for the whole Rand, it having been found that by dividing the total value produced by the tonnage crushed, from the opening of the mines to date. An average value of about 39.76s. has been obtained. No account, however, has been taken of the general decrease in yield of the ores milled at the mines from the surface downwards. Taking 28 of the principal mines, the yield per ton milled appears to have been, on average, about 31 per cent less in 1898 than in 1899. This decrease in yield has not been so rapid in the lower levels as in the upper ones, but it may well make it impossible to work the deep-level mines at a profit when account is taken of the large capitals required, the length of time necessary to open them up, and the increased cost of working compared with those of the outcrop mines.

WILLIAM S. WELTON.

Wembley, England, Nov. 6, 1902.

Retaining Ink on Glass.

Sir.—Referring to the inquiry of "A" in your issue of November 8, allow me to state that I made a glass model of the May Mine at Ducktown, Tenn., and used oil colors on the plates to show the outlines

of workings at the different levels. The colors were applied with a No. 1 sable brush after moistening slightly with spirits of turpentine.

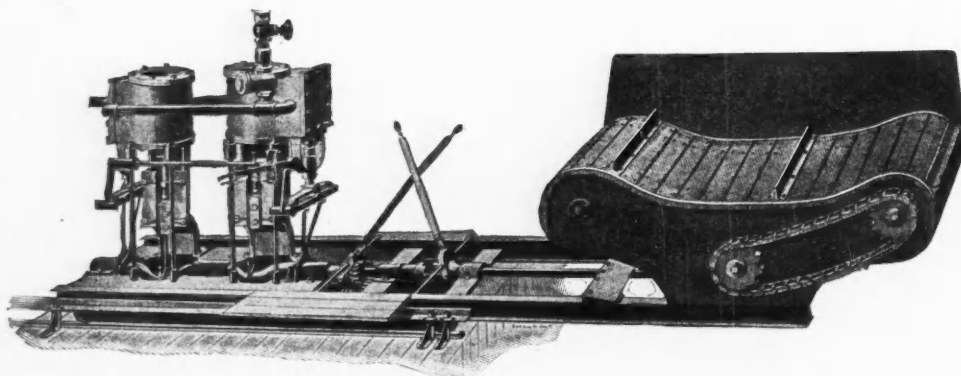
The model included a contour map of the surface. I drew the contour lines with a lettering pen and liquid drawing ink. The outline of shafts and buildings I formed with right-line pen. I used no preparation on the glass, but was careful to see that it was entirely free from moisture or grease. The results were entirely satisfactory.

BENJ. H. CASE.

Copperhill, Tenn., Nov. 10, 1902.

Sir: If "A" will use Higgins' water-proof drawing ink he will have no trouble in making lines on glass. He should first make a tracing of the workings, then turn the tracing face downward and place the glass plate over it and trace on the glass. The workings will then be seen on the glass backward. The glass is then turned over and the workings appear right side up. This plan removes the danger of injuring the markings by touching with the fingers, or by removing dirt or dust from the plates with a damp cloth. I have just completed a glass model of a part of the Portland Mine. My plan was as follows:

A frame was made of 2 by 2-inch pine uprights, to



THE CHRISTY BOX CAR LOADER.

which horizontal slats were nailed. These slats were properly spaced for the levels. I then made the levels on glass plates, as described before. After the (level) sheets were in place I placed a sheet of glass rendered translucent by a sand blast under the others. I then placed 16 candle-power electric lamps under the translucent sheet. The effect is beautiful.

If "A" will follow out this plan I am sure he will be delighted with the result.

FRANK M. KURIE.

Victor, Colo., Nov. 11, 1902.

QUESTIONS AND ANSWERS.

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

Smelting Iron with Crude Oil.—Kindly advise us of the relative cost and practicability of the use of crude oil as compared with 72-hour Frick coke, or, rather, the number of gallons necessary to produce the same amount of heat as one ton of Frick's or Connellsville 72-hour coke, when applied for the smelting of iron ore or the reducing of rock to a fluid. Would also like to have names of parties who manufacture furnaces or cupolas adapted to the use of oil for this purpose. Also give us the names of manufacturers of furnaces in which coal is used by converting it into gas, and the gas is then used for smelting.—A. I. M.

Answer.—I. No one has yet succeeded in smelting iron ore in the blast furnace with oil as fuel. Oil can

be used in reverberatory and similar furnaces, but for reduction in the blast furnace solid fuel is required, at least, in any furnace in use up to the present time. No iron smelted with oil as fuel on a commercial scale is on record. We are therefore unable to refer you to any manufacturer of such furnaces as you desire.

2. There are a number of good gas-producers on the market, in which coal is converted into gas for use in metallurgical works. Producer gas is used largely in reverberatory furnaces, in open-hearth steel furnaces, etc. It is not used, however, in smelting iron ore in the blast furnaces. You will find several gas-producers advertised elsewhere in this paper.

Treating New Zealand Gold-bearing Sands.—I observe in your issue of November 8 an answer to a query, mentioning a reward offered by the New Zealand Government for a successful method of treating auriferous black sands. Being a regular reader of your publication, I would like to have from you all information relating to this reward, as I believe some recent work of mine may prove to be the solution.—T. J. M.

Answer.—In answer to this question, and for the

information of others who may be interested, we reprint below the official notice of the reward offered:

The Department of Mines of New Zealand gives notice that a bonus of £2,000 will be paid to any person who before January 1, 1904, shall invent such appliances as will successfully save gold from black sands in New Zealand. The bonus will be paid on compliance with the following conditions:

1. The invention shall, in its main features, differ from all machinery and appliances at present in use for the saving of gold, whether coarse or fine.
2. It shall be readily transportable from place to place, and shall be capable of utilizing local water for all its requirements.
3. The invention must be capable of treating not less than 30 cubic yards an hour of black sand or any coarser material up to a diameter of 4 inches; and it must be capable of treating such material profitably where there is not more than a value, in gold, of 3 pence per cubic yard; not less than 80 per cent of the gold contained in the material to be recovered by the machine.
4. No bonus to be paid until the invention has been continuously worked for not less than six months, and it shall, during that period, have treated not less than 100,000 cubic yards of material, working three shifts a day.
5. The bonus will be paid on the certificate of an officer that not less than 20 persons other than the applicant for the bonus are successfully working the invention.
6. Any person who receives the bonus shall not be allowed to take out patent rights in New Zealand for his invention.

Applications should be addressed to Hon. James McGowan, Minister of Mines, at Wellington, New Zealand.

THE CHRISTY BOX-CAR LOADER.

During the past few years there has been a growing tendency to ship coal in box cars. This condition is brought about partly on account of a demand from dealers who desire to stop the waste caused by stealing from flat cars, and also that they may receive their coal in better condition. For the same reasons the railroad order a large portion of their coal supply in box cars, and in addition to this they find it necessary to furnish box and stock cars to the coal traffic to keep the cars up to full earning capacity.

Mine operators have looked with disfavor on box car use on account of the extra expense of men in loading and the reduction of output through extra time consumed. This condition is being overcome of late by the introduction in many mines of box car loaders.

The latest improved loader put on the market is the Christy loader manufactured by the Christy Box Car Loader Company, of Des Moines, Iowa. This company is now supplying a number of large mines. Some of the machines are now handling 2,000 tons per day with success. These loaders are made in the strongest possible manner to withstand the hard wear about large mines.

With Christy loaders, it is claimed that box cars are even more quickly loaded than flats; that coal can be safely and thoroughly picked clean of impurities while the loader is in operation; and that the output of a mine can be maintained to the highest degree, as they handle coal as fast as it can be dumped. The machines are simple in construction, easily operated, and require little repair. It may be added that these loaders will handle any mineral substance usually carried in box cars.

LAKE NAVIGATION IMPROVEMENTS.

The improvement of the navigation of the Great Lakes is a matter of so much importance to the iron industry of this country, that general attention ought to be given to the report of the Chief of Engineers on this point. In this report, as just published, Gen. C. L. Gillespie says that the new work on the Detroit River authorized in the last river and harbor bill, will be started this fall or early next year. Operations during the last fiscal year were conducted under three continuing contracts, the result of which was to increase the minimum depth of the improved channel to 21 feet below present mean low water wherever work is being done. Gen. Gillespie estimates that it will cost \$1,250,000 to complete the existing project and asks for an appropriation of \$450,000 for work to be done during the fiscal year ended June 30, 1904. The report says that the new appropriation for increasing the capacity of St. Clair flats canal, \$330,000, and a contingent \$80,000 additional, will enable the engineer in charge to commence the construction of the second channel. No estimate is submitted for next year.

It will cost \$4,000,000 to complete the improvement of Hay Lake and Neebish channels in St. Mary's River, according to the report, and Gen. Gillespie asks for \$88,000 for pushing the work in the next fiscal year. He says the funds now available under past appropriations will be applied toward increasing the width of the Little Rapids division of the channel from its present minimum of 300 feet up to a uniform width of 600 feet, and the work will be done under continuing contracts as authorized by the river and harbor act of March 3, 1899, all the funds (\$494,115) having now been actually appropriated. These contracts are already in progress and will be completed at an early date, under the funds and the authority of the June 13, 1892, appropriation new contracts will be entered in upon the completion of the old channel via the Middle Neebish and commencement of the new channel via the west Neebish.

The report makes no suggestion or recommendation as to the advisability of constructing a third lock at Sault Ste. Marie, such as has been agitating vessel men for the past few months. Gen. Gillespie simply recites the opening of the Poe lock to naviga-

tion in 1896, and states that work since then has consisted in completing the deepening of the canal and its approaches, rebuilding and extending piers, grading and improving canal grounds, etc.

During the past fiscal year there were removed from the St. Clair River section of the ship canal from Duluth to Buffalo portions of three shoals at St. Clair, Stag Island and Grande Pointe, the total amount of material dredged being 80,753 cubic yards. The result of the work was to provide a clear depth of 21 feet where the controlling depths before improvement ranged from 16½ to 18 feet. In the St. Mary's River section there were found two new shoals near Frying Pan Island and Crab Island, both near the direct line of navigation and with less than 21 feet depth, both being mapped and reported to the lake survey office and other navigation interests. Surveys and examinations with sweeping rafts during summer and ice-boring and sounding apparatus during winter continued over the remaining unsurveyed areas of St. Mary's and St. Clair rivers. The unex-

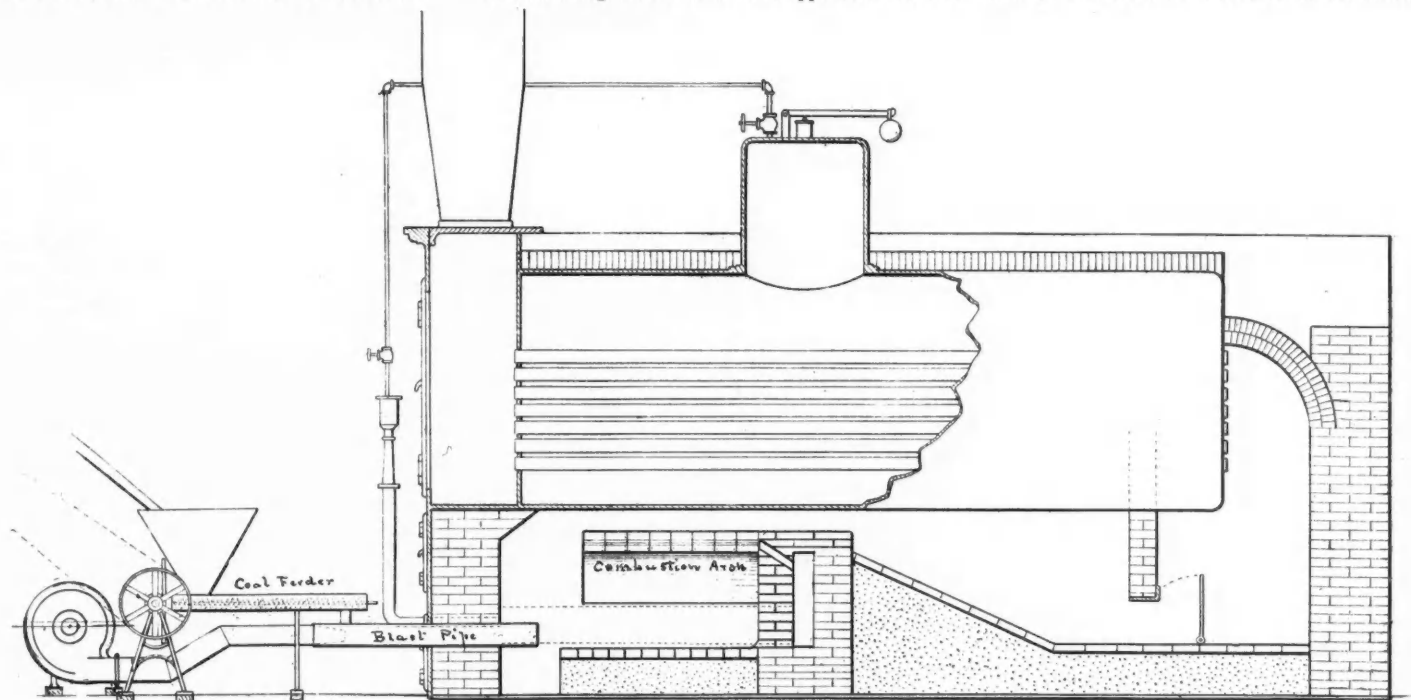
perfect combustion. These passages admit the air in such a manner so as to render it impossible for any particles of coal to escape without being perfectly consumed. The air is supplied by a small blower, which also forces the coal from the feeder through the blast pipe into the furnace.

The feeding machine consists of a small worm operated by a disk and adjustable feed-wheel. This machine is so arranged as to spray the fine coal as it passes before the blast nozzle, thus obtaining a perfect admixture of the air and coal which pass into the combustion chamber from the blast nozzle in the form of a cloud of coal dust, which is met by currents of hot air from the air passages in the combustion chamber arch, and instantly ignites burning with an intense heat. The heated gases in passing out of this combustion chamber, pass through currents of heated air into an auxiliary chamber behind the first, thus completing the process of combustion before escaping to the flues and uptake.

The advantages claimed for this apparatus are that

shafts being vertical. With the application of water power to the generating of electrical currents, it became necessary to set turbine wheels in a vertical position on horizontal shafts. When the Michigan Lake Superior Power Company prepared its plans for the new power house, this setting was finally determined on as being the most economical, and proposals and plans were invited from turbine builders.

Up to this time all tests of wheels had been made on a vertical step at the Holyoke Water Power Company's flume in Holyoke, which is at present the most reliable testing station, as it was designed by Francis and constructed by Clemens Herschel. This type of flume was used by Francis to obtain his formulas for calculating water powers, which are authoritative today. To make tests on wheels in a horizontal setting required considerable expenditures, and an arrangement was finally entered into between the Power Company, the Webster, Camp & Lane Company, and J. & W. Jolly, of Holyoke, to design, build and test a turbine unit which should fulfill the following re-



SMOKELESS CALORIFIC COMPANY'S FURNACE FOR PULVERIZED FUEL.

pending balance of previous appropriations will suffice for all work required to complete improvements contemplated by the present approved project.

UTILIZING BLAST-FURNACE GAS.—According to the report of the Cockerill Company, of Seraing, Belgium, the company has now in operation six large gas engines operated by the waste gases from the blast furnaces. Two of 200 horse-power and two of 600 horse-power are used to drive dynamos, while two of 600 horse-power are employed as blowing engines. A new 1,200 horse-power blast furnace gas engine to be used as a blowing engine is approaching completion.

THE SMOKELESS CALORIFIC FURNACE.

The accompanying illustration shows a section of a boiler furnace made by the Smokeless Calorific Company, of New York, which is intended for the use of pulverized coal, and which can be applied to the combustion of lignite, and other low-grade fuels. It is, according to the inventor's claim, equally applicable to the boiling of the best coal.

This system is operated as follows: The coal to be used is first pulverized in a machine, which reduces it to a fine dust, after which it is conveyed to the feeding machine in front of the boilers, for use in the furnace by a system of conveyers, adapted to the location of the coal bins and boilers to be equipped.

The furnace consists of a specially constructed fire-box or combustion chamber, having passages so arranged so as to supply the needed oxygen to effect

the supply of air and coal is entirely under the control of the operator, as it can be instantly adjusted to feed greater or less quantities; the system is automatic, no handling being required after the fuel passes into the pulverizer; there are no grate bars, and consequently no fuel is wasted by passing unburned through the grates, there is no cooling of the boiler by the opening of fire-doors. In general, the claims are the absence of smoke, the saving of labor and the complete combustion of the fuel.

This apparatus has been tested in practical operation, and is covered by patents in this country and abroad. It can be placed in any boiler now in use without disturbing the present setting.

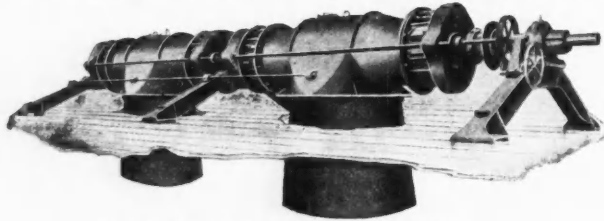
THE TURBINE EQUIPMENT AT SAULT STE. MARIE.

The great power station at the Sault Ste. Marie, which was put into commission a few weeks ago, is the largest example extant of the application and development of water-power from a low head. While the preparatory work necessary to make this a successful installation, did not call for the combined skill and efforts of hydraulic engineers in all parts of the world, as did the Niagara Falls equipment, yet it took months of experiment and study to perfect, and as installed has at least one point of advantage over its great rival, in that the efficiency of the turbines is greater. The type used in this equipment is the well-known McCormick turbine. When originally brought out, the tests made on it showed it to stand high in points of efficiency, power, and speed. The usual method of setting turbines has been to place the wheels so as to revolve in a horizontal plane, the

requirements. With a 16-foot head the unit must develop 568 horse-power at 180 revolutions, with an efficiency of 80 per cent. Tests to be made at Holyoke under the supervision of Prof. G. S. Williams, of Cornell University. After many months of experimenting with improved forms of wheels and various designs of draft-cases and draft-tubes, the final design was adopted. The best results finally obtained were as follows: Head, 16 feet; speed, 180 revolutions per minute; horse-power, 584; efficiency, 84 per cent.

The penstock unit as shown consists of four turbines arranged in pairs with one draft-tube for each pair. Each pair is keyed to an open-hearth hammered steel shaft and the two shafts are bolted together by means of forged couplings. The shafts are designed to transmit double the power of the generators with the usual factors of safety. This is to provide against the torsional vibrations caused by generating an alternating current. Each pair of the turbines discharges into a central conical ended draft case, and the discharge is continued to the tail-race by means of a conical steel-plate draft-tube. The draft cases are made of cast iron, and are separable in a horizontal plane parallel with the turbine shafts, making them easy of access. The center of each case is provided with a yoke or steady rest for the turbine shaft. The combined waterwheel shaft is supported by three heavy cast-iron pedestal girders that rest on the side of foundation walls of the penstock. The water bearings are amply large, and are made from specially prepared wood blocks. These are backed with iron and can be adjusted for wear. The

draft cases are supported by heavy spanning frames made from 15-inch steel I-beams. These also rest on the side wall of penstock. This construction frees the arches over the tail-race from the weight of the machinery. The draft cases and pedestal girders are tied together on each side by longitudinal bars, making a substantial and ideal support for the running parts. The turbine shaft penetrates the curved bulkhead by means of a stuffing box properly secured to



PENSTOCK UNIT McCORMICK TURBINES.

the steel plates by rivets. The common horizontal gate shaft extends through the bulkhead into the dynamo room in like manner, and is provided with the necessary rigging to manipulate the gates of the four turbines simultaneously by hand or by machinery.

The turbine shaft at the end farthest from the dynamo room is $5\frac{1}{2}$ inches in diameter and increases in size until it is $7\frac{1}{4}$ inches in diameter at the dynamo end, and is arranged to be coupled to the horizontal dynamo. Each of the four turbines is encased in a balance gate curb, while the individual gates are so poised as to direct the flowing water properly, and differently, at the different degrees of gate opening; maintaining a high efficiency at part gate. A view of a set of turbines as placed in the penstock is shown herewith, and a turbine unit is also shown.

MECHANICAL STOKERS IN STEEL MILL SERVICE.

Perhaps the severest character of load encountered in steam supply service is that encountered in the operation of steel rolling and slabbing mills. In one American steel plant there have recently been put into operation slabbing mills consuming as much as 2,000 horse-power during the working of a large steel bloom. This load is approximately uniform until the bloom leaves the rolls, when it instantly decreases to that of mechanical friction only. It is apparent that in order to effectually accommodate these excessive variations in steam supply either a considerable storage capacity must be provided in the boiler equipment, permitting uniform firing, or quick steamers must be employed fired by some form of mechanical stoker. At the present time the latter arrangement is rapidly coming into use, with the result that fluctuating loads are readily anticipated and cared for by control of fuel combustion. This control may be rendered automatic when mechanical draft is employed in connection with the boiler and stoker equipment. A prominent example of this arrangement is offered in the plant of the Lukens Iron & Steel Company, which comprises 5,700 horse-power capacity of Babcock & Wilcox water-tube boilers equipped with Roney improved duplex stokers, and a complete mechanical draft outfit. In this plant the speed of the fans and the position of the flue dampers is automatically controlled by the pressure of steam in the supply main, thus proportioning the rate of combustion to steam demand. In the operation of this plant it has been found unnecessary to continue the signal system formerly in use between fire-room and slabbing mill, and the heaviest demands for steam are readily provided for by the automatic arrangement for control of draft in connection with the mechanical stokers.

One of the pioneer industrial concerns to adopt the water-tube boiler-mechanical stoker outfit for steel mill service was the Carnegie Steel Company, which a dozen years ago, installed the first Roney stoker in the Homestead works. At the present time they have in use nearly 25,000 horse-power of boilers equipped with these stokers. The Lackawanna Iron

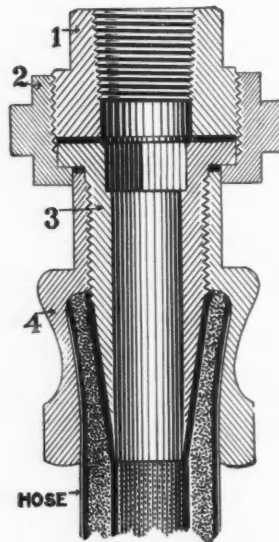
& Steel Company has also adopted the Roney stoker for the steel mills at Lebanon, Pa., and Buffalo, N. Y., where the steam plant is arranged so as to be fired either by coal or blast furnace gas with equal efficiency. The gas is introduced above the grates in such a manner that both gas and coal may be burned at once if desired, the proportions being regulated according to the demand for steam and the quality and quantity of the gas supply. The failure

of the gas supply in no manner interferes with the operation of the plant, as the coal firing is immediately resumed without interruption.

Many interesting arrangements of this nature are in use, but the solution of the problem of efficient boiler firing under heavily fluctuating loads rests entirely with the mechanical stoker, which has been adopted in such steel plants as the Carnegie, Lackawanna, Crucible Steel, Jones & Laughlin, Lukens, Phoenix, Trenton, National Tube, American Bridge, Pressed and Standard Steel Car, Illinois, Lorain, Juniata, and numerous other steel companies to the extent of 100,000 horse-power.

AN IMPROVED HOSE COUPLING.

Many dollars are annually wasted by leakage in compressed air lines. This waste is principally at the points where connections are made with the main line rather than in the main line itself. The



THE G. E. HOSE COUPLING.

accompanying illustration shows a hose connection, which has been designed to obviate these losses, especially when working under heavy pressures. The "G. E." hose coupling, as it is called by the makers, holds the hose securely compressed in a metal pocket, without the use of outside clamps.

Another feature claimed for this coupling is the increased size of the air passage, which is larger in the G. E. coupling than is possible in the old style couplings, where the hose is drawn over the corrugated end of the coupling. This coupling is suited for working under very heavy pressure. The ordinary coupling, although it fastens the hose to the coupling with clamps, will not prevent leakage at the end of the hose. In the G. E. coupling, the end of the hose is in a metal pocket and leakage is impossible.

As will be seen from the illustrations the coupling is of substantial proportions, and designed to give long wear. It consists of four parts, and is entirely

self-contained, not requiring the additional purchase of hose clamps, nor involving the expense of their renewal.

Other advantages claimed for the G. E. hose coupling besides those above mentioned include its efficiency when working under heavy pressures. The first couplings made were tested to 700 pounds pressure without leaking. Its substantial proportions and the absence of projecting bolts secure a longer life than is possible with the old style couplings using outside clamps.

In the G. E. coupling, the hose is firmly secured by the pressure of the tapered portion of part 3, the latter being screwed into part 4 by means of the square socket at the larger end. There are several slight depressions in the walls of part 4, into which the pliable hose imbeds itself, making it impossible to withdraw the hose until uncoupled. A rubber gasket is used between the faces of parts 1 and 3, and in making connections with this coupling, part 1 having a female end, may be attached directly to the pipe line without the expense of a pipe coupling.

These couplings are manufactured in both malleable iron and brass by the American Engineering Works, of Chicago.

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 November 4, 1902.

712,472. CUPOLA-FURNACE.—Peter Bacher, Canton, Ohio. In a cupola-furnace a base-plate supported in proper elevation, pillars or posts carrying a top plate having connected thereto a dome-section, said dome-section extending below the bottom or under side of the plate, hinged sections normally located below the top plate and above the base-plate and said sections hinged together, and means for securely holding the hinged sections in a closed position.

712,480. SAND-REEL FOR OIL OR ARTESIAN WELLS.—Andrew Benson, Bradford, Pa., assignor of one-half to Hiram W. Eaton, Jr., Bradford, Pa. In a well-rig the combination with a band-wheel and a brake device, of a rotatable spooling-shaft comprising fixed and oscillating members, and a driven wheel upon the latter member adapted to engage either said band-wheel or said brake device.

712,486 and 712,487. ANTIFRICTION DEVICE FOR SUCKER-RODS.—William L. Black, Fort McKavett, Tex. The combination of a sucker-rod coupling comprising two engaging members and an antifriction device comprising a collar provided with antifriction-rollers, interposed between the engaging members of the coupling.

712,502. MUFFLE-FURNACE.—George G. Convers and Arthur B. de Saulles, South Bethlehem, Pa. A retort-furnace provided with two retort chambers or compartments having air and gas inlets at their base and having a central downtake, said downtake extending throughout the length of the furnace between the retort-chambers.

712,527. PROCESS OF MANUFACTURING WHITE PIGMENT.—James B. Hannay, Loch Long, Scotland. A process of producing white pigment consisting in fusing lead sulphite ore upon heated coke slabs and burning the ore directly to basic sulphate of lead from coke the slabs acting as wicks so that oxidation of the ore and volatilization of the resulting product takes place mainly by means of the heat generated in the formation of the said basic sulphate.

712,562. MANUFACTURE OF INCANDESCENT MANTLES.—George H. Maisch, Baltimore, Md. An incandescent mantle made up of oxides of the rare metals including beryllium, in combination with a glaze-enamel.

712,565. HOISTING AND CONVEYING APPARATUS.—Thomas S. Miller, South Orange, N. J. In a hoisting apparatus, in combination, the fall-rope drum, the fall-rope engaging said drum and a fall-rope supporting-rope also engaging the said drum and means whereby a correlative travel is maintained between said ropes during the lowering of the fall.

712,572 and 712,573. DUMP CAR.—Thomas R. McKnight and Hiram A. Clapp, Aurora, Ill., assignors to Western Wheeled Scraper Company, Aurora, Ill. The combination with a dump-car, of a support beneath the body of the car at the side where the contents of the car are to be discharged, a pivotal connection for said support with the car-truck, a rod connected with said support and extending transversely of the car and provided with a notch, and a fixed engaging device adapted to enter said notch to lock said rod in place and thereby maintain said support in supporting position.

712,585. CONVEYOR.—Staunton B. Peck, Chicago, Ill., assignor to the Link Belt Machinery Company, Chicago, Ill.

A conveyor consisting of the usual chains and traveling portions with a series of pans, each consisting of comparatively thin metal portions and fibrous linings for such portions as receive the blows of the falling material.

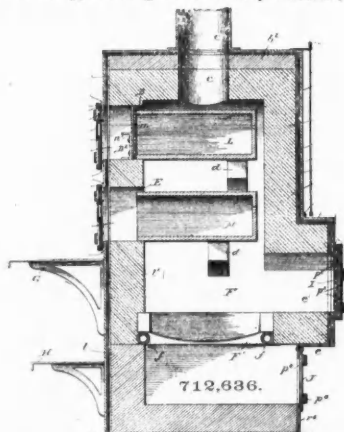
712,592. **ROCK-DRILL.**—Joachim Puechagut, Black Diamond, Wash. In combination with the frame and rotatable screw-threaded spindle, of a divided nut for said spindle hung by a trunnion to a carrier adapted to be moved longitudinally to said frame, means to open and close the nut, a latch for locking the nut, a multiple gear-wheel mounted to revolve loosely upon a mandrel integral with said nut, means to prevent the removal of the said gear-wheel from the mandrel, another gear-wheel mounted upon the said spindle so as to be free to move longitudinally thereon, but splined to rotate therewith, said splines extending through the hub of the last-mentioned gear-wheel and adapted to be secured thereto by a latch adapted to engage with slots cut in the hub of the gear-wheel at determined distances so that when the said splines bear against the adjacent face of the nut the said gear-wheel may be set to mesh with any one of the several gears of the multiple wheel.

712,597. **VALVELESS ENGINE FOR DRILLS.**—Robert L. Rickman, Denver, Colo., assignor to the Rickman Drill and Channeller Company, Denver, Colo. In a motor, an inlet-pipe, a valve therein, a lubricant-chamber in connection with such valve and a lubricant-passage in such valve communicating with the inlet-pipe and with said chamber and being in such relation to the valve-inlet passage that as the one passage is opened to communicate with the motor the other is closed.

712,615. **BLAST-FURNACE.**—Thomas Stapf, Ternitz, Austria-Hungary. A blast-furnace provided with an open discharge-passage leading from the hearth or bottom of the metal-chamber outwardly and upwardly to a suitable height to cause a continuous discharge of metal, and with an open slag-discharge passage leading from a suitable point upwardly and outwardly to a suitable height to cause a continuous discharge of slag.

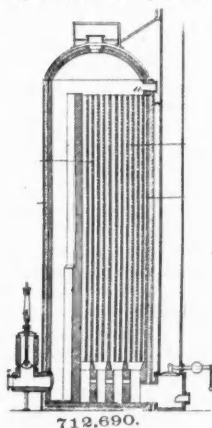
712,635. **WATERPROOF ARTIFICIAL FUEL.**—James F. Bartlett, Mayfair, Ill. A composition of matter consisting of 75 per cent. coal-dust, 25 per cent. cow-manure, 2 gallons of blood, 2 gallons of lime, 4 ounces of alum, 2 pounds of glue and 4 gallons of water.

712,636. **FURNACE.**—Chester S. Batchelder, Spokane, Wash. A muffle-furnace for the purpose stated, comprising a metallic casing, a lining of refractory material, an asbes-



tos packing interposed between the metallic casing and said refractory lining, a solid-fuel-burning fire-box having a lateral stoking-opening, said fire-box and opening being located in the base of the furnace, a muffle-chamber above the fire-box and a door for said muffle-chamber arranged to admit air to said chamber.

712,690. **HOT-AIR STOVE.**—David Lamond, Pittsburg, Pa. In a hot-air stove, a lattice-work, a covering for the rear



lattice-work flues and a combustion-flue having sectionally a convexed form, one side of which forms a divisional wall between the flue and the lattice-work.

712,640. **PROCESS OF TREATING ANODE RESIDUES.**—Anson G. Betts, Troy, N. Y. A process of treating anode residues containing lead, copper, antimony and arsenic

from the electrolytic refining of lead alloy, which consists in combining a part of the lead, copper, antimony and arsenic present with chlorine gas, and of removing the soluble chloride from the remainder.

712,696. **BRIQUETTE-MAKING MACHINE.**—Richard Martin, San Francisco, Cal., assignor to one-half to Stephen T. Smith, San Francisco, Cal. The combination in a briquette-machine of an annular horizontally-revoluble body having radial mold and plunger chambers disposed in line with each other, exterior and interior lines of plungers movable in said chambers said lines of plungers disposed at right angles to the axis of the revoluble body, exterior and interior cams by which the plungers are moved radially with relation to each other to meet and compress the material in the mold-chambers, and an annular feed-channel exterior to the mold-chambers through which channel the exterior plungers are movable to charge the molds and compress the material.

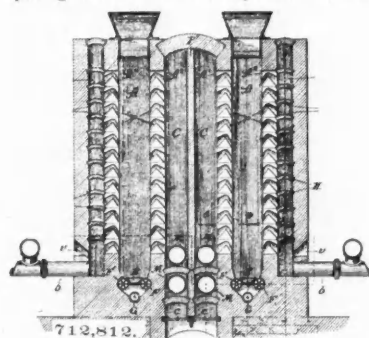
712,704. **CONDENSER FOR AMMONIA GAS.**—Joseph L. Morris, Lawrence, Kan. An apparatus for liquefying ammonia-gas, comprising a chamber, a sinuous tube in said chamber for passage of the gas, said tube being composed of horizontal runs arranged vertically, a series of horizontal perforated plates arranged between the runs of said tube in such a manner as to form a sinuous air-passage through said chamber, means for admitting water to the uppermost of said plates, and a blast-fan connected to one end of said air-passage, for cooling the water which falls through said perforated plates.

712,734. **DRILL FOR BORING WELLS.**—Andy C. Shuster, Bakersfield, Cal., assignor to one-half to Timothy Spellacy, Bakersfield, Cal. In a drill, the combination with a shank, of two oppositely-disposed ribs having cutting edges and cutting ends, both ribs being located upon one side of the center of the shank, and a guiding-rib, having a cutting edge and a cutting end, located upon that side of the center of the shank upon which the oppositely-disposed ribs are located.

712,758. **COATING FOR METALS.**—John V. Brauch and Bernard Hemann, Belleville, Ill. A combination for coating metals consisting of crude turpentine, linseed-oil and fish-oil, substantially in the proportions of 20 per cent. crude turpentine, 40 per cent. linseed-oil and 40 per cent. fish-oil.

712,807. **PROCESS OF TREATING MINERAL SUBSTANCES BY HEAT AND PRESSURE.**—Victor Karavodine, Paris, France. A process of treating mineral substances insoluble in water and containing water chemically combined to produce refractory solid compact masses, which process consists in subjecting said substances simultaneously to a temperature of from 250° to 400° C., and to a high pressure exceeding 100 kilograms per square centimeter, thereby expelling by heat the chemically-combined water and agglomerating the molecules by pressure, substantially as described.

712,812. **ORE-FURNACE.**—William A. Kōneman, London, England, assignor to one-half to Azel F. Hatch, Chicago, Ill. In an ore-furnace, the combination of a vertical combustion-chamber divided by horizontal baffles into passages, each opening into that immediately above it, whereby the



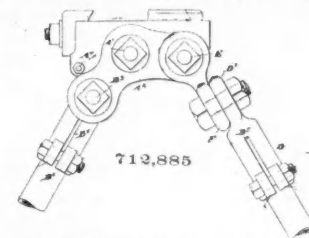
products of combustion in rising through the chamber traverse in succession all the passages and the whole length of each passage, a vertical exhaust-chamber, walls spaced apart to form said combustion and exhaust chambers and containing numerous ports throughout their height, and an ore-chamber between said walls provided with a feed-inlet at its upper end and with a discharge-outlet at its base.

712,869. **MINER'S POCKET-TRANSIT.**—Josiah H. Tre-rise, Butte, Mont. In a surveying instrument, the combination of a compass-casing, a pair of arms having their lower ends pivotally connected to the casing at diametrically opposite points and having their upper ends rigidly connected, and a sighting-arm hinged to one of said arms on a line at right angles to the diameter joining the points at which the arms are pivotally connected to the casing.

712,884. **BUSHING FOR ROCK-DRILLS.**—Warren Wood, Paterson, N. J. A tubular bushing having a connecting portion at each end weakened longitudinally to allow of its removal by cutting away the weakened portion.

712,885. **TRIPOD FOR ROCK-DRILLS.**—Warren Wood, Paterson, N. J. In a rock-drill tripod, a hollow T-shaped casting one branch of which is longitudinally slotted with a conical inner end portion terminating within the same, a lug upon each side of the slot at the free end thereof, a

leg received in said socket and having its inner end terminating within said socket and tapered to match said conical portion, and means passed through said lugs for draw-



ing together the adjacent edges of the slot and for clamping the said leg in the socket, the opposite ends of the longitudinal portion of said casting terminating in circular heads with tapered outer ends.

712,887. **CENTERING AND GUIDING DEVICE FOR DEEP-BORING APPARATUS WITH ECCENTRIC BORING-TOOL.**—Josef Wyczynski, Truskarwiec, near Drohobycz, Austria-Hungary. The combination with the bore tube or casing provided with an internal circumferential gripping-face and the tool-rod; of a guide and centering device comprising a guide-bearing for said rod having formed thereon a sectoral rigid gripping-jaw of the same radius as the internal radius of the gripping-face of the bore-tube, and carrying a sectoral radially-sliding gripping-jaw diametrically opposite said rigid jaw and means for moving the sliding jaw into and out of engagement with the internal gripping-face of the bore-tube.

712,925. **PROCESS OF MANUFACTURING FERROSILICON AND SILICOSPIEGEL.**—Gustave Gin, Paris, France. A process of manufacturing ferrosilicon and silicospiegel from silicon slags of bessemer or open-hearth furnaces with silicon coating, consisting in treating the slags which have been pulverized in an electric furnace after an addition of carbon to the slags in a quantity of one molecular proportion of carbon for each molecular proportion of oxygen for reducing silicate and metallic oxides and producing metallic silicides.

712,948. **DEVICE FOR LOADING VESSELS.**—Warren F. Mills, San Francisco, Cal., assignor to one-half to J. H. Bennett, San Francisco, Cal. A loading device for vessels and the like consisting of a frame, a chute and means for locking it upon the vessel's rail and hatch-way an endless traveling belt and means for moving it, a turn-table or swiveled connection between the upper end of the carrier and the chute, and means by which the lower end may be moved about said swiveled center.

712,959. **HOISTING-HOOK FOR MINERS.**—Charles F. Pohlman, Spokane, Wash. A device comprising a pair of jaws pivotally connected at their upper terminals and having lower inturned overlapped hooked terminals freely movable in relation to each other, and shoulders on the outer edges above the said hooked terminals, the shoulders having a combined transverse extent greater than the combined overlapped extent of the jaws at a distance below said shoulders, and a link embracing the jaws and freely slidable over latter, the said link being normally loosely located below the shoulder, but having a greater length than the distance between the outer terminals of the shoulders when the jaws are closed.

713,012. **COMBINATION BLAST-FURNACE.**—Gibb B. Mitchell, Forsyth, Ga., assignor to one-fourth to Reuben R. O'Neal, Forsyth, Ga. A device comprising a base having a fire-pot mounted thereon and provided with a draft-opening, a blower slidably mounted upon the base and removably engaged with the draft-opening and means mounted upon the base for engagement with the blower to slide it from engagement with the draft-opening.

713,043. **PROCESS OF SMELTING AND REFINING VOLATILE METALS.**—John Armstrong, London, England. A process, which consists in smelting ores containing zinc and like volatile metal and other less volatile metals with fluxes so as to slag the more volatile metals, condensing any fumes in the form of poussiere, returning the same to the furnace, drawing off the slag and distilling it with fuel to obtain the zinc and other very volatile metals and tapping out the mixture of lead, silver and other like metals.

GREAT BRITAIN.

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

- Week Ending October 16, 1902.
- 12,950 of 1901. **REFINING FURNACE.**—G. J. Snelus, Frizington. A rotary cylindrical refining furnace, with basic lining, heated with gases from blast furnace, the charge being pig, oxide of iron and lime.
 - 19,527 of 1901. **BORAX EXTRACTION.**—J. Hargreaves, Widnes. Improved plant for obtaining a larger extraction of borax from borate of lime.
 - 20,792 of 1901. **ROCK DRILL.**—W. W. Waite, Colfax, Wash., U. S. N. A rock drill consisting of a series of hammers striking the drill tool.
 - 16,834 of 1902. **ROLLS.**—A. G. Gates, Chicago, U. S. A. Improved method of adjusting Cornish rolls.
 - 17,213 of 1902. **PURIFYING BLAST FURNACE.**—Deutsch Luxemburgische Bergwerks, Differdingen, Luxemburg. Improved apparatus for purifying blast furnace gases.

PERSONAL.

Mr. V. M. Clement is at Zacatecas, Mex.

Mr. George Earnshaw, of Salt Lake, Utah, has been in Denver, Colo.

Mr. Robert Bell, of Custer, has been elected State Mining Inspector of Idaho.

Mr. E. J. Schmitz, of New York City, left for Cuba November 15 on a professional trip of several weeks.

Mr. J. J. Brown, a prominent mining man of Leadville, Colo., has returned to that camp from a business trip East.

Mr. J. LeNoir, of Parral, is to be manager of the Santa Maria Mine, at Gavilana, near San Jose del Sitio, Mex.

Mr. John A. Church, of New York City, has been retained as consulting engineer by the Shannon Copper Company.

Mr. H. Colbath, manager of the Mercur Mine, Utah, is in Denver, Colo., investigating a process for treating Mercur ores.

Mr. E. R. Woakes, of Nelson, B. C., has been in San Francisco to attend the meeting of the California Mines Association.

Mr. Judd Stewart, treasurer of the American Smelting and Refining Company, was in Leadville, Colo., on a business trip last week.

Mr. Philip Argall, of Denver, Colo., last week visited the Carr property at Central City and made a report thereon for his English clients.

Mr. C. A. Montross, Jr., of Denver, who is connected with the Argo Smelter, has been examining mining property in Gilpin County, Colo.

Mr. J. F. Sullivan, manager of the Golden Valley Mining Company, has returned from Denver to the mines at La Dura, Sonora, Mex.

Mr. M. H. Joseph, an old and valued contributor to the ENGINEERING AND MINING JOURNAL, has been elected assessor of Ferry County, Wash.

Mr. George R. Hancock has resigned as manager for the White Knob Copper Company, of Mackay, Idaho, and is succeeded by Mr. William H. Cox, of Boise.

Mr. R. G. Hall, formerly superintendent of the American Nettie Mine at Ouray, Colo., is now manager of the Paradox copper mine and smelter at Paradox, Colo.

Mr. S. W. Mudd, manager of the Small Hopes and other big combinations at Leadville, Colo., has returned to that camp after a business trip to St. Louis and Boston.

Mr. Aug. R. Meyer, president of the Yak Mining and Terminal Company, of Leadville, Colo., was in Leadville last week from Kansas City, Mo., inspecting the big enterprise.

Mr. J. H. Strite, who for the past 8 months has been building a 60-stamp mill at Smuggler, Colo., for the Tomboy Mining Company, has returned to his home at Redding, Cal.

Mr. H. R. Reed, former consulting engineer of the Camp Bird, and Mr. W. B. Alexander, late auditor of the same mine at Ouray, Colo., were in Denver last week on private business.

Messrs. J. W. Boyd and J. W. Bell, of Idaho Springs, Colo., are examining the Santa Gertrudis and Guadalupe mines in the southwestern part of Chihuahua, Mex., for a syndicate.

Mr. Andrew Dyatt, of the Bassick property, at Silver Cliff, Colo., has been visiting in Gilpin County, Colo., looking at mining property, in which Bridgeport, Conn., parties are interested.

Mr. T. C. E. Hunter, of the Compressed Air Machinery Company, of San Francisco, recently secured a contract for a 120-h.p. compressor plant for A. C. Brokaw, of Quartz Valley, Cal.

Capt. B. H. Breitung, of Rat Portage, Ont., who recently severed his connection with the Black Eagle Gold Mining Company, of London, is about to take charge of a group of mines in British Columbia.

Mr. J. P. Evans, one of the mechanical engineers on the staff of the Colorado Iron Works Company, of Denver, is assisting in the installation of the Majestic Smelter, near Milford, Beaver County, Utah.

Mr. L. Walker has resigned as superintendent of the California Mine at Sumpter, Ore., and taken a similar position with the Cracker-Oregon Company. Mr. A. L. McEwen succeeds him at the California.

Dr. John H. Gower, of Denver, who has returned from a visit to England on mining business, has been up to Black Hawk, Colo., where he is looking after the interests of Englishmen in the Running Lode property.

Mr. J. Cuthbert Welch, formerly chief chemist and assayer at the Canadian Smelting Works, Trail, B. C., lately entered the employ of the Montreal & Boston Copper Company, at its smelting works at Boundary Falls, B. C.

Mr. B. Blake has resigned as superintendent of the Pacific Refinery at Bakersfield, Cal., and will take

charge of the erection and operation of a refinery at Tampico, Mex., Mr. R. S. Knight succeeds him in charge of the Pacific Refinery.

Mr. Henry Bratnaber, of San Francisco, Cal., is reported to have purchased the Cracker Jack Mine, on Prince of Wales Island, Alaska. The claim is stated to have been located about 4 years ago by Mr. A. Hollis White, of Boston.

Mr. J. W. Benson, late manager of the Camp Bird Mine, intends to make Denver his home. It is asserted that one of the reasons why Mr. Thos. F. Walsh was willing to sell the Camp Bird was because of the failure of Mr. Benson's health.

Mr. H. A. Titcomb has been appointed local manager of the exploration department of the Stratton's Independence Company, to whom all offers of properties are submitted and upon whose preliminary examination they will be considered.

Mr. W. W. Charles, who was connected with the auditing department of the American Smelting and Refining Company, at New York City, has severed his connections with the company and embarked in business in Leadville, Colo.

Mr. A. Chester Beatty, the Colorado agent and assistant consulting engineer to Mr. John Hays Hammond, of the Stratton's Independence and Camp Bird mines, says that the former company has no idea of purchasing the Victor Mine at Cripple Creek.

Mr. J. Allison Holmes, formerly connected with the metallurgical departments of the Montana Ore Purchasing Company, of Butte, Mont., has accepted a similar position with the United States Mining Company's smelter department, and will reside in Salt Lake, Utah.

Mr. R. Bracco, late master mechanic to the Northwest Smelting and Refining Company, who completed the installation of the large machinery plant at Crofton, B. C., is in the Boundary country, where he will superintend the installation of new machinery at the Montreal & Boston Copper Company's smelter at Greenwood.

Messrs. J. K. Sefrit, of Chicago, Ill.; A. M. Ogle, of Indianapolis; J. H. McClellan, of Brazil, Ind., and J. Smith Talley and Jacob Kolsom, of Terre Haute, Ind., leading Indiana coal operators, have been in New York City. It is said they were making final arrangements for financing the \$25,000,000 company, which is to take over most of the bituminous mines in Indiana.

Mr. George J. Bancroft, of Denver, Colo., who has been appointed consulting engineer of the mining properties of the late W. S. Stratton in the Cripple Creek District, is a graduate of the Leland Stanford University, and also attended the Colorado State School of Mines. He has recently been in the employ of the Phelps-Dodge Company, looking after properties in Mexico.

Mr. Wilbur G. Laird, formerly with the Denver Engineering Works, Denver, Colo., who has been visiting his brother, Mr. Geo. A. Laird, superintendent of La Victoria y Anexas, San Pedro, San Luis Potosi, Mex., has accepted a position with the Anaconda Copper Mining Company, in its mechanical department at Butte, Mont., and will be located at Butte after December 1.

Messrs. W. H. Goadby, H. O. Seixas, William E. Strong, Jr., J. J. Nestell and Richard Mortimer, of New York City, directors of the Sloss-Sheffield Steel and Iron Company; R. C. Matthews, of Toronto, and Warren Soper, of Ottawa, representing Canadians that have holdings in the Sloss-Sheffield Company, have been in the Birmingham, Ala., district looking at the properties of the company.

Mr. J. H. Sanborn, Pacific Coast agent for the Leyner drill, reports that at Nevada City, Cal., the Posey Mining Company has bought a Leyner air compressor and water Leyner rock drills. The Oregon-Cracker Mining Company has bought a Leyner duplex air compressor, and at Salt Lake J. J. Trenam, manager Stockton Gold Mining Company, and F. M. Benedict have bought a Leyner compressor.

Mr. Charles Colcock Jones has resigned as consulting engineer to E. N. Breitung, and manager of the Breitung estate on the Michigan iron ranges and in Canada, his resignation to take place November 15. Mr. Jones leaves Marquette, where he has made headquarters for past 3 years, to take a position on the staff of Mr. Lewis T. Wright, general manager of the Mountain Copper Company, Keswick, Shasta County, Cal.

OBITUARY.

Thomas Henry Mason, who died at his home in New York City on November 15, was one of the oldest members of the New York Stock Exchange, he having taken his seat on October 15, 1875. Mr. Mason was born in Bristol, R. I., in 1845, but had resided in this city most of his life. He was largely interested in copper companies, and besides being president of the Quincy Mining Company, was connected with the Rhode Island Copper Company, and the Adventure Consolidated Mining Company.

SOCIETIES AND TECHNICAL SCHOOLS.

ENGINEERS' CLUB OF ST. LOUIS.—At the meeting on November 5, 42 members and 9 visitors were present.

Messrs. L. C. F. Metzger and W. O. Renken were elected to membership.

The paper of the evening, "The St. Louis Water Problem," was presented by Mr. R. E. McMath. It was stated that St. Louis must improve its water supply with reference to appearance and purity, and it was desirable that the improvement be secured at as early a date as may be practicable, and that the existing water works be retained as a part of the future supply system. The available sources of supply are the Mississippi River at the Chain of Rocks, the Missouri River and the headwaters of the Meramec River. If taken from the Mississippi River the water could be treated by mechanical filtration or by the modified slow sand filter, or by the slow sand filter and plain subsidence. The principal claims of the Meramec are that water would be delivered without pumping, and is so pure as to require no treatment to fit it for use. The advantages of the several sources of supply were considered in detail, and the systems of clarifying and filtering were discussed. Attention was called to the meagerness of the information concerning portions of the Meramec watershed. The belief was expressed that if the Meramec scheme should be found impracticable the Missouri River would be eventually adopted as a source of supply.

Mr. Robert Moore considered that the objections to the use of alum were not well founded. He called attention to the difficulty of maintaining the purity of a impounded water supply, and of the expense involved in abolishing dairies, slaughter houses, hotels and even villages. As an instance of the influence of the development of a district upon the purity of the water supply, the Big River District in Missouri was cited; this water, once of exceptional purity, has been utterly poisoned by lead industries.

Mr. Colby opposed the use of alum and stated that the experience of Eastern cities with the waters of the Potomac and other rivers was of no value to St. Louis, as the suspended matter in the two rivers was in the ratio of one to one hundred. He named several cities which were going to considerable distance to secure an unpolluted supply in preference to filtering impure water near at hand.

Mr. Wheeler called attention to the remarks of Mr. Moore regarding future pollution, and stated that the indications for future pollution of the Meramec watershed to-day are far stronger than were those of the Big River District 20 years ago. He stated that much of the land had mineral indications, and disagreed with the former speaker as to the price at which the land could be obtained.

INDUSTRIAL NOTES.

The American Engineering Works, of Chicago, Ill., reports that it is making special riffle screens suitable for placer mining work.

The Harrisburg Manufacturing and Boiler Works, of Harrisburg, Pa., is reported to have secured a contract for pipe to be shipped to Barcelona, Spain.

The Bucyrus Company, of South Milwaukee, Wis., is preparing to increase its foundry output, and has let the contract for a steel and brick addition of 30 by 80 ft. to its foundry space.

The George V. Cresson Company, at its works in Philadelphia, Pa., is now building a large amount of crushing machinery for mining purposes, to be installed in Western mining localities.

The Kneeland & Bigelow Company, of Bay City, Mich., is installing one of Garland's patent chain conveyors in its plant near Lewiston, Mich. The Garland conveyor is manufactured by the M. Garland Company, of Bay City.

A quantity of mining machinery, made by the Allis-Chalmers Company, of Chicago, and consigned to a mining company operating in Korea, recently reached Vancouver, B. C. It will be taken by the steamer *Athenian* to Kobe, Japan, where it will be transhipped to a local steamer for Korea.

The Robinson Machine Company, which had its machine shop and foundry entirely destroyed by fire on May 29, has shipped the last of the machines under contract at the time of the fire. The company fortunately saved all its records, drawings and patterns, and was thus able to begin shipments before August 1.

The Burt Manufacturing Company, of Akron, O., has closed a contract for 4 large special style Cross oil filters to be used on 4 new battleships now being built for the Government. The firm calls attention to the fact that the Cross oil filters have now been adopted by 10 different governments.

The Westinghouse interests recently secured two important contracts for the electrical equipment of British coal mines. The larger contract calls for a 4,000-h.p. plant for installation in the collieries of the Staveley Coal and Iron Company, of Chesterfield. A contract for a 1,500-h.p. plant has also been received from the Snéyd Colliery at Burslem.

The S. H. Supply Company, of Denver, Colo., sends out a little pamphlet calling attention to the growth of its business, and its great success in handling second-hand machinery. The company states that its business, while but 4 years old, to-day requires 65,000 sq. ft. of floor space for salesrooms, 4 acres of yard room and 2 warehouses.

Charles C. Moore & Co., the well-known engineers of San Francisco, Cal., have accepted the agency of the Holthoff Manufacturing Company on the Pacific Coast. This company's machinery is now being installed in a great many of the mines on the Coast, and in Arizona and Mexico. Charles C. Moore & Co. are ready to accept any proposition to install complete mining and smelting plants of any size.

The engineering department of the Pittsburg Gage and Supply Company, Pittsburg, Pa., has been unusually rushed with work recently. Recent orders are for one 150-h.p. boiler for the Lincoln Fire Brick Company, plant at Bolivar, Pa.; one 150-h.p. boiler for the American Porcelain Company, New Brighton, Pa.; plant; and one 150-h.p. boiler for the Keystone Mining Company, at Leadville, Colo.

The Oil Well Supply Company, of Pittsburg, Pa., has lately taken some large orders from foreign countries. The company will ship to the Dutch East Indies a general equipment for pipe lines and refineries, the machinery including boilers, storage tanks, bleaching tanks, etc. A big order will be filled for water well supplies in Cape Town, South Africa, and equipments for drilling water wells have been contracted for points in Cuba.

The M. Garland Company, of Bay City, Mich., reports that it has shipped one of its patented cable conveyors to the Palmetto Lumber Company, Oakhurst, Texas, which required 255 ft. of sprocket chain. A similar outfit has just been shipped to the Dow Chemical Company, of Midland, Mich. The M. Garland Company reports a brisk trade, many orders being received by telegraph calling for prompt delivery, in some cases necessitating running the plant over time.

President J. W. Duntley, of the Chicago Pneumatic Tool Company, is still in Europe, and his return is not definitely announced, though it is known that he will be home before long. The company reports a large increase in sales during the past few weeks, and all its factories are working night and day. The full capacities of the air compressor department and the factory at Franklin, Pa., are taxed to keep up with the flood of orders.

At the recent Dusseldorf exhibition, Arthur Koppel has received highest award, the silver medal, for his exhibit of industrial railway equipment, including dump cars, inclined planes, self-discharging ore cars, electric railroads, etc. The firm of Arthur Koppel also received the gold and silver medal at the Paris exhibition, the highest award given there for similar material. Arthur Koppel has offices at 66-68 Broad Street, New York City, and will send catalogues to all interested parties.

The new shops are far better equipped than were the old with tools, cranes, etc. The company makes a specialty of haulage, hoisting and ventilating machinery for coal and metal mines. There is now in course of construction and under contract at the plant 10-mine ventilating fans of various diameters, from 5 ft. up to 16 ft., and also 4-wire rope haulage engines for coal mine use. The plant is located at Monongahela, Pa., and the Sales Department is at 304 Frick Building, Pittsburg.

The J. H. Montgomery Machinery Company, of Denver, Colo., is working day and night shifts at present in order to complete several large rush orders, including a copper smelting plant for Monterey, Mex.; one of the patent 5-stamp mills for northern Idaho, and a supplementary order for 20 coal cars, to be added to the 50 recently ordered by the Black Warrior Mining and Milling Company, of British Columbia. The J. H. Montgomery Company also reports several orders for ore cars and buckets from Chihuahua and other parts of Mexico.

The Sullivan Machinery Company, of Chicago, Ill., has recently sold to G. H. Cole & Co., contractors of Cleveland, O., 2 air compressors and a number of rock drills. The compressors are of the straight line, single steam, 2 stage air type, and will operate 10 and 12 drills, respectively. The above plant will be used in driving the Black Oak Ridge Tunnel for the Knoxville, La Follette & Jellico Railroad at Dossett Station, 25 miles from Knoxville, Tenn. The tunnel will be 3,600 ft. long, and the rock formation is limestone. G. H. Cole & Co. are also using a Sullivan compressor and drills on the Philadelphia water supply tunnel at Tacony, Pa.

The Quaker Portland Cement Company, with headquarters at 26 Broadway, New York City, says that it is about to begin the erection of a new cement plant on its property in the Lehigh Valley cement belt. The company intends to have a plant, when completed, which will be one of the largest, if not the largest, in this country, and also intends to have it up-to-date in every particular. To this end the company desires communications from engineers and others familiar

with such requirements, who may suggest anything in the line of economical construction or labor and time-saving devices, any of which, if accepted, the company will gladly pay for.

Owing to the death of Mr. Otto Heckelman, the firm of Heckelman, McCann & Co., owning a large ore testing and sampling works in the City of Mexico, has been dissolved, and is succeeded by a new firm, McCann Brothers & Jeffcock, which assumes all the liabilities and takes over the assets of the old. Two of the new firm, Mr. Ferdinand McCann and Mr. Francis J. C. Jeffcock, were interested with Heckelman, McCann & Co. The new member, Mr. Warner McCann, was employed for 3 years by that concern as an assayer and chemist, and for the last 2 years by the Esperanza y Anexas Mining Company, of El Oro, Mex., as assayer and mill foreman.

Messrs. Charles H. Besly & Co., of Chicago, Ill., report general business very good. They call particular attention to their large and varied assortment of seamless brass and copper tubing carried in stock. Three hundred sizes of tubing are carried varying from 1-64 in. outside diameter to 8½ in. The firm also carries in stock brass rods, sheets, wires and brazed tubing, braziers sheet copper, soft and cold rolled copper anodes, brush copper for electrical purposes, German silver sheet, rod and wire also carried in stock. Their new store building on Clinton Street is progressing rapidly, and will give them over double the space of their present 5-story building, 10-12 North Canal Street.

A complete equipment of gas generators, gas engines and direct connected generators is in process of installation at the Winchester Repeating Arms Company, New Haven, Conn.; the Atlantic Refining Company, Philadelphia, Pa.; Industries Company, Batavia, N. Y., and the Rockland Electric Company, Hillburn, N. Y. The first of these equipments to be put in service will be that of the Winchester Repeating Arms Company, at New Haven. The power house has been specially designed for the new gas apparatus, and the entire power for manufacturing and lighting purposes will be furnished from this point. The engines are of Westinghouse make of the standard vertical 3-cylinder single-acting type, aggregating 500 h.p. They are each direct connected to 250-volt Westinghouse direct-current generators, and are furnished with gas fuel from Loomis-Pettibone gas generators located in the adjoining producer room. Two additional engines of the vertical type are employed as auxiliaries. Suitable gas holders are provided for insurance of continuity and uniformity of fuel supply. The power station of the Atlantic Refining Company will be equipped with a type of Westinghouse gas engine, new to American practice, the horizontal, double crank, double acting engine. There will be 2 engines, each of 500 h.p., and each engine will be direct connected to a 350-k.w., 25-cycle, 3-phase generator, arranged for parallel operation. The engines will operate upon a rich oil gas of approximately 1,200 British thermal units per cu. ft.

TRADE CATALOGUES.

The Hoffman standard ball-thrust bearings for light, medium and heavy work are described in folders issued by the Hoffman Manufacturing Company, Limited, of Chelmsford, Essex, Eng.

A folder issued by R. D. Wood & Co., of Philadelphia, Pa., briefly describes the production of Mond producer gas for power and heating. It shows the results obtained at the works of Brunner, Mond & Co., at Norwich, Eng., in producing ammonium sulphate and using Mond gas, under a gas engine directly coupled to a dynamo.

The White briquetting press is described in circulars and pamphlets issued by the Henry S. Mould Company, of Pittsburg, Pa. The press is made in 3 sizes, turning out 150, 75 or 50 briquettes per minute, each briquette being 3½ in. in diameter by 2¼ or 2½ in. thick, and weighing, in fine dust or concentrates, from 2½ to 3 lbs. each. The construction and operation of the press is described in detail and its merits are pointed out.

"Jessop Steel, and How They Make It," is the title of an artistic and finely illustrated pamphlet of 74 pages, issued by William Jessop & Sons, Limited, of Sheffield, Eng. The firm states that in spite of all the talk of an American invasion of Great Britain it is now sending, so far as concerns the best quality of steel, larger consignments to the United States than ever before, in spite of the hostile tariff. The firm is completing works at Washington, Pa., which will be conducted on much the same lines as those at Sheffield. Swedish iron will be used, and the process of manufacture will in general be the same. The pamphlet describes in detail the equipment of the company's Sheffield works, established over a hundred years ago, the processes of manufacture used, and the products of the works, including material for all purposes from a ram for a battleship to that for a watch-spring, a needle or a steel pen.

Chain belting and steel cable elevating and conveying machinery are described in catalogue No. 72, a

pamphlet of 376 pages, published by the Jeffrey Manufacturing Company, of Columbus, O. The illustrations in the catalogue are reproduced from the company's machinery in actual use, and give a general idea of Jeffrey elevating and conveying machinery adaptable to almost every known industry. Some of the important devices shown in use in the catalogue are coal-handling machinery for power house equipment, open conveyors for handling ore in large quantities, the Century belt conveyor, and a retarding conveyor for lowering coal down inclines. The company also manufactures reciprocating conveyors for handling gritty material, such as sand, ores, gravel, etc., and the Jeffrey-Robinson coal washers. Other devices shown in the catalogue are adjustable elevators and conveyors for handling boxes, barrels, or packages of any sort about industrial plants, portable excavators and loaders, and dredging ladders, and dredge boats for placer work. The company also makes screens for all purpose, including the Columbian vibrating screen, and coal tippie machinery, including the Ray automatic cage and dump. The catalogue contains a complete list of the various attachments, and types of links used with Jeffrey conveyors, and gives price list of wire rope, sprocket wheels, elevator buckets, shafting, pulleys, etc.

Belt conveyors are now used in various industries for handling nearly all kinds of raw and finished products. The Stephens-Adamson Company, of Aurora, Ill., which designs and furnishes complete equipments for handling any kind of material, issues a 16-page pamphlet calling attention to its belt conveyors. These conveyors are especially adapted for carrying heavy and dusty material, such as cement, ores, crushed stones, coal, sand, etc., being dust-proof and self-lubricating throughout. The troughing rollers are of patented design, having a pocketed bracket with babitted sleeve, on which the spindle of the roller revolves, submerged in oil. The oil-pot bracket spindle, sleeve and rollers are also self-contained, and the oil-pots once filled will run for several months without attention. The supporting rollers are carried on oscillating ring oiling, dust-proof bearings, which adjust to any setting of the framework. The company's standard carriers are of similar design, except that the oscillating bearings carrying the supporting rollers are fitted with grease cups. In the company's plain carriers, the troughing rollers run loose on centrally drilled shafts fitted with compression grease cups. The company uses either S. A. conveyor belting having an extra thickness of rubber on the carrying surface or the S. A. oiled and stitched cotton belting made of 4, 6 or 8 ply heavy duck, soaked in preserving compounds. This latter belt is well suited for various kinds of work.

GENERAL MINING NEWS.

Mineral Oil Exports.—In October the United States exported 13,309,498 gals. crude oil; 1,720,923 gals. naphthas; 73,476,314 gals. illuminating; 6,993,737 gals. lubricating and paraffin, and 3,444,168 gals. residuum; total, 98,944,640 gals., against 89,476,865 gals. in the same month last year. In the 10 months ending October 31 the exports amounted to 873,146,086 gals., against 874,741,229 gals. in the corresponding period last year, showing a decrease of 1,594,143 gals., principally in illuminating oil.

Pipe Line Returns.—While the daily average runs for October fell short of those for September by less than 900 bbls. a day the increased demand for Pennsylvania oil brought about a heavy increase in the shipments and the net reduction in the pipe line stocks amounted to over 12,800 bbls. a day. At the same time the demand for Lima oil exceeded the supply by over 8,500 bbls., and the net reduction in the stocks for the month was over 192,000 bbls. The reduction in the stocks of both Pennsylvania and Lima oil was at the rate of over 19,000 bbls. a day, says the *Oil City Derrick*. The October runs of Pennsylvania oil were 90,050 bbls. daily. The total runs of Pennsylvania oil for the 10 months to November 1 were 26,159,156 bbls., a daily average of 86,050 bbls. The shipments in October were 103,829 bbls. The net stocks of Pennsylvania oil on October 31 were 6,416,555 bbls., the lowest point touched since April, 1896, adding the net stocks of the Buckeye and other lines handling Lima oil, 17,833,537 bbls., makes a total of 24,250,093 bbls. in iron tanks on October 31. During October the average daily runs of Lima oil were 57,914 bbls. The shipments were 66,130 bbls. daily. For October the total runs of the Lima and Pennsylvania oil were 147,964 bbls., and the shipments 169,959 bbls. a day.

ARIZONA.

COCHISE COUNTY.

(From Our Special Correspondent.)

Tombstone Consolidated.—The new pumps have been given a trial. The large triple expansion Prescott pump has been lowered to the 600-ft. level, and has started work at that depth. It has a capacity of 1,700 gal. per minute, and lifts a 15-in. col. from the station to the surface. The 2 6-in. Prescott duplex sinking pumps have also been lowered, and the necessary connections made. These pumps have a capacity of about 600 gal. per minute, and are expected to furnish water for the main pump for about 30 days.

when two more of the same capacity are to be installed. The hoisting engine and boiler used in sinking the new shaft has been taken down and will be installed at the Silver Thread Mine, where the company will sink several hundred feet deeper. The work of digging the ditches and laying pipe lines to various hoists is progressing rapidly.

Last Chance.—Final payment has been made on this mine, near Bisbee, by the Canon Copper Company, J. H. Page, manager.

Wilcox Smelting and Refining Company.—This company, at Wilcox, is to build a custom smelter. The incorporators are W. W. Robinson, Tucson; A. Meyer, J. Risner, H. Brower, E. W. Armstrong, San Francisco.

COCONINO COUNTY.

(From Our Special Correspondent.)

Anita Copper Company.—This company, at Williams, owns 300 acres of land. A roasting furnace is being put in.

GRAHAM COUNTY.

Arizona Copper Company.—The production of copper for October was 1,299 tons of 2,000 lbs. each.

MOHAVE COUNTY.

(From Our Special Correspondent.)

Gold Roads.—A cyanide plant is being installed under the directions of O. P. Posey.

Nighthawk.—The Ellspass mill for this mine at Layne Springs will soon be on the ground. New Standard concentrators will be used.

Oro Plata.—A company has been organized to work the gold ores of this mine in Todd Basin. A 50-ton plant will be installed, a calcining furnace put in, and the product of the concentrating tables reduced on the ground.

Queen Bee.—James Untapher has sold this mine at Mineral Park to the Val Vencle Smelting Company, of Jerome.

San Francisco.—C. D. Dickering has 12 men at work on this mine, near Stockton Hill. A cross-cut is being run from the bottom of the shaft to cut the vein. The shaft will be sunk to the 400-ft. level.

YUMA COUNTY.

Black Warrior Company Amalgamated.—Work at the mines and leaching works near Globe has resumed with a small force of men. It is said that a smelting furnace and 4 leaching vats will be added to the present plant.

CALIFORNIA.

ALAMEDA COUNTY.

(From Our Special Correspondent.)

Federal Salt Company.—Judge W. W. Morrow, of the United States Circuit Court, San Francisco, has declared the "salt trust" to be an illegal combination in restraint of trade under the Sherman anti-trust law. A temporary injunction was issued October 15 against the company, 7 other companies and 44 firms or individuals, and the order was made permanent on November 10. Many affidavits were filed, showing there was a combination to regulate prices. Men who had been formerly able to buy salt at \$4 per ton in San Francisco proved that they were now unable to buy it for less than \$18 per ton. In rendering his decision Judge Morrow said (in part): "The case comes before the court on an original bill filed by the United States Attorney and a number of affidavits, showing that the parties defendant were engaged in business in violation of the anti-trust act of 1890, and also the provisions of Section 73 of the act of Congress of August 27, 1894. It has been admitted by counsel for defendants that the Getz contract is void. But the other contracts still belong to the same general scheme of the Federal Salt Company to strangle all competition, and it is very evident that all form part of one general combination or conspiracy. Their only possible effect is to restrain commerce here and in other parts of the Union.

"I think that the contracts can be properly construed as a class of contracts which has already been declared illegal by the Supreme Court, and more recently in the Court of Appeals."

Most of the salt manufactured in California is from Alameda County, though some comes from Riverside and San Diego counties. Nearly all the salt makers in Alameda County went into the combination and leased to the Federal Salt Company, which controlled the trade. D. E. Skinner, formerly of Michigan, and V. White, of the National Salt Company, secured the leases. Salt jumped from \$3 per ton in 1900 to \$25 per ton a few months since. It is thought that the Federal Salt Company will not attempt to carry out the provisions of its contracts with other companies and persons in view of this decision. It is also understood that criminal indictments will be brought against certain persons by the Federal grand jury, which meets November 22.

CALAVERAS COUNTY.

(From Our Special Correspondent.)

Utica Mining Company.—In this mine at Angels, underground operations have been suspended for a few weeks for repairs.

What Cheer.—This mine, near Mokelumne Hill, has resumed work. New buildings have been erected.

EL DORADO COUNTY.

(From Our Special Correspondent.)

Vandalia.—In this mine at Shingle Springs, owned by John Rosenfeld's Sons, of San Francisco, an 80-h.p. gas engine is used. By the use of Coalinga oil, distilling it, and using the gas in the engine, the cost for 5 months has been from 16 to 20c. an hour for 80 h.p., or \$1.80 a month per h.p. At this same mine some very close and cheap work in cyaniding is done.

INYO COUNTY.

(From Our Special Correspondent.)

Borax Deposits.—Several parties of prospectors are at work in the Death Valley region in search of borax deposits. It is reported that F. M. Smith, the "borax king," is searching a route for a railroad into the valley.

Dean & Jones.—At this mine at Arondo, between Ballarat and Johannesburg, a large deposit of low-grade ore is worked. The ore is passed through Cornish rolls and treated by cyanide. Twelve tanks are in use, and the number is to be increased. A tramway is projected. A gasoline engine furnishes power.

Inyo Development Company.—This company, which is manufacturing soda, has bored an artesian well near Keeler, from which a very fine flow of water has been obtained. The water rises 35 ft. above the top of the well. Noah Wrinkle is superintendent.

KERN COUNTY.

(From Our Special Correspondent.)

Associated Oil Companies.—The Union Trust Company, of San Francisco, has been made trustee for a bond issue of \$5,000,000 of the Associated Oil Companies. There are 5,000 bonds which run for 20 years, with interest at 5 per cent. The object is to pay for oil properties in Kern and other districts, and for working capital. Half the bonds will be issued at once.

Butte.—From this mine at Randsburg, P. H. McMahon superintendent, the last clean-up of 80 tons of ore showed a yield of \$72 gold per ton. Another shaft is being sunk.

Mammoth Coal Company.—This company, opening the mines near Garlock, has machinery, dynamos and poles on the ground, and intends furnishing electric power to the mines in that region.

McKittrick Oil Wells.—Many wells in the McKittrick District have had recently much water coming in. The McKittrick Oil Company has, it is reported, succeeded in casing off the water.

Mesquite Springs Gold Company.—This company is to open 3 claims at Mesquite Springs, about 9 miles from Randsburg, owned by A. P. Bland, of Los Angeles. A tunnel is being driven to tap the ledge on the 200 level.

Winnie.—At this mine, in the Stringer District, near Randsburg, recently purchased by Mr. Fudiker, of Los Angeles, men are doing development.

LOS ANGELES COUNTY.

(From Our Special Correspondent.)

American Iron Company.—This company is operating an experimental plant at Russ Station near Surrey. Both oil and charcoal are used for fuel. The limestone comes from Tehachapi. Some pig iron is produced.

Natural Gas.—The Myers ranch, at Whittier, has been leased by Henry Hartman and others, of San Bernardino, for the purpose of developing natural gas. The first derrick has been put up. Gas has been found in that vicinity before.

MADERA COUNTY.

(From Our Special Correspondent.)

Gambetta Mining Company.—This mine, at Grub Gulch, John E. Porter, superintendent, is yielding some very high-grade ore from the new vein found at about 800 ft. It employs 25 men, and there is a rumor that a new vertical shaft will be sunk to work the Gambetta and other claims.

Mount Raymond.—This mine, near Grub Gulch, is to be equipped with an electric light and power plant by P. Clark, of Spokane, Wash.

Rex.—This mine, at Grub Gulch, has been bonded by Ward & Day for \$75,000 to the owners of the Gambetta Mine. A contract has been let to run a tunnel.

MARIPOSA COUNTY.

(From Our Special Correspondent.)

Hayseed.—This is one of the Austin & Dolph mines, near Whittlock. D. A. Conoly is superintendent. A new steam hoist is to be put in and oil used as fuel.

McAlpin.—At this mine, Coulterville, S. E. Rigg superintendent, the shaft is now down 90 ft.

Monitor Group.—These claims, known as the Gilbert & Kennedy properties, are to be developed at once. C. H. Shorey, of Columbia, is to have charge.

NEVADA COUNTY.

(From Our Special Correspondent.)

Gray Eagle.—A 10-stamp mill has been shipped to this mine at Washington by Henry Keller.

Posey Mining Company.—Superintendent Bray has ordered a compressor and drills for this mine at Nevada City. Good ore is coming from the mine.

Shady Creek Mines.—Iron for 3,000 ft. of pipe for the gravel claims on Shady Creek has been purchased by Superintendent Clifford Graham. After the flumes and ditches are finished a hydraulic elevator will be used. Water will be brought from above a dam on Shady Creek.

Union Blue Gravel.—For this mine at North Bloomfield, A. D. Gassaway superintendent, 3 car-loads of iron pipe have been shipped.

SAN BERNARDINO COUNTY.

(From Our Special Correspondent.)

Greene-Campbell.—Capt. C. H. Thompson, who recently bought these claims near Manvel is to build a concentrating plant for the ores at Needles, on the Colorado River. The ores will be shipped over the California Eastern & Santa Fe road.

Mountain Jewel.—A 5-stamp mill for this mine has been shipped to Ibex, near Needles, by Mrs. Rose Howard and John Flynn. There is a 2-stamp mill at the mine.

SAN DIEGO COUNTY.

(From Our Special Correspondent.)

Noble.—At this mine, near Julian, the first week's run of the mill is reported to have returned \$3,100.

SHASTA COUNTY.

(From Our Special Correspondent.)

Redding Copper and Gold Mining Company.—This company has bonded the Reid Mine, near Keswick, and the La Plant group, near the same place. A hoisting plant has been ordered for the Reid Mine.

Trinity Copper Company.—In the Shasta King Mine, at Kennet, A. H. Brown superintendent, the air compressor and diamond drills and other machinery have been stopped, and about 20 men only are now employed.

SISKIYOU COUNTY.

(From Our Special Correspondent.)

Miller Brothers.—This hydraulic mine is about 2 miles from Weitchpec. Supplies are shipped from Eureka to Korbel, whence they are taken by pack animals over the trails to the camp. Lack of roads and transportation facilities are a great drawback to this section.

Siskiyou.—This mine, on Humbug, 16 miles from Montague, has been pumped out, and is being examined with a view to purchase. The mine is owned by Ridenhour & Thomas.

TUOLUMNE COUNTY.

(From Our Special Correspondent.)

Olio.—At this mine, Jacksonville, A. P. Chittenden superintendent, the mill has temporarily stopped and the shaft is being sunk deeper.

Cosmopolite.—At this mine, near Groveland, Harry Argall superintendent, operations have been suspended pending installation of a compressor.

Doyle.—A new pump is being put in this mine on Table Mountain, near Columbia. Buildings are being put up over the machinery.

Harvard Gold Mining Company.—At this mine at Jamestown, owned by a Boston company, the transformers have been moved to the old mill building nearer the center of the plant. No. 1 shaft is down about 700 ft. A new air compressor has been installed.

Mapes.—At this mine, near Columbia, a new 10-stamp mill has been installed.

Richards.—This gravel mine, near Sonora, Thomas R. Muir superintendent, is exploring under Table Mountain for the old channel.

Sierra Gold Mining Company.—A car-load of machinery has arrived at Chinese Camp for this mine. Work on the gallows frame continues, and a force of miners is sinking a double compartment shaft.

YUBA COUNTY.

(From Our Special Correspondent.)

Barton Hill.—John Craig, P. LeCompte, and Jos. Depot, owners of this mine, near Strawberry Valley, have applied to the California Debris Commission for permit to mine by hydraulic process and dump debris behind barriers in Lost Creek.

Honeycomb.—At this mine, near Camptonville, Griff Williams, general manager, considerable quartz has been taken out for the new mill ordered.

Yuba River Debris Dams.—The Government has let the contract for the first of the four debris barriers on the Yuba River, 10 miles above Marysville. About 150 men are to start work at once.

COLORADO.

(From Our Special Correspondent.)

Perhaps the most interesting single item of news for the week is the statement from D. H. Moffat that he

has placed the entire issue of bonds required to build the Denver & Northwestern Railway. The construction of this line means the opening of a section west of the Rockies larger than the State of Pennsylvania, within the limits of which the nearest parallel railway is approximately 200 miles longer than the new road. The opening of this section means much to Colorado.

The great consolidation, or merger, that has been under consideration for 6 months' past by Providence, New York and Boston capital, and is to include all the leading producers of Cripple Creek, may become a reality early in 1903. E. J. Knight, the leading spirit, who has been quietly but energetically working, feels quite confident of success.

CLEAR CREEK COUNTY.

(From Our Special Correspondent.)

Gem Consolidated Mines Company.—A deal is reported at Idaho Springs in the sale by option and lease for \$3,000,000 of the Gem, Gem Extension, Main Trunk, Freighters Friend, Silver Age and Franklin groups, comprising a group of about 100 claims, and covering over 2 miles of the big vein cut in the Newhouse Tunnel over 2 years ago, which has lain idle because of a conflict of interests. Two payments have been made by W. E. Renshaw. By the merger Pittsburgh men, who made money in Pennsylvania and Texas oil fields, acquire the holdings as an investment, and will work the property on a large scale. In the deal are the Newton, State Ore, Wilkie and Silver Age mills. These will be enlarged, and about 1,000 tons of mineral handled per day, it is claimed. About 30 ft. of milling ore is cut in the Newhouse Tunnel drift at a depth of 2,000 ft. W. E. Renshaw, who remains as manager, says that control of the Seaton Mountain Electric Light, Heat and Power Company was included in the transfer.

EL PASO COUNTY.

United States Reduction and Refining Company.—This company is to erect at Colorado City a \$100,000 electrolytic plant to manufacture chlorine gas by electricity, the Reduction Company some months ago having acquired patents covering the process. C. M. MacNeill, president of the company, states that the plans for the new buildings are ordered, and that work will begin within three months.

GILPIN COUNTY.

(From Our Special Correspondent.)

Mining Deeds and Transfers.—Martin Clennon to the Rainbow Mining and Milling Company, the Rainbow group of 11 claims, Pine District; H. A. Sherrill to M. Sherrill, the Missouri and Missouri Cross lodes, Nevada District; Virginia Raedel to H. Sturm, the Silver Joy and Gold Bug lodes, Vermilion District; E. C. Sherman to A. S. Adnutt et al, the New Century lode, Eureka District; V. Maren to J. W. Huffaker, 1/2 interest in Riverside lode, Russell District; A. Belfrage et al to E. J. Ingram, 1/4 interest in International tunnel, Trail and Black Diamond lodes, Wisconsin District; D. Munday et al to G. A. Kurtz et al, the Jno. Isabella lode, Eureka District. E. A. Chapman to Osceola Van Arsdale, the Pet lode, Silver Lake District; R. W. Ray to D. W. Croff, 1/2 interest in Ruby lode, Pine District; J. M. Taylor et al to T. J. Duncan et al, the Homestake, Homestake No. 1, Homestake No. 2 and K. D. lodes, Independence District.

Carcassonne Mining Company.—Illinois and Wyoming men are interested in a lease and bond on the Diedrick in Illinois-Central District, and have opened up some sulphuret and gray copper ore in the 60-ft. level, carrying values of from \$300 to \$400 per ton. H. E. Corn, Central City, is manager and secretary.

Clear Creek Mining and Reduction Company.—A very large strike is reported in the Saratoga workings in Russell District in a cross-cut that was started to the north, from the 1,000-ft. level of the cage shaft. The vein as measured by Manager Franklin R. Carpenter, of Denver, is 26 ft. 4 in. wide, with no signs of a well as yet. The values of the large ore body have not been given out, but it is believed that the ore may be continuous from that depth to the surface. Credit for the big strike is given to Superintendent E. R. Nelson, of Russell Gulch. The daily shipments from the property are now averaging from 50 to 75 tons, all of which goes to the Carpenter Smelter at Golden. With the new ore body the shipments will be largely increased, and also the force of 100 men.

Corydon and Adaline.—Edgar S. Moulton, of the Rocky Mountain Milling Company, of Central City, has taken a lease and option on this group, and will make a thorough examination. If results are satisfactory new machinery will be at once installed.

Druid Mining Company.—A new shaft building and machinery are to be installed on a new shaft of the Haseltine property which will be made the main working shaft of the large group including the Church placer of 60 acres in Russell District. Coates Brothers, of Paisley, Scotland, are the owners. The property is said to be showing up favorably. C. W. Anderson, Central City, is in charge.

Fairfield Mining Company.—Baltimore parties are

interested in a lease and bond on the Fairfield Mine in Russell District, and are sinking a 100-lift, which will make the shaft 420 ft. deep. There is a large crevice, with from 1 to 2 ft. of smelting ore, carrying better values than ever. Former sinking gave \$3 for every \$2 expended, and there seems to be no doubt but that the Fairfield Company will soon have a large mine. The smelting ores ran from \$129 to \$140 per ton net, while the milling ore ran from \$8 to \$10 per ton. Dr. Nickerson, Central City, is manager.

Kemp-Calhoun.—Manhire Brothers, Russell Gulch, are the lessees of this property, and have averaged \$5 per day to the man while sinking, the smelting ores going better than \$200 per ton. They have installed a small steam plant, and added to their top buildings. The property is owned by J. H. Kemp, of Boulder.

Notaway Mining Company.—Chicago parties are interested with J. F. Perkins, Central City, in charge. Work has been carried on through the West Notaway shaft for the past 4 years, but the company has acquired a lease and bond on the Alva Adams property of 9 claims and intends to open up the Consolidated group by a large shaft to the south of the property, where a number of claims come together. A large plant of machinery and new buildings will be put up inside of 60 days.

Pearce.—It is reported that Dr. John H. Gower, who recently returned from London, has secured capital for the resumption of this property in Central City District. The property is less than 300 ft. deep, but when formerly operated by local parties under a lease and bond they took out a heavy tonnage of milling ore of better than the average grade. Machinery will be installed and E. M. Messiter, Central City, is spoken of as manager.

LAKE COUNTY—LEADVILLE.

(From Our Special Correspondent.)

Leadville Output.—While the tonnage of all classes of ores has averaged 2,400 tons daily, the greatest interest has been manifested in the new strikes, the most important of which is on North Fryer Hill, where a fine lead carbonate shoot promises to be the extension of the celebrated Chrysolite.

Buckeye Combination.—The North Side and Buckeye claims have been leased to J. J. O'Neill, local manager of the Continental Oil Company, who has already broken ground for a new shaft, and will try to tap the shoot caught in the Progressive shaft. The property is adjoining territory, and is near the west line of the O. K. shaft.

Fryer Hill Mines Company.—This company has a good acreage to the east, and directly in line with the new strike of the Progressive Company, and has already begun a new shaft on its Pride of the West claim within 350 ft. of it, and will sink 400 ft. where it anticipates getting the same lead carbonate ore shoot. The Fryer Hill Company, with its El Paso pumping capacity, is easily caring for the water, and is gradually increasing shipments. In addition to the high grade siliceous ore shipped an iron production has just started, and the company will be shipping from 5 shafts by January 1. Machinery is being put on the new Harvard shaft, and if necessary this shaft will be sunk 1,000 ft. It has opened in the Tip Top claim a low grade and a high grade siliceous body, the former averaging 10 oz. and the latter 100 oz. silver to the ton.

New Leadville Home Mining Company.—At the special stockholders' meeting it was decided to make a loan on the machinery and other assets of the company to raise \$7,100 necessary to pay debts and an additional sum to carry on prospect work. Several propositions to lease the territory were submitted, and have been taken under consideration. The reports from March 1 to October 1 showed that 33,682 tons of ore had been shipped, which brought \$90,499, average price per ton being \$2.69, while cost of mining with all expenses was shown to be \$2.80 a ton. The company believes that development will open up richer ore bodies.

Ohio & Colorado Smelting Company.—This concern now has 3 furnaces going and has placed a buyer in the Leadville field for all classes of ores. It is handling 200 tons daily of siliceous and oxidized material from its New Monarch mines at Leadville.

Progressive Mining and Development Company.—The company is working the O. K. shaft of the Cady Mines group on North Fryer Hill, and is also sinking a new shaft on its Olathe Placer holdings further north. At 280 ft. in the O. K. shaft a station was cut and 2 drifts started. In one of these, at 26 ft. and directly underneath the flint, a remarkable lead carbonate body has been cut, which is now 10 ft. wide, and averages of 6 assays show \$46.50 to the ton, the ore running from 20 to 72 oz. silver, 24 to 65 per cent lead, and .04 to .24 oz. gold; the last value being the first time that a gold assay has been shown in Fryer Hill ores. The ore itself is a typical lead carbonate of the early days of that locality, and over \$2,000 worth of ore broken this past week indicates that the management has really the extension of an original, possibly the Chrysolite, ore shoot. The second drift of the company running in an opposite direction

also shows indications of the near approach to mineral. The Progressive Company strike would have been of great importance even if the ore had been low grade, as it would have established the presence of ore on the north side of Big Evans. W. L. Cooper, who directed the work of the H. A. W. Tabor properties in the same localities in the early days, is in charge, while F. E. Carringer and W. H. H. Miller, both of Denver, are respectively president and secretary-treasurer of the Progressive Company.

Valley Leasing and Mining Company.—This concern is backed by Springfield, Mass., men, and under the direction of J. W. Deane a new shaft is being sunk, besides work on the old shaft of the Valley. The property adjoins the Monarch group, and in the new shaft at 280 ft. near the Monarch end lines a new ore body has been cut, which assays .21 to 2 oz. gold, 27 to 40 oz. silver and 38 to 60 per cent lead.

TELLER COUNTY—CRIPPLE CREEK.

(From Our Special Correspondent.)

Central Consolidated Mining Company.—This company is said to have struck a good-sized ore shoot on Raven Hill, on which considerable work has been done, and if it proves to be as big as indicated, a complete steam plant will be installed.

C. O. D.—A new company, known as the C. O. D. Mining and Leasing Company, has been incorporated to develop this property. The old levels will be developed, and the old shaft sunk 200 ft. Part of the ground will be sub-leased.

Elkton.—Considerable development work is being done by the company in the hope of opening new ore bodies. A great deal of work is also being done by lessees.

El Paso.—It is reported that the El Paso Company will start a tunnel 4,000 ft. west of the present El Paso shaft in December to drain the property. It is also understood that the Mary McKinney and Elkton people will join in the construction of this tunnel. The new shaft of the El Paso is now in shape for hoisting.

Golden Cycle.—The new pump has arrived, but will not be installed until the shaft is sunk another 200 ft. Sinking will start shortly after January 1. The production for October is up to the standard maintained for some time. The company is developing the 8th level, expecting to cut the Harrison vein in a short time.

Moon Anchor.—This property is now worked under lease, and pay ore is reported opened in several parts of the mine. The mine was once one of the best in the district, but for some time not much work has been done on it. An English Company took an option on it some time ago, but after spending several thousand dollars decided to let it go back to the former owners. The property, like many others in the district, is both-ered with a large flow of water.

Morning Glory No. 2.—None of the ore bodies now worked are of great extent, but they are large enough to maintain for some time to come the present production, which is very fair.

Pharmacist.—Lessees have been shipping quite heavily of late, and this property attracts considerable attention. It is reported that the company is making preparations to operate extensively on its own account. A new cage will be installed soon.

Portland.—The new 100-drill compressor has arrived and will be put in as soon as possible.

Strattons Independence.—It is understood that a strike has been made on the 1,150-ft. level. Very conservative statements have been given out concerning it, but indications point to its improving with development.

IDAHO.

IDAHO COUNTY.

Thunder Mountain District.—The winter population of Thunder Mountain is about 250. Outside of the business at Roosevelt the residents are all engaged in development work.

The Dewey 10-stamp mill has been run on the ore taken from the drifts and shafts, and is said to have more than paid all the expenses of operation, new machinery and new buildings. An ore body 180 ft. deep, 400 ft. wide and 1,000 ft. long is reported blocked out. The ore secured is said to go about \$7 per ton.

At the Fairview Mine a 200-ft. ore body has been cut that is said to run better than \$7 to the ton, and a 30-in. streak runs \$250 to the ton. A long cross-cut tunnel is now being run on the Fairview to tap the ore at a depth of 500 ft., and 3 shifts will be engaged all winter on development work.

The Sunnyside is to average about 20 men this winter on development.

LEMHI COUNTY.

Gold Dust Mining Company.—This company, operating three-quarters of a mile from Leesburg, has decided to build. The company, which is composed largely of prominent Salt Lake operators. The company owns 9 claims, 3 of which are patented.

SHOSHONE COUNTY.

Frisco Consolidated.—This mine, 4 miles from Wal-

lace, after being idle for 18 months, has resumed work. When the property closed down it had 280 men on the payroll. Manager Gus Ehrenberg said recently: "We are employing men as rapidly as we can secure them, and shall probably work about 275 men. We shall take ore from practically all the levels of the mine."

Paragon Mining Company.—L. W. Stedman, superintendent of this company, operating 6 miles east of Murray, has placed an order for a hoist to sink a double compartment shaft 300 ft. deep. The shaft has been started about 700 ft. from the ledge, and will be 5 ft. in the clear. About 110,000 ft. of shaft and building timber have been cut.

St. Jose Basin Placer Mining Company.—This company has taken a group of 8 claims at the headwaters of the north fork of the St. Joe River for \$95,150. A cash payment of \$2,000 has been made, and the remaining payments are to be made in installments. The deal was put through by W. T. Hales, of Wallace, who remains as manager. The property was owned, with about equal interests, by Roy Macdonald and Mr. Hales. The company officials are E. Edmonston, Pittsburg, Pa., president; John Kerr, Greensburg, vice-president; L. H. Creek, Pittsburg, secretary and treasurer; James Golden and C. Enney, both of Pittsburg, as directors. The 8 claims were located about 12 years ago, and considerable development work has been done on them. In the spring work will be resumed with a force of about 50 men. The property will be worked by giants. The machinery and other supplies will have to be taken in by way of Iron Mountain, Mont., which is about 25 miles from the diggings.

INDIANA.

DELEWARE COUNTY.

(From Our Special Correspondent.)

United States Steel Corporation.—This company has leased 5,000 acres of coal lands in Sullivan County, and will proceed at once to mine coal for its factories. It has also discovered a vein of coal in this county of good thickness and quality.

MADISON COUNTY.

(From Our Special Correspondent.)

Manufacturers' Fuel and Mining Company.—This company of Anderson has elected the following officers: President, George Lilly; vice-president, A. W. Tyler; secretary and treasurer, B. O. Haugh. The company purposes mining coal on a large scale, and has purchased valuable coal lands.

SULLIVAN COUNTY.

(From Our Special Correspondent.)

Park County Coal Company.—The buildings of Mine No. 8, belonging to this company, were totally destroyed by fire on November 13. Loss, \$50,000. The mine had a capacity of 600 tons a day, and employed 175 men.

MICHIGAN.

COPPER—HOUGHTON COUNTY.

(From Our Special Correspondent.)

Baltic.—This mine, owned by the Copper Range Consolidated Company, is now shipping rock to its stamp mill over the Copper Range Railroad, the necessary track extensions having been completed.

Calumet & Hecla.—This company has closed its sawmill at Shelldrake in Chippewa County, and discharged the force of 50 men. Operations will be resumed next spring. The cut last summer was 12,000,000 ft., most of which was used at the mine.

Champion.—Work at the stamp mill is well advanced, and it is expected that 2 heads will go into commission in December. The other 2 heads will start work by March.

Copper Range Railroad.—Work on the Calumet extension is advancing rapidly, and the roadbed is about completed. Contracts for depots at Calumet, Laurium and Hancock have been let, and work has started.

Globe.—Diamond drill work has stopped. The drill has been removed to the Winona Mine. Work was directed to locating the Baltic amygdaloid lode. Several holes, from 500 to 1,200 ft. in depth, were bored, but results were not made public. The overburden is from 275 to 300 ft. deep, and boulders rendered stamming difficult. The property is owned by John Stanton, of New York City.

Trimountain.—At this mine the new rock and shaft house at No. 3 shaft is in commission. It is constructed of steel, 44 by 64 ft., and 86 ft. high to the headsheave. The rockhouse is fitted with jaw crushers, with 17 by 24 in. openings and 13 by 20 in. openings, also a steam hammer for handling masses. The machinery is driven by a 10 by 24-in. Corliss engine.

Wolverine.—At this mine the drifts south from No. 4 shaft are opening good ground from the 12th to the 18th levels, and the rock goes to the stamp mill with little selection. Twenty-six power drills are in commission, the greater number for stoping.

COPPER—KEWEENAW COUNTY.

(From Our Special Correspondent.)

Mohawk.—Willard J. Smith has been appointed assistant superintendent of this mine and Wolverine. He has been engineer since 1899.

COPPER—ONTONAGON COUNTY.

(From Our Special Correspondent.)

Adventure.—Two stamps are in commission at the new mill, treating 800 tons of rock daily. The mill is 132 by 216 ft., ground dimensions, with steel frames and shathing. Three Allis-Chalmers heads, fitted with Parnall-Krause mortars, with 11-16 in. openings, are installed. Each head is also fitted with 2 horizontal revolving screens with 5-16 in. mesh. The mineral is distributed to 72 separator jigs, and then to 36 finisher jigs. Three Overstrom diagonal concentrating tables and three Wilfley tables receive the slime from the finisher jigs. Two Huntington mills regrind the ragings, which go to another set of three Overstrom tables. The mill has a capacity for 1,500 tons of rock daily when operated to its full capacity. A 4-section compound Riedler pump, with a maximum capacity of 15,000,000 gals. daily, supplies the mill with water. It is installed in a pump house 38 by 72 ft. The boiler house, 50 by 72 ft., contains 5 firebox boilers of 78-in. shell and 18-ft. flues. Each has a capacity of 150 h.p. A coal bin, 21 by 72 ft., adjoins.

MINNESOTA.

(From Our Special Correspondent.)

Many iron mines are closing for the winter, having filled season allotments. Among these are the Minnesota, on the Vermilion Range, the Biwabik, Duluth, Liba, Corsica, Franklin, and several of the western Mesabi properties. About November 20 the rest will have closed shipments, except possibly a few. There is no change in the lake situation, and little ore is being chartered by the larger carrying interests at the present rates. Stock-piles have been shipped closer than in recent years, not only in Minnesota, but on all ranges. Mine managers have been given to understand that larger outputs will be expected next year, and are preparing for a bigger winter's work than ever.

October shipments from Minnesota mines amounted to 1,900,000 tons, of which the Duluth & Iron Range moved 680,000; the Duluth, Missabe & Northern, 630,000, and the Great Northern, 590,000. This makes the Minnesota total for the year to November 13,765,000 tons, 3,852,000 tons more than the preceding year to the same period, and more than the total shipments from Minnesota last year by 2,975,000.

IRON—MESABI RANGE.

(From Our Special Correspondent.)

Biwabik.—This mine has closed shipments for the season with an output of about 650,000 tons, but is working yet, and may do some work during the winter.

Duluth.—This mine is to strip some additional ground this winter, and sink its shafts another level.

Cleveland Cliffs Iron Company.—This company has abandoned the Great Northern land near Oxhide Lawe, in T. 56, R. 23, where it has been exploring. It found some lean ore. It is still exploring near the Hawkins, in 31 and 32, T. 56, R. 22, where some good ore has been discovered. It has taken options east of the Stephens Mine in 29 and 31, T. 59, R. 14, and will start work there shortly.

Fayal.—This mine is shipping about 12,000 tons a day in an attempt to add 200,000 tons to its former allotment. It is probable that the mine will ship 1,850,000 tons for the season, far above what any mine has ever done, and about 200,000 tons above Fayal's own output last year. The mine is extensively developed, and is opened so far ahead that such an output can be maintained some years without further work. It has 3 shafts and 2 pits, one of them the deepest known, 90 ft. from surface, and the other very large. R. R. Trezona is superintendent.

Standard Mining Company.—This company has been formed by W. A. Barrows and attorneys, to handle and explore ore lands for the W. P. Snyder interest, of Pittsburg, Pa. Mr. Barrows has taken an option on 40 acres in section 10, T. 58, R. 18, a quarter of a mile south of the Mountain Iron, and will explore immediately. He has abandoned the lands in section 6, T. 58, R. 15, where he has been exploring.

MISSOURI.

JASPER COUNTY.

(From Our Special Correspondent.)

Four cash sales of mining property in the Joplin District were made last week, and the amounts involved aggregate \$185,000. Three of the purchases were made by James Luke and Byron Ash, of Carthage for a syndicate headed by Jamot Brown, of Chicago, and R. B. Barrat, of Burton-on-Trent, England. The purchases were the Paragon at \$80,000, the Hanson & McGraw at \$50,000, and the Battle Axe at \$35,000. All considerations were paid in cash. The Paragon Mine is west of Joplin and was formerly known as the Nellie M. It was sold to the Paragon Company in July for \$40,000. The Hanson & McGraw embraces a lease of 21 acres on the S. Duffield

Mitchell land, a mile south of Lehigh, and 2 mines, although no mill has been erected. This property is new territory that was first developed last summer. The Battle Axe is a sublease on 6 mining lots on the H. B. H. lease on the June Wheeler land at Alba. The fourth sale made during the week was that of the Misark Mine for \$20,000. The Misark is a fee of 80 acres 2 miles northwest of Joplin, which was owned by Moses C. Wetmore and William J. Stone, of St. Louis. It was sold to Benjamin B. Hulbert, of St. Louis.

MONTANA.

GRANITE COUNTY.

(From Our Special Correspondent.)

Albion Copper Mining Company.—This company operating near Princeton, at its annual meeting in Butte, elected F. C. Arnold president, Martin Brent vice-president, J. M. Hinkle secretary and treasurer, and Christ. Riechert superintendent. Hoisting machinery will be purchased, and a shaft sunk near the entrance to No. 2 tunnel. The management is sacking ore from the tunnel for a trial shipment.

LEWIS & CLARKE COUNTY.

(From Our Special Correspondent.)

Volapak.—John A. Rowland, of Helena, has secured a bond on this property in Ophir Gulch, 25 miles west of Helena, from John Bruesvitz and partner for the sum of \$15,000. The ledge is a large body of porphyry and quartz, said to have an average value of \$4 per ton gold per milling.

MADISON COUNTY.

(From Our Special Correspondent.)

Hennepin Ore Company.—This company, organized under the laws of Minnesota to mine near Norris, is a reorganization of the Norris Mining Company. The capital stock is \$300,000. G. M. Gillette, Amasa C. Paul, G. W. Bestard and John B. Briggs, all of Minneapolis, are directors. The company has purchased the Galena Mine at Sterling. John B. Briggs is manager.

SILVER BOW COUNTY.

(From Our Special Correspondent.)

Emma.—Two feet of ore, having a value of \$60 per ton in gold and silver, has been cut through in the cross-cut on the 400-ft. level. Considerable diamond drill work from the 800-ft. level is under way. No great success has been reported so far.

Tramway.—In the United States Court at Helena, Judge Knowles made an order directing Receiver John S. Harris, of the Snohomish and Tramway mines to pay \$4,053 to F. Aug. Heinze as a reasonable expense incurred by the latter in development of the Tramway. Last month Heinze filed objections to the report of Receiver Harris. The objections were in part sustained, and the amount of \$4,053 ordered paid Heinze.

SWEET GRASS COUNTY.

(From Our Special Correspondent.)

Paramount Mining Company.—Eight miners are employed on the property of this company at Nye City.

Speculator.—The owners of this mine in Boulder District have let a contract for building a wagon road from Elk Park, a distance of 8 miles, to be completed by May 1. The property has been under quiet development for 2 years, and has quite a tonnage of shipping ore on the dump.

NEVADA.

NYE COUNTY.

(From Our Special Correspondent.)

Tonopah Mining Company.—This company has placed with Curtis P. Mason an order for a gasoline engine of 150 h.p. to operate a compressor and its battery of 15 drills.

Hannapah Mining and Smelting Company.—This company is capitalized at \$1,000,000, in \$1 shares. Samuel Newhouse is president, A. J. Bettles vice-president, and W. E. Block secretary and treasurer. The properties owned are in Nevada, 18 miles east of Tonopah, and embrace 6,000 ft. along the strike of 2 ledges.

OREGON.

BAKER COUNTY.

White Swan.—Judge Munger, of the U. S. Court at Des Moines, Ia., has refused to grant Detson Balliet, the self-styled "Cecil Rhodes of Oregon," a new trial, and sentenced him to pay a fine of \$1,000 and to serve one year in the county jail. Balliet was convicted last spring of using the United States mails for fraudulent purposes. In 1900 he purchased the White Swan Mine, which had been deserted by the original owners, and immediately began to exploit the same through advertisements in newspapers all over the country, including those of standing like the *New York Sun*, and sold stock on the monthly payment plan. It was shown on the witness stand at the time of the trial that over \$180,000 was received by Balliet from small investors from all over the United States. It was also shown that not a dollar was expended upon the mine, and that much was spent in dissipation, although representations were made to the contrary in his advertising matter.

PENNSYLVANIA.

ANTHRACITE COAL.

Various labor troubles in the Lehigh Region, the aftermath of the big strike, have been compromised or temporarily patched up. The chief difficulties were at the collieries of G. B. Markle & Co., Coxo Brothers & Co., and the Lehigh Coal and Navigation Company, and were over the status of non-union men, over men who had taken a prominent part in offenses against law and order, or quibbles over minor details of employment. A few mines are still idle, but production is now approaching normal figures.

BITUMINOUS COAL.

Penfield Coal Company.—This company, composed of Elk County men, who recently secured a charter, has begun mining coal near Penfield. One hundred men are building a railroad to its new opening, which is on a 2,000-acre tract.

Riverview Coal and Coke Company.—This company recently sold its plant and coal in Nicholson township along the Monongahela River, consisting of about 300 acres of coal, 240 acres of surface, 78 coke ovens and mine equipments, to Isaac H. Brownfield. In addition, Mr. Brownfield has purchased from Rocks & Work 250 acres of coal adjoining the Riverview property and 12 acres of surface, 60 coke ovens known as the Cats Run ovens, together with the mine equipments. The price paid for the two plants was \$550,000.

SOUTH DAKOTA.

CUSTER COUNTY.

(From Our Special Correspondent.)

Grantz Gold Mining Company.—An ore bin has been completed, and ore is being mined in an open cut for shipment to Denver. It is largely free milling, although carrying some sylvanite and bismuth telluride. The main shaft is over 100 ft. deep. A drift has been run on the vein at 83 ft., from which a good quality of ore is taken.

Pepper Group.—Several free milling gold veins are reported discovered by the owners, J. A. Collins, Chas. Harbach, William Tarrant and William Peterson.

LAWRENCE COUNTY.

(From Our Special Correspondent.)

Black Hills Mines Production.—The mines produced \$7,342,228 during the 10 months ending November 1, according to the annual report of the State mine inspector, Thomas Gregory, of Lead. Of this amount the Homestake produced \$4,303,978, the Golden Reward \$1,223,689, Horeshoe \$575,000, Holy Terror \$180,000, Portland \$84,000, Clover Leaf \$80,320, Dakota \$150,000, Rossiter \$90,000, Wasp No. 2 \$75,000, Imperial \$180,000, Spearfish \$165,000, Deadwood-Standard \$20,000, Golden Slipper \$20,000, Alder Creek, \$45,231, placer (estimated) \$100,000, intermittent producers \$50,000. There are 3,207 miners and mill men employed in the region. The total ore tonnage was 1,631,601. There were 22 mine accidents during the year, 13 of which resulted in loss of life and 9 in serious injury.

Custer Peak Mining Company.—Work has been resumed with John O'Brien as superintendent. An extensive system of development has been started.

Clover Leaf Gold Mining Company.—A new hospital, assay office and other buildings are completed. The company is working 45 miners and 30 surface men. The mill is treating 2,200 tons a month and cleaning up \$8,990 in gold.

J. G. Reid Mining and Development Company.—Mining has begun on 125 acres of ground recently purchased near Galena. A pyritic ore carrying a large percentage of iron and sulphur and 11 per cent silica is shipped. This ore assays \$12 a ton in gold. Tests have been made at various smelters. The company will ship to the Horseshoe Smelter at Rapid City. At one point there is exposed a large deposit of silver-lead ore from which it is expected shipments will also be made. C. A. Allen, of Deadwood, is superintendent.

Lucky Strike Mining Company.—Several hundred acres are being developed in southern Lawrence County. The company expects to conduct deep explorations.

PENNINGTON COUNTY.

(From Our Special Correspondent.)

Columbia Gold Mining Company.—L. M. Coulson, 3 years foreman for the Horseshoe Mine, has been elected superintendent. A steam hoist plant has been purchased of the Harney Peak Tin Mining Company and installed on Silver Creek, where a shaft has been started. The first cross-cut will be driven at 200 ft.

Golden West Mining Company.—Permanent work has begun on the Benedict and Yellow Bird groups, with Percy Train as manager. A small Chilean mill is treating 5 tons a day for demonstration purposes. The deepest work is an incline shaft of 125 ft. The company controls over 300 acres.

Holy Terror Mining Company.—The ore tonnage for October was 1,400 tons, yielding, it is said, \$13,000 in gold. The company is driving a cross-cut on the 1,100-ft. level to cut the Keystone vein.

UTAH.

(From Our Special Correspondent.)

Ore and Bullion Settlements.—During the week closing November 14 settlements on ores and bullion as reported by the banks were as follows. American Smelting and Refining Company, bullion, \$168,800; gold, silver, lead and copper ores, \$174,800; and gold bars, \$16,300, making a total of \$359,900.

BEAVER COUNTY.

(From Our Special Correspondent.)

Horn Silver.—This mine at Frisco sent 5 cars of high-grade ore to the samplers in Salt Lake in the week of November 14.

Imperial Company.—A contract has been let to drive the tunnel 200 ft., placing the breast 1,040 ft. from the entrance. The intention is to drive to the intersection of the Horn Silver ledge with the copper zone upon which the imperial is at work.

Majestic.—It is stated that R. M. Chapman, of Rhode Island, recently secured a large block of shares.

JUAB COUNTY.

(From Our Special Correspondent.)

Tintic Shipments.—The receipts for the week ending November 14 are: Mammoth, 15 cars ore; Eagle & Blue Bell, 4 cars; Eureka Hill, 9 cars; Gemini, 15 cars; Bullion Beet, 7 cars; Uncle Sam, 1 car; Lower Mammoth, 10 cars; Yankee Consolidated, 7 cars; Ajax, 1 car.

Boss Tweed vs. Victor.—The upraise made by the Boss Tweed Company to determine the apex has reached the surface within the Boss Tweed territory. The Victor Company claims the joint upraise is to settle the difficulty.

Grand Central.—The new rope-tram from the mine to the railroad is in commission. The delay has been caused by failure to get material on the ground.

Lower Mammoth.—With the marketing of another lot of ore the company finds itself out of debt.

Mammoth vs. Grand Central.—This dispute is to be carried to the Supreme Court on appeal from judgment by jury and concurrent decision by Judge Marionaux.

PIUTE COUNTY.

(From Our Special Correspondent.)

Golden Star.—P. L. Kimberly has acquired the Ryan interest in this property on Gold Mountain, and as he had previously secured all the other stock he and his associates are in full possession. This property lies close to the Annie Laurie.

SALT LAKE COUNTY.

(From Our Special Correspondent.)

Bingham Shipments.—Outside of the large companies who smelt their own ore, the consignments are as follows: Mountain Gun, 1 car; Columbia, 1 car; Bingham Copper and Gold, 1 car lead ore; United States, 3 cars lead ore; Petro, 1 car; Richmond, 1 car.

Bingham Consolidated.—It is stated the tunnel is 26 ft. into the copper-bearing channel, with but one wall showing.

United States Company.—The new furnaces have blown in.

SUMMIT COUNTY.

Park City Shipments.—During the week ending November 14 the Mackintosh Sampler reports the receipt of the following shipments: Daly West, 3,272,300 lbs.; Ontario, 664,820 lbs.; Anchor, 222,480 lbs.

American Flag Company.—The new hoist is in commission, and Capt. T. F. Singiser, president, has arrived from Salt Lake to witness the start. High-grade ore is being sacked on the lower levels and stored for shipment.

Little Bell.—This company has decided to sink its shaft to 500 ft. and drive a drift to the main ledge. The shaft is now down 300 ft.

TOOELE COUNTY.

(From Our Special Correspondent.)

Ingot.—A rumor has it that the Consolidated Mercury has followed a vein into this company's territory.

Midus.—The new mill at Deep Creek has been tried and found to work well. Men are busy underground stopping ore.

Ophir Hill Company.—It is said Senator Clark contemplates erecting a smelter in the valley near Stockton to accommodate his own mines and those of Stockton. Improvements still continue at the Ophir Hill and electrical power will soon be used.

WASHINGTON.

FERRY COUNTY—REPUBLIC.

(From Our Special Correspondent.)

Arlington and Clara.—These claims, situated on La Fleur Mountain, near the British Columbian boundary line, show 4 ft. ore at a depth of 10 ft. The pay streak vein is 16 in. wide, mostly chalcopryrite. The Comstock belongs to the Le Roi Company, of Rosslund, B. C.

Messrs. Finn and O'Neill have a fractional claim adjoining the Arlington, with 3 or 4 ft. wide of the same character of ore. They have a shaft down 100 ft., with ore at the bottom, pretty much all pyrites.

Black Tail.—Four men are breaking good ore at about 70 ft. below the cropping.

California.—A contract has been let to sink the shaft 100 ft. When completed the shaft will be sunk an additional 100 ft. to the 600 ft. Ore is being stoped on the 1st, 3d and 4th levels. Shipments of 60 tons weekly of high-grade ore to the Hall Smelter continue.

North San Poil.—About 400 tons of ore on the dump will be shipped immediately to the Granby Smelter, at Grand Forks, B. C.

Lone-Pine Surprise Consolidated Mining Company.—This company held its annual meeting at Spokane, November 10. Charles P. Robbins, C. D. Bibbins, Leo H. Long, W. J. C. Wakefield, O. Jeldness and Thomas Ryan, of Spokane, and Phillip Creasor, of Republic, Wash., were elected directors. The executive officers are C. P. Robbins, president, treasurer and general manager; Leo H. Long, vice-president, and C. T. Newcomb, secretary. Another meeting is set for January 10, 1903, to determine the question of equipping the mine with an air compressor, power drills and such other machinery as may be deemed requisite.

Lucille Dreyfus.—A cross-cut cuts the vein at a depth of 40 ft. A drift runs thence south on the vein 140 ft. At 107 ft. in the vein was cross-cut 15 ft. The cropping shows the vein from 6 to 15 ft. wide. The property is situated next the boundary line, 30 miles north of Republic.

Quilp.—Work was resumed October 18, and 1½ car-loads, of 28 tons each, have since been shipped per day to the Granby Smelter, at Grand Forks, B. C. The average of returns received are \$29.48 per ton. An electric power plant of 3,000 h.p. at Cascade, B. C., which will shortly furnish the Granby works with 2,000 h.p., when the Quilp Mine will ship 3 car-loads of ore per day. The ore now being shipped is taken from the upraises to connect the different levels from 400 ft. to surface. At present 26 men are employed. The company is out of debt.

San Poil.—Eight men are stoping ore on the intermediate level. Four car-loads were shipped recently to the Granby Smelter at Grand Forks, B. C.

Trade Dollar.—On the 300-ft. level the south drift, in 78 ft., has been discontinued. The north drift, in 125 ft., is being driven by 2 men each, day and night shift, on 3 ft. of high-grade ore.

Washington & Great Northern Railway.—All difficulties between this and the Republic & Kettle River line have been settled, and the former is continuing its road through an additional 5 miles, to the Granby Smelter, at Grand Forks, B. C. Perhaps lower rates of transportation may result.

Zala Consolidated Mining Company.—Two car-loads of ore were recently hauled to the railroad and shipped to the Granby Smelter, and operations have been suspended until next spring.

WEST VIRGINIA.

Coal Miners Strike.—While the strike in the New River field has not yet ended, the number of men out is very much smaller than some weeks ago. Recognition of the union is the sole issue. The chances are that with the coming of winter the strike will be compromised, as in the Kanawha field, and the men will secure some minor advantages, but no recognition of the union.

FOREIGN MINING NEWS.

ASIA.

INDIA—MYSORE.

(From Our Special Correspondent.)

Great interest has been aroused in London by the publication of a scheme for extending the property of the Mysore Gold Mining Company of India. The mine is developing splendidly, with depth and promises to continue in good ore for a long time. The reef dips to the west, and will, in the course of a short time, arrive at the westerly boundary. It has been considered desirable, therefore, to acquire additional land along the property and 1,700 ft. wide in order to enable the company to continue its operations. This property belongs to the company called the Gold Fields of Mysore, another of the same group. A new main haulage shaft is also being sunk and equipped at considerable expense, and 60 new stamps have just been completed, bringing the total to 210. The power used is entirely supplied electrically from the Cauvery Falls, so that the expense formerly incurred in fuel bills is very much reduced. In order to provide additional capital for the purchase of the new land and for other purposes it is now proposed to increase the nominal capital from £265,000 to £290,000 by the issue of 50,000 new shares, of nominal value of 10s. Of these 15,000 shares are to be allotted to the Gold Fields of Mysore as part purchase price, and the remaining 35,000 are to be offered for subscription at £6 per share. Out of the proceeds, £20,000 will be paid to the Gold Fields of Mysore, while £190,000 will

be available as additional working capital. There is no doubt that the shares will be readily taken up, and it speaks well for the high reputation of the directors and managers that new shares can be placed in these dull times.

Kolar Gold-field.—The output for September is reported at 49,420 oz. crude, being 7,896 oz. more than in September, 1901. For the nine months ending September 30 the total was 370,023 oz. crude, against 377,940 oz. for the corresponding period in 1901; a decrease of 7,917 oz. The total this year was equal to 333,020 oz. fine gold or \$6,883,523.

AUSTRALIA.

WESTERN AUSTRALIA.

The gold production for October is reported at 194,387 oz. crude. For the 10 months ending October 31 the total was 1,790,490 oz. crude, against 1,530,111 oz. for the corresponding period in 1901, an increase of 260,379 oz., or 17 per cent, this year. The total for this year was equal to 1,538,706 oz. fine gold, or \$31,905,054.

CANADA.

BRITISH COLUMBIA—BOUNDARY DISTRICT.

(From Our Special Correspondent.)

Boundary Ore Shipments.—The aggregate tonnage of ore shipped by Boundary mines during 1902 to the middle of November is about 425,000 tons. More than half of this was from the Granby Company's Old Ironsides and Knob Hill group of mines, and a considerable part of the remainder from the British Columbia Copper Company's Mother Lode Mine. The approximate output of the respective mines of the district is as follows: Granby Company's mines, 266,000 tons; British Columbia Copper Company's mine, 117,000 tons; Snowshoe Company's mine, 12,000 tons; B. C. Chartered Company's mine, 10,000 tons; Montreal & Boston Copper Co.'s mine, 10,000 tons; Dominion Copper Company's Emma Mine, 6,000 tons; Jewel Company's mine, 2,000 tons, and several smaller mines, 2,000 tons. Practically the whole of this ore was treated at Boundary smelters.

Boundary Smelters.—The Granby and British Columbia Copper Company's smelters are at present running 2 furnaces each, and the Montreal & Boston Copper Company 1 furnace. The Granby Company has been short of power, but has been promised additional electric power during November, to enable it to put 2 more furnaces in blast. The 5 furnaces now in operation in the district treat about 1,800 tons a day, so these would, if run without interruption until December 31, under ordinary conditions increase the year's aggregate to more than 500,000 tons. With 2 more furnaces started this month the total should reach at least 530,000 tons. The Montreal & Boston Company is putting in a second furnace, which should be running by December 1, so may add 10,000 tons more to the year's total. In any case the 500,000-ton mark should be passed this year, while the figures may reach to between 540,000 and 550,000 tons. As compared with output of 97,854 tons in 1900, and 386,675 tons in 1901, together 484,512 tons, the production of the current year exhibits a satisfactory increase and gives evidence of substantial progress. The gross value (with copper at New York prices) of the district's production for 1902 should be between \$2,000,000 and \$2,500,000.

Montreal & Boston Copper Company.—The company's operations have been running very smoothly since September 17. The company is building a brick engine and blower room, 120 ft. by 38 ft., installing 2 new 125-h.p. high-pressure boilers, a No. 7 Connorsville blower, direct connected to an engine, another furnace 176 by 40 in., and expects all this equipment to be running by January 1. Manager Goodell expects to place an order for a third furnace soon, and have 3 furnaces in blast by March 1. The company's ore supply is pronounced ample. The matte is contracted to the Granby Mining and Smelting Company.

BRITISH COLUMBIA—VANCOUVER ISLAND.

Crofton Smelter.—This plant at Crofton is running with 2 standard type furnaces. The smelter is handling about 350 tons a day. The converter is working successfully, and all the output of the plant is reduced to blister copper.

The Garretson furnace, installed as an experiment, is reported to have failed to come up to expectation. It was given a trial run of less than 24 hours, and froze, according to report.

NOVA SCOTIA—CAPE BRETON.

Dominion Coal Company.—This company's shipments of coal in October were 295,864 tons. For the 8 months of the fiscal year from March 1 to October 31 the shipments were 2,135,233 tons, against 1,781,262 tons in the corresponding period last year; an increase of 353,971 tons, or 19.9 per cent.

NOVA SCOTIA—GUYSBORO COUNTY.

(From Our Special Correspondent.)

Strathcona.—This mine, in Forest Hill District, is owned by Robert Dickson. It is under option. The work for the past few months has been chiefly development, which is proving most satisfactory. On

the Schoolhouse lode the shaft is some 290 ft. During October the shaft sunk some 40 ft., yielding 275 tons of rock that gave 352½ oz. of gold, worth \$19.75 per oz. The last 145 tons yielded 202¾ oz. The quartz vein is from 8 to 14 in. thick.

NOVA SCOTIA—HALIFAX COUNTY.

(From Our Special Correspondent.)

Nova Scotia & Baltimore Mining Company.—The work in Cariboo District, on the Lake lode, is of great importance to the district and to the gold mining interests of the Province. For a number of years mining has been done to a depth of 300 and 400 ft., the one at this depth being low grade. The company having erected a modern 40-stamp mill and adequate appliances to sink deeper determined to sink to 1,000 ft. At 700 ft. much better ore has been struck, and from a level driven at this point 350 tons of ore yielded 1.6 oz. to the ton. The lode is from 4 ft. to 8 ft. thick.

MEXICO.

DURANGO.

(From Our Special Correspondent.)

It is reported that rich gold placers have recently been discovered in the hacienda of Canutrillo, Partido of Inde. Coal has also been found in 2 localities, between El Gallo and Mapimi, Partido of Nazas, and upon the lands of the hacienda Torreon de Canas, in the Partido de Inde.

Avino Mines, Limited.—Operations have been suspended at these mines. The exact reason is not known to outsiders, but it is inferred to be difficulty in connection with ore treatment by the new leaching plant. The order to stop work is said to have come from the directors in London, by way of New York. It is believed here that the suspension will be temporary only. Charles Flynn, the managing director, is now on his way to London.

Guggenheim Exploration Company.—It is reported that this company, which recently purchased the Velardena mines, and extensive mining properties in Parral, made overtures for the purchase of the smelter at Torreon, near to Velardena, but were not successful in securing the smelter.

The new 400-ton concentrating plant, which is nearly completed, has been in partial operation as a test, in order to have everything in shape for starting. It is not anticipated that many changes will be made in the local management.

Soto.—A rich strike of ore is reported in this mine, in the Guanacevi District. The mine was for some time abandoned, but is now worked by Senor Longrega.

SAN LUIS POTOSI.

(From an Occasional Correspondent.)

Cocinera.—This mine, at San Pedro, with 200 men, is marketing about 400 tons per month.

Compania Metalurgica Mexicana.—This company, operating under a long-term lease in La Victoria, is also extracting 300 to 400 tons per month, and is erecting a 75-h.p. steam hoist on the Begonia shaft. The company has contracts for all the ores, and contemplates the construction of a railroad from Portozuelo to the mines, a distance of about 5 miles, in order to transport the ores. Burros and wagons are now used.

El Barreno.—This mine, with 300 men, is marketing about 400 tons per month.

La Victoria y Anexas.—This mine, at San Pedro, with a force of 800 men, is extracting about 2,000 tons of smelting ores per month.

NEW CALEDONIA.

Exports of minerals for August and the 8 months ending August 31 are reported by the *Bulletin du Commerce de Noumea* as below, in metric tons:

	August.	8 months.
Nickel ore	23,784	68,882
Cobalt ore	1,207	3,766
Chrome ore	129	5,933

The August exports of nickel ore included 2,443 tons consigned to New York.

NEW ZEALAND.

(From Our Special Correspondent.)

Gold and Silver Export.—During September we exported 57,783 crude oz. of gold, valued at £222,466 (\$1,112,330), and 61,037 oz. silver, valued at £6,220 (\$31,100). During the 9 months ending September 30 the colony exported 372,847 oz. (crude) of gold, valued at £1,433,966 (\$7,169,830). As the last quarter of the year is generally the best one, the export for the year will almost certainly exceed £1,900,000, and may approach £2,000,000. The large production of the Southern dredges during the past two or three months lends support to the latter figure.

Dredging in Otago.—During the past few weeks the returns from the Otago dredges have been the best on record, the weekly production averaging close to 3,000 oz. Though the approach of summer and the consequent rise of the Molyneux's snow-fed waters will considerably diminish the returns till the approach of

next month, it is now certain that this year's production will exceed last year's by about 60 per cent. During the first 36 weeks of 1902 Otago dredges produced 74,283 oz. of gold, valued at £283,485 (\$1,417,425), as against 45,393 oz. for the same period in 1901, and 42,964 oz. in 1900.

West Coast.—The West Coast dredges, though on the whole quite paying their way, are not by any means yielding up to expectation, and it is obvious that this field, as stated by me more than a year ago, has been considerably over-rated. The moderate success of the dredges in this locality is, however, partly to be attributed to disadvantages which may be overcome. In some cases failure has been due simply to building a type of dredge unsuitable to the ground to be worked. In others the gold saving appliances are at fault, the gold being fine and associated with a great deal of heavy black sand. There is a wide field open to the inventor of some appliance which will save a good percentage of the fine gold associated with the black sands of this and other localities. In this connection it may be mentioned that the New Zealand Government offers a bonus of £2,000 (\$10,000) to the inventor of any such appliance.

The New Zealand Consolidated Goldfields Company's mines at Reefton are maintaining their usual production, the last month's return being £13,313 (\$66,565), from 6,695 tons. As this company is now developing several new properties their production will probably be considerably increased in a few months' time.

Hauraki Goldfield.—The output of this field for the first nine months of this year is £525,010 (\$2,625,050), an increase of £36,820 on the yield for the corresponding period of 1901. The chief returns for the past month were: Waihi, £41,030 (\$205,150) from 14,311 tons; New Zealand Crown, £6,026 (\$30,130) from 2,890 tons; Komata Reefs, £2,935 (\$14,675) from 1,100 tons; Tairua, £2,400 (\$12,000) from 576 tons; Kauri Freeholds, £1,334 (\$6,670) from 1,138 tons.

At Waihi all the productive work is as yet carried on by one company, the other companies being engaged simply in prospecting, developing or shepherding their ground. The Waihi-Gladstone Company, however, is erecting a small battery, which will be at work about the end of the year. The 40-stamp battery formerly owned by the defunct Waihi-Union Company lately absorbed by the Waihi Company, is now at work crushing on behalf of its new owners, who thus have at the present time no less than 330 stamps at work.

At Karangahake the Woodstock battery, after a long stoppage, is again in full swing.

At Coromandel, a place noted for rich patches, the sensation of the month has been the striking of rich stone by a party of tributers in the Bunker Hill Mine, which was on the point of being closed down. The richness of the stone may be gauged from the fact that 323 lbs. of picked stone yielded 282 oz. of bullion, valued at £868 (\$4,340). The tributers have now on hand a considerable amount of general ore, besides several hundred pounds of picked stone worth from £2 to £3 per pound.

SOUTH AMERICA.

CHILE.

Esperanza Nitrate Company.—For the 10 months ending June 30 the trading profit amounts to £7,126 (\$35,630), of which £2,868 (\$14,340) is absorbed by miscellaneous expenses, leaving £4,258 (\$21,290) to be carried to the balance sheet. Deducting from this £3,320 (\$16,600) standing at the debit of profit and loss on August 31, 1901, there remains £938 (\$4,690), out of which directors' fees have to be paid, and balance placed to reserve. The manufacture of nitrate began on a small scale towards the end of last year, but it was only in January that regular production began, and it has since then been steadily maintained.

Santa Catalina Nitrate Company.—The second annual report, covering the year ended June 30 last, shows gross profits of £27,287 (\$136,435), which is considerably better than the previous year. Deducting miscellaneous expenses amounting to £10,322 (\$51,610), there is a balance of £16,965 (\$84,825), to which should be added £655 (\$3,275) brought forward from last year, making a total of £17,620 (\$88,100). Of this £15,800 (\$79,000) has been credited to dividend account, being 20 per cent for the year. The balance of £1,820 (\$9,100) has been carried forward. The additions and alterations to plant and machinery during the year cost £4,515 (\$22,575). The oficina is now thoroughly equipped, and its quota for the present combination year is 357,633 qtls. nitrate of soda.

San Pablo Nitrate Company.—Operations during the past year showed a net profit of £7,192 (\$35,960), which with the amount brought forward from the last account makes a total of £8,859 (\$44,295). Deducting a per cent dividend, amounting to £6,400 (\$32,000), there is a balance of £2,459 (\$12,295). Production was necessarily curtailed, owing to some serious defects in the boilers, which had to be remedied.

MINING STOCKS.

(Complete quotation will be found on pages 698 and 699.)

New York. Nov. 19.

Copper stocks have been irregular, and sales below last week. Amalgamated, after selling down to \$53 last week, became feverish and went upwards to \$56½. The gain did not hold, and on Wednesday \$53 was low-water mark. During these fluctuations the transactions fell off, indicating manipulations. It is noteworthy that the price of \$53 puts the market value of the Amalgamated holdings at \$82,150,000, which is \$52,700,000 less than was obtainable a year ago. Anaconda, a subsidiary company, fares the same as Amalgamated; it sold this week at 87½@89 per cent (\$21¼@22¼), or below par, few shares changing hands.

Trading on curb was narrow, and only a few of the specialties attracted any attention. United Copper, of Montana, was handled by certain brokers, who succeeded in lowering the price to \$27 on Tuesday. This price, however, was not for public buying, as transactions were between interested parties. Most of the public trading was done around \$30. White Knob, of Idaho, was active at times, selling between \$13 and \$11½, and closing around \$12½. Greene Consolidated, of Mexico, another favorite, had its innings, changing hands at \$23@24¼, while further sales of rights were made at \$50@70 per 100. Tennessee was dull at \$16@15¼, and so was Union, of North Carolina, which brought \$2¼@2½. Montreal & Boston, did more business at \$2¼@2½, while British Columbia was quiet at \$6.

Bamberger-De Lamar Gold, of Nevada, is lower at \$9½, without initiating any large trading.

Homestake Gold, of South Dakota, since reducing its annual dividend rate from 6 to 3 per cent, has dropped in value, and this week sold at \$67.

Ontario, of Utah, feels the depression in the metal market. This week the stock sold at \$7.50.

Quicksilver, of California, has reappeared with sales of the common stock at \$2.75, and of the preferred at \$7.

In the Colorado gold list speculation is limited, though the production of the different districts is quite satisfactory. Of the Cripple Creek stocks Portland shows better form at \$2, and Elkton at 36c., while Isabella is unsteady at 29c.

The Comstock stocks are in the dumps again, as the assessment list is large, and the cash holdings of the various companies are small. Consolidated California & Virginia hangs around 80c., and Ophir at \$1, while Mexican slumped from 78c. to 65c.

Standard Oil shares gained with an increase in the quarterly dividend rate. Sales were made at \$670 @ \$675. With the 10 per cent dividend just declared the company paid this year 45 per cent, which compares with 48 per cent in 1901 and 1900. In the four years prior to 1900 the annual dividend varied between 30 and 33 per cent. Previous to 1895 the company paid 12 per cent annually.

Besides the trading in listed mining stocks, much business is being done in companies that have a reputation to make. Among the most active promotions are the Mexican companies, with high capitalizations, which are selling stock at 50c. to \$18.50 per share. Some of these have properties that may develop profitably, but most of them are prospects of unknown value, which are being offered to the public at exorbitant prices. Money invested on extravagantly worded prospectuses and advertisements is often entirely lost, and does legitimate mining irreparable injury. Fortunately the Mexican "wild cat" companies will die in time as did the Klondike Gold, Arizona Copper and Missouri Zinc booms. Meantime, we would advise our readers to carefully investigate the claims of promoters who are offering "a fortune at rock bottom prices."

Boston. Nov. 18.

(From Our Special Correspondent.)

Fluctuations in the mining share list have been unimportant in most cases during the week, and net gains and losses are about evenly divided. The slump of \$35 per share to \$460 in the price of Calumet & Hecla is the most important point to be mentioned, but as the stock is pretty closely held for investment it does not cause more than a ripple. Total transactions in the stock for the week amounted to but 191 shares. A \$20 drop in Quincy Mining over night to \$100 caused some surprise, but the immediate following price was at \$110, at which price it holds now. Some discussion is ventured that the dividend will be reduced, it now paying \$3 semi-annually, but like Calumet & Hecla, the stock is held close by investors. The company paid \$9 last year. The death of President Mason may have precipitated the decline. The \$100 mark is the lowest since 1898. In 1901 it touched \$187.

Copper Range, of course, is the most active mining stock, and runs along pretty close to Amalgamated Copper. It rose to \$55.50, but broke to \$50, with subsequent rally to \$55.50, and the close the same as a week ago, \$54.12½. The stock at present is a highly speculative one, but with 278,000 shares outstanding

it is selling for over \$15,000,000 at present market prices. This, in some quarters, is thought excessive, but the large owners are confident of the ultimate success of the property as a big dividend earner, and have taken large blocks from the market. A great many of the small traders have been nipped in this stock. Osceola settled \$1.50 to \$47.50, but rallied rather sharply to \$51. There is talk of a contest for control at the annual meeting next March. The last annual meeting stirred up a hornet's nest, it will be remembered. President Bigelow is the reputed owner of 1,865 shares of Osceola; G. M. Hyams, 1,349, and Director T. Henry Brooks, 1,456 shares. T. W. Lawson has also quite a large interest in this property.

Considerable buying of United States Mining is noticeable, based on the starting of the smelter after four years of development and the expenditure of \$2,000,000. Bingham Consolidated has stiffened \$1.50 to \$25.50 since the return of President White from the mine. He is very enthusiastic over the results. Atlantic Mining, new stock, is off \$1.25 to \$7. Trading in this stock is very limited. Lawson's Trinity has sagged \$1.50 to \$8.50, with nothing said. Mass has been buoyant up to \$15, Mohawk up to \$39.75, Centennial up to \$16.75, United States Coal and Oil is up to \$14.25, and Utah to \$20.75. There is renewed talk of changing the Utah Consolidated from an English to an American corporation, thereby saving \$40,000 per annum in salaries paid to English officers, besides the English income tax. About 80,000 out of the 300,000 shares are held in England. Tamarack holds at \$146@148, with inside buying reported. Dominion Iron and Steel has kept within a \$3 fluctuation, closing at \$54.62½. Daly West is \$2 lower at \$45, Isle Royale is selling at \$12, and Old Dominion at \$15.50. The Shawmut Oil Company has declared a 50c. dividend, payable December 24.

Colorado Springs. Nov. 14.

(From Our Special Correspondent.)

The week has been far from satisfactory. Prices have fallen off in some cases and advanced slightly in others, but the changes have not been of sufficient importance to materially alter the appearance of the list. There is a decided apathy in everything. The special water committee appointed some time ago did not hold any meeting this week, which is one of the factors that went to make a quiet market. The reports from the mines continue to inspire the greatest confidence in the district, but no effect on the stock market has been evident.

El Paso stood at 69¼c. a week ago, and 68¼c. to-day. Nothing of importance has developed at this mine lately. Elkton strengthened a little, due in part to a better showing on the part of some of the big leases on this mine. A week ago it was quoted at 35@35½c., to-day at 35½@36½c. Golden Cycle, which is soon to be made the basis of an extensive consolidation of properties in that neighborhood, was quoted at 59½@62c. last week, and is now 59½@60¼c. Isabella was listless, being quoted at 33@34c. last week, and to-day at 32½@33¼c. The balance of the market was featureless.

Salt Lake City. Nov. 15.

(From Our Special Correspondent.)

This week a decided reaction set in and developed into a general downward movement. Before the close most of them began to recover, and at the close nearly every one caught had nearly regained its old position. Of the Park City mines, Daly was not in evidence, save on the opening day at \$1.80 for 100 shares. Daly Judge was carried down to \$8.70, with 4,435 shares, and Daly West dropped to \$45, with but 274 shares sold. California had a heavy load of 76,750 shares, and fell to 20½ from 32c. at opening. Wabash was a leader in the slide, and went lowest. Opening at \$1.12½, it led the way to 78½c., and with the changing of 25,745 shares at the close, had climbed back to \$1.05. New York Bonanza did the same with 10,700 shares, opened at 48c., and slid rapidly to 26c., recovering to 35c.

The Mercur mines felt the influence, but were somewhat more steady, with Consolidated Mercur opening at \$1.86@1.80, and closing at \$1.80, having dropped to \$1.78 during the handling of 5,300 shares. Sunshine fell off 3c., placing 1,000 at 13@10c. Ingot had 13,900 shares at 11@10¼c.

Tintics properties responded to the panic, but in less measure. Carisa went to 17c. from an opening at 20¼c., and closed on sales of 6,100 shares. Grand Central came out with 1,200 at \$5.10@4.70. Lower Mammoth sold 25,600 at \$1.50@1.22½, while May Day stood quite steady at 25¼@21¼c., with sales of 50,800.

The week closed on the exchange of 486,940 shares, which were valued at a total of \$207,673.

San Francisco. Nov. 15.

(From Our Special Correspondent.)

Mining stocks have been quiet and rather weak on a limited volume of trading.

The sworn returns of the mining companies, as filed in their offices this week, show cash on hand as below, with all expenses paid, unless otherwise noted: Alpha Consolidated, \$787; Alta, \$54, with indebtedness of \$2,519; Belcher, \$4,699, with indebtedness of \$7,962;

Best & Belcher, \$771, with bills payable of \$12,500, and \$3,000 due bank; Bullion, \$116; Caledonia, \$3,302, with October expenses unpaid; Confidence, \$3,182; Consolidated Imperial, \$1,652; Challenge Consolidated, \$1,109; Chollar, \$734, with indebtedness of \$1,500; Gould & Curry, \$3,073, with bills payable of \$12,500, and indebtedness of \$14,765; Justice, \$2,004, with indebtedness of \$6,994; Lady Washington, \$14, with liabilities of \$1,896; Mexican, \$305, with indebtedness of \$3,000; Overman, \$120, with \$1,065 due treasurer, and October expenses unpaid; Potosi, \$211, with indebtedness of \$1,500; Savage, \$1,820, with bills of \$420, and October expenses unpaid; Sierra Nevada, \$6,361; Silver Hill, \$20,760; Standard Consolidated, \$115,821, with October clean-up and October expenses to be accounted for: Syndicate, \$2,164; Union Consolidated, \$1,145; Utah Consolidated, \$68, with indebtedness of \$1,500.

The following companies report an indebtedness on November 1: Consolidated California & Virginia, \$2,801 on current account, with \$21,500 due bank; Crown Point, \$176, with October expenses unpaid; Ophir, \$4,715, with bullion on hand estimated at \$2,500.

Business in oil stocks was somewhat better and quotations generally firm. Imperial sold at \$15; Peerless, \$9; Four, 50c.; Monarch, 17c.

London. Nov. 8.

(From Our Special Correspondent.)

The South African mining market has adopted a more generous view of the forthcoming visit of Mr. Chamberlain to South Africa than I was able to report last week. It has been acknowledged that the visit will be in the interests of everybody, and that this is the view taken by the public at large. The dissatisfaction at the delay in the settlement of the African question caused by this visit is neutralized by the feeling that the settlement when it does come will be more permanent. The grumbling magnates also feel that they are adopting an unpopular role in trying to force the hand of the Government. Altogether, a more cheerful air has been assumed, and the market presents a hopeful aspect. The issue of the report of the Consolidated Goldfields of South Africa has also helped to brighten things up a bit. This report covers the 12 months ended June 30 last, and shows a profit that allows a cash dividend amounting to £500,000 to be distributed, certainly an excellent result, at these times. The tone of the report as to future prospects and the labor question is excellent, and tends to show the public that the large South African houses are not all pessimists. Altogether, it is an excellent corrective to the disconcerting statements recently circulated, and should help to revive public interest in South African speculations.

The British Columbian market continues to be much upset with events in the Le Roi group. As I mentioned last week, Le Roi No. 2 has come to the end of its supply of ore that is payable to ship under present circumstances, and the shares have fallen much in value. The future policy is not yet decided on, and as Mr. MacDonald and Mr. Thompson are terminating their engagements, it seems probable that some new investigation will be made and new plans laid down.

The report for 1901 of the Mikado Gold Mining Company, in the Lake of the Woods District, Canada, has only just been published. It shows that payable ore has been exhausted, and that the mill is shut down and work confined to exploring for new ore bodies. The finances of the company are also in an unpromising state, for there is a debit balance of over £5,000, with no more available capital in sight. This company has been undeservedly unfortunate, for economy of capital and management has always been carefully studied. It is true that at one time developments were not carried on very intelligently, but that was a mere incident. The company intends to go on prospecting, and it is to be hoped that more satisfactory ore will be found.

COAL TRADE REVIEW

New York, Nov. 20.

ANTHRACITE.

Mild weather during the greater part of the past week has been a boon to operators and to the public. It is easy to imagine the howl that would have arisen from the daily press had a cold wave of unseasonable severity happened along. The public apparently does not realize that with coal in short supply and likely to be in sort supply till in January every dealer cannot get all the coal his customers may order. However, the return to work of nearly all the miners in the Lehigh Region will result in substantial gains in shipments to New York Harbor, as mines get in good working order and miners settle down to steady labor, production is now approaching normal, and if the miners are willing to work their best, it may exceed normal in another month. In the meanwhile, consumers and dealers will have to be patient.

Some coal has arrived at the head of the lakes, and is being sold at St. Paul and other points, but the total arrivals before the close of navigation, as lake freight rates are likely to advance decidedly with the first

heavy storms, will probably be but a drop in the bucket compared with ordinary supplies, and bituminous coal, lignite and wood will have the call in the Northwest this winter. In Chicago territory anthracite is coming in more freely, several cargoes having arrived during the week. All rail receipts, owing to the general car shortage, are light, and lake shipments will be given the preference by operators until navigation is closed. Supplies at that time, however, will undoubtedly be light, with nearly all dealers. Prices now f. o. b. cars Chicago are: Broken, \$6.25; egg, stove and chestnut, \$6.50. Along the lower lakes receipts are still very light, as upper lake points and points down East are given the preference by operators. The all rail trade at points between the lakes and the seaboard is likewise shy of coal, and receives less attention than that at points where needs are more immediate. Along the Atlantic seaboard New York, Philadelphia and Boston, to say nothing of smaller cities, are all short on coal. At New York, though the nominal retail price is \$6.50, some coal has sold as high as \$10 during the week for prompt delivery. At Philadelphia the mild weather has taken off a little of the urgency shown by consumers last week. The companies are reported impartially distributing what coal arrives. Speculative dealers naturally have less show than regular customers under this condition, and are given to complaints. Wholesale prices are \$5.50@6.50, delivered, for prepared sizes. Retail prices range from \$7 up to \$8. Several barges loaded with domestic sizes have arrived in Boston, and heavier arrivals are expected. Retail prices are down to \$9. Some coal has arrived at points beyond Boston, but there are many points throughout New England where coal will be badly wanted for a month yet.

BITUMINOUS.

The Atlantic seaboard bituminous trade continues strong with Clearfield grades selling in a speculative way at \$5.35@5.50 f. o. b. New York Harbor points, and no oversupply. Arrivals of English coal during the past week or 10 days have been very heavy. It is thought that the expectation of these arrivals, everybody knowing that the coal was on the way, had the effect of easing the market and keeping prices down. Now that the coal is here in quantity, and is practically placed the balance to arrive has been discounted and with no more or very little coming from the same source consumers must rely on the home market, and as that is short, prices are advancing slightly.

The situation in the seaboard market is still entirely in the hands of the railroads, as producers are getting only about 40 per cent of the total number of cars they require. It is stated that the upper officials of the Pennsylvania Railroad have been making a personal investigation of the situation along the lines they control, and as a result have cleaned up the lines to some extent. However, all that is known is that transportation during the past week or 10 days has improved greatly. Coal is not running through in such broken lots as formerly, and comes through in about a week, where 10 days or 2 weeks were taken. Producers feel that to get much better service is almost a hopeless task.

In the far East, on account of the arrivals of foreign coal at Boston coming in a lump the market is easy, and considerable demurrage will accrue on some of this coal. The ice ports are now pretty well cared for, and the coal required on contracts is about all forwarded, except an odd cargo or so here and there. Along Long Island Sound the trade is short of coal. Consumers' demands are heavy, and considerable speculative coal is taken. At New York Harbor points producers fare pretty well by buying speculative coal when contract supplies are insufficient. The great difficulties the past week have been the small vessel and barge supply. Freight rates for this class of craft for harbor traffic have risen from 17@18c. to 40@50c., and even the highest figures do not bring a sufficient supply of vessels promptly. In the all-rail trade coal is in short supply, and some manufacturing is curtailed by the shortage.

Transportation from the mines to tidewater has improved, coal coming through in a week. Car supply continues very poor. In the coastwise vessel market vessels are in short supply, and rates are advancing. We quote current rates from Philadelphia as follows: Boston, Salem and Portland, \$1.10@1.15; Providence, New Bedford and Long Island Sound, 90@95c.; Portsmouth and Bath, \$1.15@1.20; Bangor and Gardiner, \$1.35@1.40, with towages to latter port.

Birmingham. Nov. 17.

(From Our Special Correspondent.)

The railroad car shortage is the only interference to the coal production in Alabama, and it is proving a very serious one, too. The mines along the Southern Railway, which are quite numerous, do not get near the cars necessary for steady operation of the properties. The production, however, in this State to-day is greater than it ever was, but it could be still greater if the railroads were able to furnish the cars. It is announced that further development in new coal-fields will take place in the immediate future. The fields to be developed are in the vicinity of Henry Ellen, in the northeastern part of Jefferson County. The Central

of Georgia Railroad Company is interested in a large tract of land just purchased there and will participate in the development, expecting to use the coal on its system. The Tennessee Coal, Iron and Railroad Company will develop considerable property also in the neighborhood of Henry Ellen, and already has about 25 men at work. The Seaboard Air Line Railroad, which is working towards Birmingham will build a track to these new coal properties while the Southern Railway and the Central of Georgia will build four-mile extensions to the same locality. Other development to be noted in Alabama is in Bibb County, where the Bessemer Land and Improvement Company is opening two or three new mines.

The operation of coal mines in this State by convicts under the lease system will probably be corrected to a considerable extent. The State expects to get more returns from its convicts and a proposition on the part of the State to operate the mines at a certain price has been made. The Tennessee Coal, Iron & Railroad Company and Sloss-Sheffield Steel and Iron Company work State convicts in their mines. Both of these companies also work a large number of county convicts, and these will not be disturbed. Several companies are after convict labor.

Chicago. Nov. 17.

(From Our Special Correspondent.)

The coal market, so far as wholesale dealers are concerned, is light. The mild weather, extraordinary for this season of the year, has caused but a mild demand so far for coal. Anthracite continues to come in piecemeal. A boat-load here and there and a few scattering car-loads are unable to satisfy the eager demand of consumers of hard coal. Up to date five steamers have arrived by lake, bringing not more than 15,000 tons, the rail receipts are not over 10 cars a day for each of the principal railroads, or one-sixth to one-tenth of the normal receipts at this season. Wholesalers have disposed of lake receipts at \$7.25. This means but a small allotment to each customer, of course. Without exception, wholesalers report the demand for anthracite pressing. Everybody seems to be of the opinion that the much-desired fuel is being kept back from the West for secret reasons. "The East," the retailers have been crying, "is getting the bulk of the production of the anthracite mines." And from the East comes the cry that the West is absorbing anthracite production. There seems every probability that the West will get its pro rata share of production, but no more. According to local representatives of the coal-mining railroads, the West is getting a fair percentage of products of the reopened mines, and no more.

There is practically no change in wholesale-car-prices since last week. Quotations are: Hocking (more plentiful than for many weeks, \$5; Youghiogheny, \$5; West Virginia, \$4.50; Pocahontas and New River smokeless (both still scarce), \$5.50; Maryland smokeless, \$5. Indiana and Illinois bituminous still forms the chief supply of Chicago wholesalers, and range from \$2.75@3 for Illinois lump to \$3.25@3.50 for Indiana lump.

According to all present appearances, lake navigation, so far as anthracite shipments are concerned, will close sharply on December 6, the date when insurance expires. Local advices show that little coal may be expected from Erie, and not much, considering the extraordinary demand, from Buffalo, before the closing of navigation. By rail little coal can be expected before the tie-up of rolling stock that invariably occurs in winter.

Cleveland. Nov. 18.

(From Our Special Correspondent.)

The market conditions have been rather distressing in the coal trade. In the lake movement the shippers have given up all hope of fulfilling their contracts at the head of the lakes. Their only aim from now on will be to accomplish as much of that movement as possible, leaving the remainder of it to be sent up by the all-rail routes during the winter. One shipper's experience is perhaps indicative of what is generally seen along the lakes. He had a fair supply on Monday of last week, after which his supply dwindled away to less than 1-6th of the requirements for the remaining 5 shipping days. The other shippers are in practically the same box and the point has been reached where it is hopeless for the shippers to even maintain the advantage in the soft coal movement, which they had over last year at the first of October. The lake tonnage with which to move the material has been more than adequate. In fact, the shipments out of Buffalo have increased so perceptibly during the last week that some of the tonnage which had been trying to find employment here went to Buffalo to take cargoes. The rates out of Buffalo have been more enticing. Here they have not changed for months, and there is hardly a condition which would make them change now. The shippers have not enough coal with which to force a decline. The domestic market is in much better shape. The factories here have been obtaining a full stock of coal, and the local retail dealers seem to have been unstinted in their supply. The prices hold steady without further tendency to advance them, which was not a week or so ago.

Pittsburg. Nov. 16.

(From Our Special Correspondent.)

Coal.—There has been no improvement in the situation during the week, and most of the railroad coal mines in the district are idle. A fair supply of cars was received at the mines along the Panhandle Railroad yesterday, but none to-day. The cars that have been loaded during the past week have not yet been moved. A like condition of affairs exists along other lines leading into the coal fields. It is now estimated that the Pittsburg Coal Company will be 1,500,000 tons short in its contracts for the Northwest. Some of this may be made up in all rail shipments during the winter, but this is doubtful. The lake shipping season likely will close in about two weeks. The Monongahela River Consolidated Coal and Coke Company is operating all of its river mines, and now has loaded fully 20,000,000 bush. ready to go to Southern ports on the next rise. The local supply of coal from the river mines has been unusually good, and this alone has prevented the closing of some of the industrial establishments as shipments by rail are very irregular. Prices are firm and premiums are offered in many instances for prompt delivery.

Connellsville Coke.—There has been a falling off in both production and shipment, and there is but little indication of an improvement. Fancy prices continue to be offered for coke, but the railroads are unable to move the coke required, and the blast furnaces of the Valleys and in the Pittsburg district are being operated very unsatisfactorily. The Courier, in its last issue, gives the production for the previous week at 247,310 tons, a decrease of 7,427 tons. The shipments for the week aggregated 9,606 cars, distributed as follows: To Pittsburg and river tipples, 3,729 cars; to points west of Pittsburg, 4,581 cars; to points east of Connellsville, 1,298 cars. This was a decrease of 952 cars.

San Francisco. Nov. 15.

(Special Report of J. W. Harrison.)

The local coal market is quiet, with no special changes to report.

Prices.—Current prices for Coast coals to dealers are as follows: Wellington, \$8.50; Southfield, \$8; Roslyn, \$7; Seattle and Bryant, \$6.50; Coos Bay, \$5.50; white ash, \$5. For Rocky Mountain coals, large lots, quotations are: Castle Gate, Clear Creek, Rock Springs or Sunnyside, \$8.50; Colorado anthracite, \$14. For Eastern and foreign coals, cargo lots, prices are: Pennsylvania anthracite, \$14; Cumberland, \$12; Welsh anthracite, \$13; cannel, \$9; Brymbo, \$7.50; Wallsend, \$6.50.

Foreign Coal Trade. Nov. 19.

No export business is noted beyond the usual shipments to the West Indies and South America. Some Welsh coal continues to come in, though most of the large orders have been filled.

Messrs. Hull, Blyth & Co., of London and Cardiff, report under date of November 7, that the Welsh coal market is perhaps a shade easier for some descriptions, but there is little change to report in prices. The quotations are: Best Welsh steam coal, \$3.90@3.96; seconds, \$3.78; thirds, \$3.72; dry coals, \$3.96; best Monmouthshire, \$3.48@3.60; seconds, \$3.42; best small steam coal, \$2.34; seconds, \$2.16; other sorts, \$1.98.

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.

Freights to Mediterranean ports remain about unaltered, while Eastern and South American rates are decidedly weaker. Some rates quoted from Cardiff are: Marseilles, \$1.30; Genoa, \$1.23; Naples, \$1.23; Singapore, \$2.64; Las Palmas, \$1.56; St. Vincent, \$1.74; Rio Janeiro, \$2.40; Santos, \$2.52; Buenos Aires, \$1.98.

IRON TRADE REVIEW.

New York, Nov. 19.

The iron trade, as shown in our local letters, is seriously embarrassed by short supplies of fuel at the furnaces and by difficulties in delivering materials, resulting from the congested condition of the railroads. This has disturbed production, and made the trade very irregular for the time.

The lower range of prices established on some finished products has had little effect so far, but the results will be realized later.

Birmingham. Nov. 17.

(From Our Special Correspondent.)

The pig iron market has been featureless. The production is strong and the shipments would be satisfactory if there was not such a congestion of affairs on the railroads, locomotives and cars being short on almost all the roads in this sections. There is no iron for sale for this year's delivery. A few hundred tons might be secured at \$25 per ton, but that question is a dubious one. The bulk of the make for the first half of the coming year has been disposed of, though some

orders are still being booked. Buying for the last half of the year has not yet opened up, but some inquiry is being made. It is positive that no reduction in prices will be accepted by the manufacturers, anyhow, for some time to come.

The Sloss-Sheffield Steel and Iron Company, with 7 furnaces in blast during the month of October, though one of the furnaces was laid up for repairs for a few weeks, turned out 31,344 tons. The Tennessee Coal, Iron and Railroad Company, at its Ensley furnaces, five in blast, during last month manufactured 20,800 tons of iron, of which 6,650 tons was foundry, and much of the balance was basic iron, which is used in the steel plant. The output at the steel mills last month was over 16,000 tons. The Alabama Steel and Wire Company, in its rod, wire and nail mills, got much of the product of the steel plant. The Alabama Consolidated Coal and Iron Company, the Woodward Iron Company, the Woodstock Iron Company, and the various smaller manufacturers all got out large productions last month.

The Valley Iron Company, which will build a big furnace near Valley Head, Ala., is pushing the work. This company has just let the contract for the erection of a large battery of coke ovens, and is also opening ore and coal mines to get a full supply of raw material for the plant.

There has been no change in prices. The following quotations are made: No. 1 foundry, \$21@22; No. 2 foundry, \$20@21; No. 3 foundry, \$18.50@19.50; No. 4 foundry, \$17@18; gray forge, \$16.50@17; No. 1 soft, \$21@22; No. 2 soft, \$20@21.

There has been iron sold in this district at \$23 per ton for Nos. 1 and 2 foundry. The furnace companies have about wiped out all old contracts, and are now delivering on intermediate price iron. It will be January 15 before the bulk of the higher price iron will be going out.

The finished iron and steel market is still very active. There is no time being lost at the steel plant and at the rolling mills in Alabama. During the week the first steel rail was manufactured at the steel plant at Ensley belonging to the Tennessee Coal, Iron and Railroad Company. Rails will be made now regularly. The company has some good orders on hand and in sight.

Chicago Nov. 17.

(From Our Special Correspondent.)

Both buyers and sellers of pig iron say the market is dull; there is a disposition on the part of both parties to hedge regarding contracts; the iron sellers think it unwise to unload their product as fast as it is made on the iron-buying public; foundrymen in turn find it possible to hold off their contracts for next year's supply and profit by the delay. There is consequently a healthy lessening of contract making generally. For next year few contracts are being made. Everybody seems to want iron immediately, and to want it very much. Premiums range \$3 to \$4 for delivery this year over the market price, against \$2 to \$3 last week. Quotations to-day are: No. 1 Northern, \$23.50@24; No. 2 Northern, \$23@23.50; No. 3 Northern, \$22.50@23. These figures are for delivery next year, before July 1. For earlier delivery the premium has been noted. Southern is still \$20@22 Birmingham, or \$24.15@26.15 Chicago. Probably the greater part of the trade is being transacted at the higher figures. Much foreign iron is undoubtedly being sold for the Chicago District, though little of it is bargained for here.

Coke continues the trouble in the pig iron industry. Foundry coke sells now at \$11.50@12. There seems little prospect of lower prices for coke for an indefinite period.

Cleveland. Nov. 18.

(From Our Special Correspondent.)

Iron Ore.—The shippers are about through with their year's work. They are now beginning to curtail their movement, and from this to the end of the present month the movement will lag. The end of November will see the end of shipments for this year. The rates of carriage have remained stable at the old figures of 80c. from Duluth; 70c. from Marquette and Escanaba, although strong pressure was brought to bear to advance them. The movement so far this month has been past 1,000,000 tons, assuring absolutely that the year's movement will be upwards of 26,500,000 tons, or perhaps 27,000,000 tons. There has been some talk of carrying contracts for next year, but nothing has been done so far.

Pig Iron.—The market conditions are off considerably. The demand has eased up, because some of the foundries here have been shut down on account of a strike, and because the other foundries seem to be ordering sparingly. The relief, however, is but for the time. Without a speedy relief from the coke shortage serious times are ahead for the consumers. It is agreed that importations during the first half of the year are now impossible, because there is no further material for sale abroad. The condition in which this leaves the market can readily be understood. The coke shortage is very severe. Twenty-two furnaces have banked their fires in the Valleys, and some of them have been out of blast for a couple of weeks, partly to the uncertainty as to prices, owing to the

while all of them are running short of their usual capacity, and most of them are in blast intermittently. This leaves no iron for immediate shipment, and but very little for first half delivery. No. 2 foundry is now bringing \$23, Valley furnace, for first half delivery, and \$21 for second half. Southern foundry No. 2 is bringing \$20 Birmingham for first half delivery. The bessemer and basic producers have been off of the market for some time, and refuse now to make quotations, especially those which are in the association.

Finished Material.—The demand for plates has been the one redeeming feature of a market which was otherwise weak and listless. The buying was mostly for third quarter delivery of next year, although the amount of material available for that period is small. The price holds as it was, and the feature therefore is the continuance of the demand following the readjustment of prices in the financial circles, which it has been expected would change other market conditions. The jobbers do not fare so well, nor the smaller mills that have been demanding and obtaining premiums. The smaller mills are able now to obtain 2c. only on their material for spot delivery, with evidences that the market is likely to fall below that in a short time. The demand for plates out of stock has been so light that the price has been reduced on the sheared article to 2.25c., while on universal plates the market has continued steady at 2.50c., which has been the high mark this year. The structural material market is in about the same condition. The price has been steady at 1.60c. for the product of the larger mills, and from 2c. to 2.50c. at the smaller mills, while the jobbers have been getting from 2.50c. to 3c. for what material they have. The quotation of 2c. at the smaller mills is mostly on angles, which show some weakness. The sheet market is more quiet, with apprehensions on the part of the dealers that another decline is impending. This is so thoroughly held with the consumers that they are waiting for it, and are ordering only in small lots on that account. The prices remain at 3.10@3.25c. for No. 27 out of stock. The bar prices have been stronger during the week, with all the mills adhering to the 1.80c. quotation, while the demand has been fair only. The steel product is selling at 1.60c. Pittsburg for bessemer and 1.70c. Pittsburg for open-hearth.

Philadelphia. Nov. 19.

(From Our Special Correspondent.)

Pig Iron.—The fact which surprises most agents of pig iron and representatives of furnaces is the constant appearance in this market of small buyers, who are in a position to be taken advantage of if sellers were so inclined. A careful canvass of this market among the consumers show the surprising fact that there are a great many who will be obliged to buy from hand-to-mouth for a long time to come, or until the furnace companies catch up with their big contracts. It was supposed a few weeks ago that consumers had covered their requirements, but on investigation it is found that this is true with reference to the larger consumers, but not the smaller. The little concerns that are scattered all around have either been unwilling or unable to buy far ahead, and it is this class which is now keeping sellers worried. Quotations are \$25@26 for No. 1X; No. 2X runs all the way from \$23 to \$24, and No. 2 plain from \$22 to \$23. Gray forge can be had at about \$21, though a few brands bring more. Scotch iron is close to \$23.50 to \$24, delivered. There is not much doing this week, the importers say, in foreign material, but they are quite comfortable, as they think they understand the situation perfectly. Bessemer is likely to take another jump.

Billets.—The drop in billets has unsettled the market, and has side-tracked some business that was on the point of going through last week. With billets down to \$28 at Pittsburg and \$27.50 quoted on German, there is some reason for buyers waiting to see the next move.

Plates.—The plate people look for a good run of business before the appearance of cold weather. Some additional work for winter in the way of office buildings and in other lines has opened up, and inquiries to cover are now in hand, and will probably lead to orders. In a general way the plate mills have all they can do, and quotations are 2.10c. for small lots and 2c. for car lots; universals, 2@2.10c.; flange, 2.15@2.25c.; fire-box, 2.30c.; marine, 2.30@2.40c.; charcoal plates, No. 1, 2.50c.; flange, 3c., and No. 1 flange fire-box, 3.50c.

Old Rails.—Old rails are \$24.50@25 for iron. There are no old steel rails in the market.

Scrap.—Some kinds of scrap have been marked down, but when it comes to the heavy steel, low phosphorus or choice railroad scrap the holders are able to get their price. Heavy steel scrap brings \$20.50; choice railroad scrap \$23.50 at present.

Pittsburg. Nov. 18.

(From Our Special Correspondent.)

There is a decided lull in the iron and steel markets this week, due mainly to the freight congestion and to the uncertainty as to prices, owing to the

recent cuts made by important constituent companies of the United States Steel Corporation. The freight blockade in this district never has been as bad, not excepting the time of the switchmen's strike a year ago. The situation is growing worse, and while there was a heavy movement on Sunday the result was scarcely noticeable. As a result many mills, mines and furnaces have been forced to suspend operations. It is estimated that fully 60,000 men are idle in the Pittsburg District all of whom would be employed if the railroads were able to take care of the business offered. The situation has become so critical that a conference of railroad officials is being held here to ascertain what can be done to relieve the condition. President A. J. Cassatt, of the Pennsylvania Railroad, came to Pittsburg last night in his private car, accompanied by other officers and Chief Engineer W. H. Brown. They will look over the field, and consider what can be done to clear the yards and sidings of the immense tonnage that has accumulated, and is being added to daily. The railroad employees have been greatly overworked in the effort to handle the freight offered, and many accidents have resulted, as in some instances the men were not in condition to discharge their duties. The Pennsylvania has made a general advance of 10 per cent in wages to its employees, and other companies are preparing to follow. Among the plans under consideration to relieve the congestion between Pittsburg and Philadelphia is one to build a low-grade freight line from the Susquehanna River to the Delaware. The Pressed Steel Car Company is turning out 125, and the Standard Steel Car Company 40 cars a day, which are loaded as soon as they leave the works instead of being delivered empty. The principle difficulty, however, is the lack of adequate track facilities and motive power. Coke cars which, under normal conditions, made the round trip from the ovens to the furnaces in three days, are now held up for three weeks or a month. Not more than half a dozen furnaces in the Mahoning and Shenango Valleys were in operation yesterday, and 24 are reported banked to-day. There were no shipments of coke from the Connellsville region to the merchant furnaces in the Valleys. All the coke used was obtained from West Virginia ovens. A small lot of bessemer iron for delivery in December was sold last week at \$24, Valley furnace.

The plants of the big Steel Corporation are not as seriously affected as the smaller concerns. Runners are employed to follow all shipments and expedite the movements. The Corporation by its recent cuts in prices in dull lines has been able to book enough business to keep the plants in steady operation for many months. It is expected that all of the tin-plate works will be running before the close of another week, due to the reduction in price from \$4 to \$3.60 a box. The market in sheets is improving, but shipments are very poor, and a large tonnage is tied up at various points. The latest report relative to the purchase by the United States Steel Corporation of pig iron for the second and third quarters is that an order will be placed with the merchant furnaces for 150,000 tons under certain conditions. Furnaces that sell their iron will be furnished with coke at \$3 a ton, and will be expected to make a low price for the iron.

The steel market is quiet, and domestic billets are offered at a lower rate than a week ago. Some new business was done in plates, bars and structural material during the week at base prices for delivery next year. Lower prices are being made on common iron bars. Moderate sized lots can now be had at 1.70c., but this price has not stimulated buying. The mills are all filled for the rest of the year, but have not taken on much business for next year. Prices for iron bars during the past few months have ruled about \$2 a ton higher than steel bars. As indicated in the last issue there was no change in wages as a result of the bi-monthly examinations of the sales sheets for bar iron, steel sheets and tin plate.

Pig Iron.—All of the merchant furnaces are from 30 to 60 days behind on shipments, and but little new business is being booked. A lot of 200 tons of bessemer iron was sold the other day at \$24, Valley furnace, for delivery next month. For the first half of next year \$21 to \$22, Valley, is quoted. There is no foundry iron for delivery this year, and for the first half \$23, Pittsburg, is quoted for No. 2. Gray forge can be had for 1903 delivery at \$21@21.50, Pittsburg.

Steel.—There is but little doing in billets, and prices of bessemer range from \$28 to \$30. Negotiations for German bessemer billets that have been pending for over a week are without result, the price asked being too high. Orders for steel plates aggregating about 10,000 tons for late delivery, have been received, the price being 1.60c.

Sheets.—The American Sheet Steel Company continues to book large orders for future delivery at the reduced prices. Some independent plants are still idle, as it is impossible to meet the low rates. No. 28 gauge black sheets continue to be quoted at 2.75c., and galvanized at 75 and 10 per cent off.

Ferro-manganese.—There is no change in the market, the foreign product still being quoted at \$50@51.50.

New York. Nov. 15.

Pig Iron.—Transactions are not heavy, and buying is strictly on a hand-to-hand basis. Prices are unchanged. We quote for 1903 delivery, Northern irons at tidewater: No. 1X foundry, \$23@25.50; No. 2X, \$22@23; No. 2 plain, \$21@22. For Southern iron on dock, New York, No. 1 foundry, \$24.75; No. 2, \$24.25; No. 3, \$23.75. Middlesboro pig is quoted at \$19.50, in large lots, but for small lots and spot delivery, \$22 is obtained.

Bar Iron and Steel.—Business continues excellent. We quote for large lots on dock: Refined bars, 2@2.05c.; common, 1.90@1.95c.; soft steel bars, 2@2.10c.

Plates.—Demand continues strong with no change in prices. We quote for tidewater delivery in car-loads: Tank, 1/4-in. and heavier, 2.05@2.20c.; flange, 2.15@2.25c.; marine, 2.25@2.50c.; universal, 2@2.20c.

Steel Rails.—Standard sections are still quoted at \$28. f. o. b. mills for 1903 delivery; light rails, \$30@33, according to weight. Relaying rails are \$28@30 for heavy sections and \$33@35 for light sections.

Structural Material.—Demand is still brisk. We quote for large lots at tidewater: Beams, angles, channels and tees, 2@2.20c. For small lots and prompt delivery good premiums are paid.

Cartagena, Spain. Nov. 1.

(Special Report of Barrington & Holt.)

Shipments for the week have been two cargoes, 4,600 tons, of dry ores to Great Britain. Demand continues good and several contracts for 1903 delivery have been made.

Prices are unchanged. Dry ores are quoted from 6s. 9d. to 7s. 9d. per ton, f. o. b. shipping port; specular ore, 5s per cent iron, 9s. 3d.; magnetic ore, 60 per cent, 11s. 9d. for lumps, and 9s. 9d. for fines. Manganiferous ores range from 14s. 6d. for 20 per cent to 9s. 9d. for 12 per cent manganese.

Iron Pyrites.—Quotations for pyrites, 40 per cent iron and 43 per cent sulphur, are 11s. 3d. per ton. Shipments reported are 320 tons to Genoa.

CHEMICALS AND MINERALS.

(See also wholesale price-list on page 700.)

New York, Nov. 19.

Second hands are in control of the spot market for nearly all lines, while on future deliveries makers are inclined to shade prices, notably in heavy chemicals.

Heavy Chemicals.—A few more 1903 alkali orders have been taken at quotations below, while makers of electrolytic caustic soda are reported to have booked forward contracts at \$1.70 per 100 lbs., f. o. b. works. Bleaching powder is quiet. Other lines show steady prices.

We quote domestic chemicals, per 100 lbs., f. o. b. works, as follows: High test alkali, in bags, 82 1/2 @ 87 1/2c., for prompt shipment, and 77 1/2 @ 85c. for forward; caustic soda, high-test, \$1.90@1.95 for early delivery, and \$1.70@1.85 for futures; bicarb. soda, ordinary, \$1.25, and extra, \$3; sal soda, 55 @ 60c.; chlorate of potash, \$7.50@7.75, for immediate shipment, and \$7@7.12 1/2 for contracts; bleaching powder, next year's delivery, \$1.25. For foreign goods, we quote per 100 lbs. in New York: Alkali, high-test, 90@92 1/2c.; caustic soda, high-test, \$2.25; sal soda, 67 1/2c.; bicarb. soda, \$1.50@1.60; chlorate of potash, \$7.50@7.75 for prompt, and \$7@7.25 for forward; bleaching powder, prompt, prime brands, Liverpool, \$1.75; Continental, \$1.55@1.65; contracts at \$1.25@1.37 1/2, according to seller and time of delivery.

Copperas.—Combination prices are being shaded by outside makers, who have sold at 25c. per 100 lbs. in bbls. The combination schedule is 37 1/2c. in bulk, and 42 1/2c. in bbls.

Acids.—Important sulphuric acid contracts have been booked over next year on basis of quotations below. Oxalic acid contracts are being taken at \$5.25 per 100 lbs., which can yield small profit to the manufacturer. It is generally believed that a gentlemen's agreement now exists among foreign manufacturers of oxalic acid, as sellers are unanimous in quoting one price for new contracts. Blue vitriol is feverish, as competition is growing between the domestic and foreign makes. Sales of foreign blue vitriol are reported at \$4.45 per 100 lbs., and incoming steamers are quoted at less.

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

Blue vitriol.....	\$4.45@4.70	Oxalic com'l....	\$5.25@5.50
Muriatic, 18" ..	1.50	Sulphuric, 50"	13.50@15.50
Muriatic, 20" ..	1.62 1/2	Sulphuric, 60"	1.05
Muriatic, 22" ..	1.75	Sulphuric, 68"	1.20
Nitric, 38" ..	4.00	Sulphuric, 60"	18.00@20.00
Nitric, 40" ..	4.25	Sulphuric, 68"	21.00@23.00
Nitric, 42" ..	4.50		
Nitric, 44" ..	4.87 1/2		

Exports of copper sulphate from New York in October amounted to only 56,454 lbs., the smallest quantity in a long while. In the 10 months ending October

31 the exports aggregate 23,473,622 lbs., as against 37,352,821 lbs. in the corresponding period last year, showing a decrease of 13,879,199 lbs., or about 37 per cent this year. This falling off is due chiefly to the smaller shipments to Italy, Austria and France. Of the total exports this year Italy alone received 14,659,838 lbs., or 62.5 per cent, whereas last year the quantity reported was 27,499,645 lbs., or 73.6 per cent.

Brimstone.—Arrivals so far this month aggregate over 5,000 tons, nearly all of which went into consumption immediately. Consequently little is obtainable on spot, for which sellers ask \$24 per ton for best unmixed seconds. Early arrivals can be had at 50c. less, while futures are variously quoted at \$22.75@23.25, according to position and seller. Preparations are understood to be in progress for the working of sulphur mines in Mexico, and a 10-ton refining plant is to be erected in Zacatecas. This sulphur is to be shipped to New York.

Concerning the Sicilian market Messrs. Emil Fog & Sons, of Messina, write us under date of October 31, as follows: The coal strike in the United States and contemporaneously extremely low outward freights to the Mediterranean caused all available steamers to load coal for the United States, and a scarcity of tonnage in the Mediterranean was the consequence. Prompt steamers are entirely wanting, and as much as 12s. to New York, and 15s. to the Baltic had to be paid to fulfil previous engagements. This want of tonnage exerts a depressing influence on brimstone. Exports have decreased and stocks are increasing. End of September stocks were 322,999 tons, against 264,757 tons last year. September exports were 33,588 tons, against 34,288 tons. Under these circumstances the raising quotations was not only relinquished by the Anglo-Sicilian Company, but they even reduced prices by 1s, or so for seconds only. Prices for thirds remain unaltered, especially the lowest qualities, which are still in favor. Current thirds, which were neglected during so many years, are now bought in preference by French refineries, and through adopting improved methods the tests of impurity were reduced to only about 4 per cent against 7 to 10 per cent of old. The production, it was asserted, was on the way of diminution, and the Anglo-Sicilian Company, in consequence, manifested a desire of raising quotations for future delivery by 2s. or 3s. But the heavy increase in stocks makes one hesitate to accept such assertion, especially in Sicily, where it is so difficult to get at the truth of things.

We quote, f. o. b., per ton: Best unmixed seconds in bulk, 82s. 6d.; best thirds in bulk, 77s., current thirds in bulk, 73s.; refined block sulphur in bulk, 86s. 9d.; refined roll sulphur in 3 cwt. casks, 97s. 6d.; sublimed flowers, pure, in bags, 101s. 9d.; sublimed flowers, current, in bags, 93s. 6d.

Pyrites.—Imports are quite large. Business is good, and prices continue steady. Ocean freights from Huelva, Spain, to the United States are now 10s. 6d. (\$2.52).

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

Phosphates.—Quiet. Prices unchanged.

Phosphates.	Per ton F. o. b.	United Kingdom or European Ports.	
		Unit.	Long ton.
*Fla. hard rock (78@80%)	\$6.50@7.00	6 1/2@d.	\$10.07@10.27
*Fla. land pb. (68@73%)	3.00@3.25	4@5d.	6.65@7.00
*Tenn. (78@82%) export	3.25@3.50	5 1/2@d.	8.59@9.36
†Tenn., 78% domestic	3.00		
†Tenn., 75% domestic	2.75	3.00	
†Tenn., 73@74% domestic	2.30@2.40		
†Tenn., 70@72% domestic	2.10@2.25		
‡So. Car. land rock	2.75@3.00	3 1/2@4 1/4@d.	5.67@5.98
‡So. Car. river rock	2.75	3.00	
Algerian (63@65%)	5 1/2@d.	7.15@7.15	8.13
Algerian (58@63%)	5@5 1/2@d.	6.00@6.90	
Algerian (53@58%)	4@5d.	5.32@5.58	

*Fernandins, Brunswick or Savannah.
†Mt. Pleasant. ‡On vessels, Ashley River.

Nitrate of Soda.—The spot and nearby market continues very strong, with sales at \$1.95 per 100 lbs. Demand, however, is rather quiet. The statistical position is strong, and there appears to be little nitrate available for the next three or four months. Consumption is at the rate of about 25,000 tons a month, which is more than twice the quantity reported for the corresponding period last year. Arrivals this week were the *Capac* at New York with 28,442 bags, and the *Blue Cross* at Boston with 29,600 bags. The market for futures is quiet, and sellers quote \$1.82 1/2 @ \$1.85, according to position.

The Lagunas Syndicate, which had a net profit of \$125,128 (\$625,640) from its operations in the year ended June 30 last, has declared an interim dividend of 5s. per share, making 10 per cent (\$275,000) for the year. The company carries forward £6,318 (\$31,590) to next year's account.

Sulphate of Ammonia.—Business is regular, and prices are firm. Spot is quoted around \$3 per 100 lbs., and shipments at \$2.95@2.97 1/2.

Liverpool. Nov. 5.

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

The market for heavy chemicals is quiet, but at the same time there is a fair amount of business passing in the main lines.

Soda ash prices vary as to market. For tierces the nearest range may be called about as follows: Leblanc ash, 48 per cent, £5 15s.@£6; 58 per cent, £6 2s. 6d.@£6 7s. 6d. per ton, net cash. Ammonia ash, 48 per cent, £4 5s.@£4 10s.; 58 per cent, £4 10s.@£4 15s. per ton net cash. Bags, 5s. per ton under price for tierces. Soda crystals are firm at generally £3 7s. 6d. per ton, less 5 per cent for barrels, or 7s. less for bags, with special terms for certain export markets. Caustic soda is firmly held, and orders are coming to hand pretty freely. Quotations are unchanged, 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 is quiet as regards export business, but makers are fairly busy with contract deliveries. For hardwood packages £6 10s.@£6 12s. 6d. per ton, net cash, is about nominal range, with special quotations for certain export quarters.

Chlorate of potash is neglected, and 2 1/2d. per lb., net cash, is the nominal quotation.

Bicarb. soda is well maintained at £6 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 quotations for a few favored markets.

Sulphate of ammonia is steady at £11 17s. 6d.@£12 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 is steady on spot at £9 2s. 6d.@£9 5s. per ton, less 2 1/2 per cent for double bags, f. o. b. here, as to quality, and a moderate trade doing at the range.

METAL MARKET.

New York, Nov. 20.

Gold and Silver Exports and Imports.

At all United States Ports in October and Year.

Metal	October.		Year.	
	1901.	1902.	1901.	1902.
Gold:				
Exports.....	\$4,066,747	\$1,446,514	\$36,747,316	\$32,442,833
Imports.....	9,138,638	9,113,041	44,538,680	34,019,533
Excess. I.	\$5,071,891	I. \$7,666,527	I. \$7,791,364	I. \$1,578,700
Silver:				
Exports.....	\$4,737,683	\$4,382,545	\$46,225,608	\$39,963,084
Imports.....	3,070,516	2,709,734	25,561,660	21,470,578
Excess. E.	\$1,667,167	E. \$1,672,811	E. \$20,663,948	E. \$18,492,506

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 November 19, and for the years from January 1:

Period.	Gold.		Silver.		Total Excess, Exports or Imports.
	Exports.	Imports.	Exports.	Imports.	
Week.....	\$252,260	\$40,827	\$683,800	\$43,228	E. \$ 852,005
1902.....	25,011,792	3,552,868	23,415,858	1,083,669	E. 43,791,173
1901.....	41,447,575	4,441,223	27,967,469	3,351,796	E. 61,622,035
1900.....	36,659,688	10,070,685	35,452,312	4,391,973	E. 57,649,343

These exports were chiefly to Europe, and the imports from Central and South America and the West Indies.

Financial Notes of the Week.

The process of liquidation on the stock markets continues. General business seems to be but little affected, however, and there are no special changes to report.

Exports of merchandise from the United States in October are valued by the Bureau of Statistics of the Treasury Department at \$143,179,752, exceeding those of September by \$21,959,374; but falling \$2,479,663 below those of October, 1901. For the 10 months ending October 31 the report of the Bureau is as follows:

	1901.	1902.
Exports.....	\$1,191,987,682	\$1,086,329,230
Imports.....	727,924,332	789,638,946
Excess, exports.....	\$464,063,350	\$296,690,284
Add excess of exports, silver.....		15,492,506
Add excess of exports, gold.....		1,576,700
Total apparent balance.....		\$316,759,490

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 59 banks represented in the Clearing House, for the week ending November 15, gives the following totals, comparison being made with the corresponding weeks of 1901 and 1900:

	1900.	1901.	1902.
Loans and discounts..	\$787,846,100	\$882,567,400	\$870,434,200
Deposits	839,670,100	946,084,300	878,219,400
Circulation	30,677,500	31,982,600	44,608,100
Specie	158,852,500	176,589,500	171,030,300
Legal tenders	58,734,800	70,035,400	66,852,900
Total reserve	\$217,587,300	\$246,624,900	\$237,883,200
Legal requirements ..	209,917,252	236,521,075	219,554,850
Balance surplus ..	\$7,669,775	\$10,103,825	\$18,328,350

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 made with the holdings at the corresponding date last year:

	1901.		1902.	
	Gold.	Silver.	Gold.	Silver.
N. Y. Ass'd	\$176,589,500	.....	\$171,030,300	.....
England	174,521,920	.....	166,739,585	.....
France	479,919,180	\$219,739,000	506,173,330	\$220,803,245
Germany	163,310,000	64,675,000	157,410,000	58,225,000
Spain	70,035,000	84,530,000	71,620,000	97,765,000
Neth'lds	28,707,500	29,282,000	23,486,000	32,043,500
Belgium	15,620,000	7,810,000	15,810,000	7,905,000
Italy	79,665,000	9,849,500	82,395,000	10,194,000
Russia	335,070,000	29,405,000	370,635,000	32,700,000

The returns of the Associated Banks of New York are of date November 15, and the others November 13, as reported by the *Commercial and Financial Chronicle* cable. The New York banks do not report silver separately, but specie carried is chiefly gold. The Bank of England reports gold only.

The silver market is quoted dull, with only moderate transactions. India is buying, but no coinage orders for the European governments such as are calculated to produce a rise, are in sight.

The United States Assay Office in New York reports receipts of 132,000 oz. silver for the week.

Shipments of silver from London to the East for the year up to November 6 are reported by Messrs. Pixley & Abell's circular as follows:

	1901.	1902.	Changes
India	£6,512,910	£5,450,330	D. £1,062,580
China	590,212	102,500	D. 487,712
The Straits	439,909	648,220	I. 208,311
Totals	£7,543,031	£6,261,050	D. £1,281,981

Arrivals for the week were £170,000 from New York, £13,000 from Australia, and £3,000 from New Zealand; total, £186,000 all bar silver. Shipments were £125,000 in bar silver to Bombay and £2,500 to Colombo; total, £127,500.

Indian exchange continues steady, and the Council bills offered in London were taken at an average of 15.96d. per rupee. Buying of silver continues very light.

The gold and silver movement in France for the 9 months ending September 30 is reported by the Ministry of Commerce as below:

	1901.	1902.	Changes.
Gold:			
Imports	Fr. 245,175,000	Fr. 332,408,000	I. Fr. 87,233,000
Exports	97,622,000	48,603,000	D. 49,019,000
Exc. imp. ...	Fr. 147,553,000	Fr. 283,805,000	I. Fr. 136,252,000
Silver:			
Imports	Fr. 76,315,000	Fr. 71,897,000	D. Fr. 4,418,000
Exports	105,549,000	83,865,000	D. 21,684,000
Exc. exp. ...	Fr. 29,234,000	Fr. 11,968,000	D. Fr. 17,266,000

Imports of copper and nickel coins, at their face value, were 60,000 fr. this year, against 77,000 fr. in 1901. Exports were 274,000 fr., against 253,000 fr. last year.

The foreign trade of Great Britain for the 10 months ending October 31 is given by the Board of Trade returns as below:

	1901.	1902.
Imports	£428,745,972	£435,709,350
Exports	289,951,671	289,670,528
Excess, imports	£138,794,301	£146,038,822

This shows an increase of £6,963,378, or 1.6 per cent, in exports; a decrease of £311,143, or 0.1 per cent in imports, and an increase of £7,274,521 in the balance of imports.

Prices of Foreign Coins.

	Bid.	Asked
Mexican dollars	\$0.39 1/2	\$0.41 1/2
Peruvian soles and Chilean pesos	38 1/2	42
Victoria sovereigns	4.85	4.88
Twenty francs	3.85	3.88
Twenty marks	4.74	4.80
Spanish 25 pesetas	4.78	4.82

Missouri Ore Market. Nov. 15.

(From Our Special Correspondent.)

Joplin Ore Market.—There was a little more freedom to ore movement the past week, but a scarcity of cars is still the chief feature in the market. Zinc ore has declined \$1 a ton, and the car situation has become so bad that the Joplin Commercial Club last week sent a delegation to St. Louis to see railroad officials. There are still in the district thousands of tons of ore that have been bought by the different smelters, but cannot be handled, consequently buyers are making few offerings and the market is weak.

The assay basis all over the district is \$34 per ton

for 60 per cent ore, but in some cases only \$33 per ton was paid for standard quality. The top price for the week was \$38, and the usual high-grade ore mines round Joplin brought this figure.

During the corresponding week of 1901 the shipment was greater by 2,063,700 lbs. of zinc and 449,630 lbs. of zinc, and the value \$5,106 greater. During the corresponding 46 weeks of last year the zinc shipment was less by 10,461,500 lbs., the lead sales greater by 5,823,480 lbs., and the value less by \$1,430,299. Following are the sales from the various producing camps for the week ending November 15:

	Lead.	Zinc.	Value.
	lbs.	lbs.	
Camp			
Joplin	2,832,780	258,500	\$54,620
Galena-Empire	832,660	228,920	19,058
Carterville	1,539,260	288,570	31,842
Prosperity	314,580	67,920	7,204
Aurora	465,520	.....	7,270
Duenweg	839,960	84,670	15,656
Zincite	237,990	8,070	4,367
Oromogo	170,750	3,950	3,028
Spurgeon	102,760	13,220	1,967
Central City	127,026	6,580	1,830
Alba-Neck	322,720	54,130	7,001
Carthage	91,920	.....	1,809
Carl Junction	148,400	.....	2,597
Cave Springs	77,240	9,850	1,559
Ash Grove .....	.....	70,570	1,694
Granby	732,640	18,500	11,034
District total	8,836,200	1,113,470	172,086
Total 46 weeks	470,193,620	56,921,620	8,440,553

Zinc value, week, \$144,203; lead, \$27,833. Zinc value, 46 weeks, \$7,142,122; lead, \$1,298,431.

OTHER METALS.

Daily Prices of Metals in New York.

	Silver		Copper		Spelter	
	Nov.	Dec.	Nov.	Dec.	Nov.	Dec.
Nov.	4.87	4.93	22 1/2	11 1/2	11 1/2	5 1/2
13	4.87	4.93	22 1/2	11 1/2	11 1/2	5 1/2
14	4.86	4.92	22 1/2	11 1/2	11 1/2	5 1/2
15	4.86	4.92	22 1/2	11 1/2	11 1/2	5 1/2
16	4.86	4.92	22 1/2	11 1/2	11 1/2	5 1/2
17	4.86	4.92	22 1/2	11 1/2	11 1/2	5 1/2
18	4.86	4.92	22 1/2	11 1/2	11 1/2	5 1/2
19	4.86	4.92	22 1/2	11 1/2	11 1/2	5 1/2

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 continued weakness manifested on the Stock Exchange has influenced the market unfavorably, and in consequence thereof, values have again suffered, in spite of the fact that there has been a somewhat better consumptive inquiry.

At the close we quote lake copper 11 1/2c; electrolytic in cakes, wirebars or ingots, 11 1/4c; cathodes, 11c; casting copper, 11 1/4c.

The foreign market, which closed last Friday at £51 2s. 6d., opened on Monday at £51 5s., and the closing quotations on Wednesday are cabled as £50 17s. 6d. @ £51 for spot and £51 @ £51 2s. 6d. for three months prompt.

Refined and manufactured sorts we quote as follows: English tough, £53 @ £53 5s.; best selected, £54 10s. @ £54 15s.; strong sheets, £67 @ £67 10s.; India sheets, £66 @ £66 10s.; yellow metal, 6 1/2 @ 6 3/4 d. Statistics for the first half of November show a decrease in the visible supplies of 1,000 tons.

Exports of copper from Atlantic ports in the week ending November 18 are reported by our special correspondents as follows: Great Britain, 454 tons; Germany, 174; Holland, 1,137; France, 197; Belgium, 205; Italy, 202; Australia, 4; total, 2,373 tons. Imports were 468 tons copper from Mexico and 74 tons from Japan, also 444 tons ore from Great Britain.

Copper production, as reported by Mr. John Stanton, who acts as statistician for the associated companies, was as follows for October and the 10 months ending October 31, in long tons (2,240 lbs.) of fine copper:

	October	Ten months—	
	1901.	1901.	1901. 1902.
U. S. reporting mines	20,498	24,152	189,224 211,533
U. S. outside sources	3,600	2,100	34,500 33,000
Total U. S.	24,098	26,252	223,724 244,533
Foreign reporting mines	8,960	9,707	82,718 90,122
Total	33,058	35,959	306,442 334,655
U. S. exports	6,016	12,515	74,128 137,826

The United States production was 464 tons greater than in September. For the 10 months the increase over last year was 20,811 tons, or 9.3 per cent. The United States exports for the 10 months show an increase of 73,700 tons, or 99.4 per cent, over last year.

Tin.—The premium for spot tin, which has existed for some time past, is still maintained, but otherwise the market has been rather dull and uninteresting. Values have pretty closely followed the ups and downs of the London market, and show a net decline for the week of about 1/4c. At the close we quote spot at 25 3/4c. November, 25c.; December, 24 3/4c.

The foreign market, which closed firm last week at £115 10s., opened on Monday at £114 15s., declined on Tuesday to £113 10s., and the closing quotations on Wednesday are cabled as £113 @ 113 2s. 6d. for spot and £112 2s. 6d. @ £112 10s. for three months prompt.

Lead is quiet, but firm. A very good inquiry is reported for spot delivery, as shipments from the West are coming through rather slowly. The ruling quotations are 3.97 1/2 @ 4.05c., St. Louis, and 4.05 @ 4c., New York.

The European market remains steady, Spanish lead being quoted £10 13s. 9d. @ £10 15s., with English lead 2s. 6d. higher.

St. Louis Lead Market.—The John Wahl Commission Company telegraphs us as follows: Lead is quiet, and Missouri brands are selling at 4c., while 4.05c. is quoted for argentiferous lead.

Spanish Lead Market.—Messrs. Barrington & Holt report from Cartagena, Spain, under date of November 1 that the price for silver has been 12.25 reales per ounce, with exchange at 33.26 pesetas to £1. Pig lead on wharf was quoted at 57 reales per quintal, equal to £9 12s. per ton. Shipments included 27,027 kgs. pig lead and 1,944 kgs. silver bars to Marseilles.

Spelter.—In spite of a fair consumptive demand, values have given way further, and we quote at the close 5c., St. Louis, and 5.17 1/2c., New York.

The foreign market remains firm, good ordinaries being quoted £19 10s., and specials 5s. higher.

St. Louis Spelter Market.—The John Wahl Commission Company telegraphs us as follows: Spelter is weak and lower. The latest sales are on a basis of 5c., East St. Louis.

Spanish Zinc Ore Market.—Messrs. Barrington & Holt report under date of November 1 that ores are in good demand. The monthly production of the district shipping through Cartagena is now from 8,000 to 10,000 tons.

Antimony is quiet and steady. The ruling quotations are 9 @ 9 1/2 c. for Cookson's, 7 3/4 c. for Hallett's, 7 1/8 @ 7 1/4 c. for Hungarian, Japanese, Italian and U. S. Star.

Nickel.—The price is now quoted by leading producers at 40 @ 47c. per lb., for large quantities down to ton lots, according to size and terms of order. The price for smaller lots, according to quality, runs as high as 60c. per lb.

Platinum.—Consumption continues good, and prices are firm. Ingot platinum in large lots brings \$19 per oz. in New York.

Chemical ware (crucibles and dishes), best hammered metal from store in large quantities, is worth 73 1/2c. per gram.

Quicksilver.—The New York price continues \$48 per flask for large orders, with a slightly higher figure for small lots. In San Francisco prices are steady, and the quotations are \$45.50 @ \$46.50 per flask for domestic orders. For export orders \$44 per flask is quoted. The London price remains £8 15s. per flask, with the same figure quoted from second hands.

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

Aluminum	Per lb.	Ferro-Tungsten (37%)	Per lb.
No. 1, 99% ingots	33 @ 37c.	Magnesium	\$2.75
No. 2, 90% ingots	31 @ 34c.	Manganese, pure (N.Y.) .....	.60c.
Rolled Sheets	4c. up	Mangan'e Cop. (20% Mn) .....	.32c.
Alum-bronze	20 @ 23c.	Mangan'e Cop. (30% Mn) .....	.38c.
Nickel-alum	33 @ 39c.	Molybdenum (Best)	\$1.82
Bismuth	\$1.50	Phosphorus .....	.45c.
Chromium, pure (N.Y.)	80c.	American .....	.70c.
Copper, red oxide	50c.	Sodium metal .....	.60c.
Ferro-Molyb'dum (80%)	\$1.25	Tungsten (Best) .....	.62c.
Ferro-Titanium (10%) .....	.90c.		
Ferro-Titanium (20 @ 25%) .....	.55c.		

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

Average Prices of Metals per lb., New York.

	Month.	1902.	1901.	1902.	1901.	1902.	1901.
January	23.54	26.51	4.000	4.350	4.27	4.13	
February	24.07	26.08	4.075	4.350	4.15	4.01	
March	25.52	26.03	4.075	4.350	4.28	3.91	
April	27.77	25.93	4.075	4.350	4.47	3.98	
May	29.85	27.12	4.075	4.350	4.47	4.04	
June	29.36	28.60	4.075	4.350	4.06	3.99	
July	28.38	27.85	4.075	4.350	5.27	3.98	
August	28.23	26.78	4.075	4.350	5.44	3.90	
September	26.60	25.31	4.075	4.350	5.49	4.08	
October	26.07	26.62	4.075	4.350	5.38	4.23	
November	26.67	.....	4.350	.....	.....	4.29	
December	24.36	.....	4.158	.....	.....	4.31	
Year	26.54	.....	4.334	.....	.....	4.08	

Average Prices of Copper.

Table with columns: Month, Electrolytic (1902, 1901), Lake (1902, 1901), London Standard (1902, 1901). Rows include January through December and a Year total.

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

Average Prices of Silver, per ounce Troy.

Table with columns: Month, London (1902, 1901), N. Y. (1902, 1901). Rows include January through December and a Year total.

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

DIVIDENDS.

Table with columns: Name of Company, Date, Per Share, Total. Includes companies like Amalgamated, Bartolome Mex., Bunker Hill & Sull., etc.

ASSESSMENTS.

Table with columns: Name of Company, Location No., Delinq., Sale, Amt. Lists various mining companies and their assessment details.

STOCK QUOTATIONS.

NEW YORK.

Table of stock quotations for New York, listing companies and their prices for various dates from Nov. 12 to Nov. 18.

BOSTON, MASS.*

Table of stock quotations for Boston, Mass., listing companies and their prices for various dates from Nov. 12 to Nov. 18.

Coal, Iron and Industrial Stocks.

Table of stock quotations for Coal, Iron and Industrial Stocks, listing companies and their prices for various dates from Nov. 12 to Nov. 18.

PHILADELPHIA, PA.†

Table of stock quotations for Philadelphia, Pa., listing companies and their prices for various dates from Nov. 12 to Nov. 18.

Total sales, 802,694 shares.

†Reported by Townsend, Whelen & Co., 300 Walnut St., Philadelphia, Pa. Total sales 19,564 shares.

STOCK QUOTATIONS.

COLORADO SPRINGS, COLO.*

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

*Colo. Springs Mining Stock Exchange. All mines are in Colorado. Total sales 125,700 shares.

COLORADO SPRINGS (By Telegraph.)

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

PARIS.

Oct. 30.

Table of stock quotations for Paris listing companies like Acieries de Crenset, Alumin, etc., with columns for country, product, capital stock, par value, latest dividends, and prices.

ST. LOUIS, MO.*

Nov. 17.

TORONTO, ONT.

Nov. 17.

Table of stock quotations for St. Louis, Mo. and Toronto, Ont. listing companies like Am.-Nettie, Catherine Lead, etc., with columns for shares, par value, bid/ask prices, and sales.

*From our Special Correspondent.

Total sales, 11,000 shares.

LONDON.

Nov. 5.

Table of stock quotations for London listing companies like Anaconda, c. s., Montana, Arizona, etc., with columns for authorized capital, par value, last dividend, and quotations.

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

MEXICO.

Nov. 7.

Table of stock quotations for Mexico listing companies like Durango, Ca. Min. de Penoles, etc., with columns for shares, last dividend, prices, and sales.

SALT LAKE CITY.*

Nov. 14.

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

All mines are in Utah. *By our Special Correspondent. Total sales, 218,750 shares.

CHEMICALS, MINERALS, RARE EARTHS, ETC.—CURRENT WHOLESALE PRICES.
(See also Market Reviews.)

ABRASIVES—		Cust. Meas.	Price.	BARIUM		Cust. Meas.	Price.	GRAPHITE—Am. f.o.b. Prov-		Cust. Meas.	Price.	PAINTS AND COLORS—		Cust. Meas.	Price.
Carborundum, f.o.b. Niagara Falls, Powd., F.F.F.F.F.	lb.		\$0.08	Oxide, Am. hyd. cryst.	lb.		\$0.02	Idence, 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	BARYTES—				German, com. pulv.	lb.		.01 1/2 @ .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 1/2 @ .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
Mont., f.o.b., Chicago	"		.07 @ .07 1/2	Crude, No. 3	"		7.75	Best pulverized	"		.04 @ .08	French, washed	"		.01 1/2 @ .01 1/2
Crushed Steel, f.o.b. Pittsburg	"		.05 1/2	German, gray	"		14.50	Italian, pulv.	"		.01 1/2	Orange mineral, Am.	"		.07 1/2 @ .08
Emery, Turkish flour in kegs	"		.03 1/2	Snow white	"		17.00	GYPSUM—Ground	sh. ton		8.00@8.50	Foreign, as to make	"		.08 1/2 @ .11 1/2
Grains, in kegs	"		.05 @ .05 1/2	BAUKITE—Ga. or Ala. Mines:				Fertilizer	"		7.00	Paris green, pure, bulk	"		.12
Naxos flour, in kegs	"		.03 1/2	First Grade	lg. ton		5.50	Rock	lg. ton		4.00	Red lead, American	"		.05 1/2 @ .06
Grains, in kegs	"		.05 @ .05 1/2	Second grade	"		4.75	English and French	"		14.00@16.00	Foreign	"		.06 1/2 @ .08
Chester flour, in kegs	"		.03 1/2	BISMUTH—Subnitrate	lb.		1.40	INFUSORIAL EARTH—Gr'd.	"		20.00	Turpentine, spirits	gal.		.53 @ .53 1/2
Grains, in kegs	"		.05 @ .05 1/2	Subcarbonate	"		1.65	American best	"		37.50	White lead, Am., dry	lb.		.04 1/2 @ .04 1/2
Peeskill, f.o.b. Easton, Pa., flour, in kegs	"		.01 1/2	BIFUMEN—"B"	"		.03 1/2	French	"		40.00	American, in oil	"		.05 1/2 @ .05 1/2
Grains, in kegs	"		.02 1/2	"A"	"		.05	German	"		2.45	Foreign, in oil	"		.06 1/2 @ .09 1/2
Crude, ex-ship N. Y.: Abbott (Turkey)	lg. ton		26.50@30.00	BONE ASH	"		.02 1/2 @ .02 1/2	IODINE—Crude	100 lbs.		2.45	Zinc, white, Am., ex dry	"		.04 1/2 @ .04 1/2
Kuluk (Turkey)	"		22.00@24.00	BOBAX	"		.07 1/2 @ .07 1/2	IRON—Muriate	lb.		.05	American, red seal	"		.06 1/2
Naxos (Greek) h. gr.	"		28.00	BROMINE	"		.40	Nitrate, com'l	"		.01 1/2	Green seal	"		.07
Garnet, as per quality	sh. ton		25.00@35.00	CADMIUM—Metallic	"		1.40	True	"		.04	Foreign, red seal, dry	"		.05 1/2 @ .05 1/2
Pumice Stone, Am. powd.	lb.		.01 1/2 @ .02	Sulphate	100 lbs.		2.00@2.50	Oxide, pure cupperas color	"		.05 @ .10	Green seal, dry	"		.06 1/2 @ .09 1/2
Italian, powdered	"		.01 1/2	CALCIUM—Acetate, gray		"	1.30	Purple-brown	"		.02	POTASH			
Lump, per quality	"		.04 @ .40	" brown	"		.90	Venetian red	"		.01 @ .01 1/2	Caustic, ordinary	"		.04 1/2 @ .05
Rottenstone, ground	"		.02 1/2 @ .04 1/2	Carbide, ton lots f.o.b. Niagara Falls, N. Y., for Jersey City, N. J.	sh. ton		70.00	Scale	"		.01 @ .03	Elect. (90%)	"		.06 1/2
Lump, per quality	"		.06 @ .20	Carbonate, ppt.	lb.		.05	KAOLIN—(See China Clay.)	"			POTASSIUM—			
Rouge, per quality	"		.10 @ .30	Chloride	100 lbs.		.70 @ .90	KRYOLITH—(See Cryolite.)	"			Bicarbonate cryst	"		.08 1/2
Steel Emery, f.o.b. Pittsburg	"		.07	CEMENT—				LEAD—Acetate, white	"		.07 1/2 @ .08	Powdered or gran.	"		.14
ACIDS—				Portland, Am., 400 lbs.	bbl.		1.70@1.90	Brown	"		.06 @ .06 1/2	Bichromate, Am.	"		.08 1/2 @ .08 1/2
Boracic, crystals	"		.10 1/2 @ .11	Foreign	"		1.65@2.25	Nitrate, com'l	"		.06 1/2	Scotch	"		.08 1/2 @ .09
Powdered	"		.11 1/2 @ .11 1/2	" Rosendale," 300 lbs.	"		.75	" gran.	"		.08 1/2	Carbonate	"		.03 1/2 @ .03 1/2
Carbonic, liquid gas	"		.12 1/2	Slag cement, imported	"		1.65	LIME—Com., abt. 250 lbs.	bbl.		.80	Chromate	"		.15
Chromic, crude	"		.20	CERESINE—				Finishing	"		.90	Cyanide (98@99%)	"		.23
Hydrofluoric, 30%	"		.03	Ofange and Yellow	lb.		.12	MAGNESITE—Greece.				Kalmit	lg. ton		9.05
48%	"		.05	White	"		.13 1/2	Crude (95%)	lg. ton		6.00@6.50	Manure salt, 20%	100 lbs.		.66
60%	"		.11	CHALK—Lump, bulk	sh. ton		2.50	Calcined	sh. ton		17.50@18.00	D'le Manure Salt, 48@53%	"		1.12
Sulphurous, liquid anhy.	"		.05	Ppt. per quality	lb.		.03 1/2 @ .06	Bricks	M		170.00	Muriate, 80@85%	"		1.83
ALCOHOL—Grain		gal.	2.47	CHLORINE—Liquid	"		.30	Am. Bricks, f.o.b. Pittsburg	"		175.00	95%	"		1.86
Refined wood 95@97%	"		.60 @ .65	Water	"		.10	MAGNESIUM—				Permanganate	lb.		.09 1/2 @ .10
Purified	"		1.20 @ 1.50	CHROME ORE—				Carbonate, light, fine pd.	lb.		.05	Prussiate, yellow	"		.13 1/2 @ .14
ALUM—Lump	100 lbs.		1.75	(50% ch.) ex-ship N. Y.	lg. ton		24.75	Blocks	"		.07 @ .09	Red	"		.36
Ground	"		1.80	Bricks f.o.b. Pittsburg	M		175.00	Chloride, com'l	"		.01 1/2	Sulphate, 90%	100 lbs.		2.11
Powdered	"		3.00	CLAY, CHINA—Am. com., ex-dock, N. Y.		lg. ton	8.00	Fused	"		.20	Sylvinit	unit		.39 1/2
Chrome, com'l	"		2.75 @ 3.00	Am. best, ex-dock, N. Y.	"		9.00	Nitrate	"		.60	QUARTZ—(See Silica.)			
ALUMINUM—				English, common	"		12.00	Sulphate	100 lbs.		.75 @ .90	SALT—N. Y. com. fine	sh. ton		2.00
Nitrate	lb.		1.50	Best grade	"		17.00	MANGANESE—Powdered,				N. Y. agricultural	"		1.50
Oxide, com'l, common	"		.06 1/2	Fire Clay, ordinary	sh. ton		4.25	70@75% binoxide	lb.		.01 1/2 @ .01 1/2	SALT PETRE—Crude	100 lbs.		3.35 @ 3.40
Best	"		.20	Best	"		6.00	Crude pow'd.	"			Refined	"		4.25 @ 4.62 1/2
Pure	"		.80	Slip Clay	"		5.00	75@85% binoxide	"		.01 1/2 @ .02 1/2	SILICA—Best foreign	lg. ton		10.00 @ 11.00
Hydrated	100 lbs.		2.60	COAL TAR PITCH	gal.		.08	85@90% binoxide	"		.02 1/2 @ .03 1/2	Ground quartz, ord.	sh. ton		6.00 @ 8.00
Sulphate, pure	"		1.50 @ 2.00	COBALT—Carbonate	lb.		1.75	90@95% binoxide	"		.03 1/2 @ .05 1/2	Best	"		12.00 @ 13.00
Com'l	"		1.15 @ 2.00	Nitrate	"		1.50	Carbonate	"		.16 @ .20	Lump quartz	"		2.50 @ 4.00
AMMONIA—				Oxide—Black	"		2.26 @ 2.30	Chloride	"		.04	Glass sand	"		2.75
Aqua, 16°	lb.		.03	Gray	"		2.28 @ 2.40	Ore, 50%, Foreign	unit		.18 @ .19	SILVER—Chloride	oz.		.65
18°	"		.03 1/2	Small, blue ordinary	"		.06	Domestic	"		.20	Nitrate	"		.34
20°	"		.03 1/2	Best	"		.20	MARBLE—Flour	sh. ton		6.00 @ 7.00	Oxide	"		.85 @ 1.10
26°	"		.05 1/2	COPPERAS—in bulk	100 lbs.		.20 @ .37 1/2	MERCURY—Bichloride	lb.		.77	SODIUM—			
AMMONIUM—				In bbls.	"		.25 @ .42 1/2	MICA—N. Y. gr'nd, coarse	sh. ton		83.00 @ 38.00	Bichromate	lb.		.06 1/2
Carbonate, lump	"		.08 1/2	COPPER—Carbonate	lb.		.18 @ .19	Fine	lb.		.00 1/2 @ .02	Chlorate, com'l	"		.07 1/2 @ .08
Powdered	"		.09	Chloride	"		.25	Sheets, N. C., 2x4 in.	"		.30	Hyposulphite, Am.	100 lbs.		1.60 @ 1.65
Muriatic, grain	"		.05 1/2	Nitrate, crystals	"		.35	3x3 in.	"		.50	German	"		1.70 @ 1.90
Lump	"		.08 1/2	Oxide, com'l	"		.19	3x4 in.	"		1.50	Peroxide	lb.		.45
Nitrate, white, pure (99%)	"		.12	CRYOLITE	"		.06 1/2	4x4 in.	"		2.00	Phosphate	"		.02 1/2
Phosphate, com'l	"		.00	EXPLOSIVES—				6x6 in.	"		3.00	Prussiate	"		.11 @ 11 1/2
Pure	"		.12	Blasting powder, A	25 lb. keg		.65	MINERAL WOOL—				Silicate, conc.	"		.05
ANTIMONY—Glass	"		.30 @ .40	Blasting powder, B	"		1.40	Slag, ordinary	sh. ton		19.00	Com'l	"		.01
Needle, lump	"		.05 1/2 @ .06	"Rackarock," A	lb.		.25	Selected	"		25.00	Sulphate, com'l	100 lbs.		.75 @ .82 1/2
Powdered, ordinary	"		.05 1/2 @ .07 1/2	"Rackarock," B	"		.18	Rock, ordinary	"		32.00	Sulphide	lb.		.01 1/2
Oxide, com'l white, 95%	"		.09 1/2	Dynamite (20% nitro-glycerine)	"		.13	Selected	"		40.00	Sulphite crystals	"		.02 1/2
Com'l white, 95%	"		.12	(30% nitro-glycerine)	"		.14	NICKEL Oxide, No. 1	lb.		1.00	SULPHUR—Roll	100 lbs.		1.85
Com'l gray	"		.07	(40% nitro-glycerine)	"		.15	No. 2	"		.20 @ .21	Flour	"		1.90
Sulphuret, com'l	"		.16	(50% nitro-glycerine)	"		.16 1/2	Gasoline, 86°@90°	"		.15 @ .20	Flowers, sublimed	"		2.15
ARSENIC—White		"	.02 1/2 @ .03 1/2	(60% nitro-glycerine)	"		.18	Naphtha, crude, 68°@72°	bbl.		9.05	TALC—N. C., 1st grade	sh. ton		13.75
Red	"		.06 1/2 @ .07	(75% nitro-glycerine)	"		.21	"Stove"	gal.		.12	N. Y., Fibrous, best	"		10.20
ASPHALTUM—				Glycerine for ultra, (82-2-10° Be.)	"		.18 @ .18 1/2	OILS—Black, reduced 20 gr.:				French, best	100 lbs.		1.25
Ventura, Cal.	sh. ton		32.00	FELDSPAR—Ground	sh. ton		8.00 @ 9.00	25@30, cold test	gal.		.09 1/2 @ .10 1/2	Italian, best	"		1.62 1/2
Cuban	lb.		.01 1/2 @ .03 1/2	FLINT PEBBLES—Dan. Best	lg. ton		14.75	15, cold test	"		.10 1/2 @ .11 1/2	TAR—Regular	bbl.		2.20
Egyptian, crude	"		.05 1/2 @ .06	French, Best	"		11.75	Zero	"		.11 1/2 @ .12 1/2	Oil barrels	"		4.25
Trinidad, refined	sh. ton		35.00	FLUORSPAR—				Summer	"		.09 1/2 @ .09 1/2	TIN—Crystals	lb.		.22
San Valentino (Italian)	lg. ton		16.00	Am. lump, 1st grade	sh. ton		14.40	Cylinder, dark steam ref.	"		.08 1/2 @ .10 1/2	Oxide	"		2.25 @ 3.00
Seyssel (French), mastie	sh. ton		21.00	2d grade	"		13.90	Dark, filtered	"		.11 1/2 @ .15 1/2	URANIUM—Oxide	"		.07 @ .08 1/2
Gleasonite, Utah, ordinary	lb.		.08	Gravel and crushed, 1st gr	"		12.40	Light, filtered	"		.14 1/2 @ .17 1/2	Carbonate, ppt.	"		.09
Select	"		.03 1/2	2d grade	"		12.40	Extra cold test	"		.21 1/2 @ .26 1/2	Chloride solution, com'l.	"		.02 1/2
BARIUM—				Ground, 1st grade	"		17.00	Gasoline, 86°@90°	"		.15 @ .20	Chloride granular, com'l.	"		.04 1/2 @ .04 1/2