

The Engineering and Mining Journal

WITH WHICH IS CONSOLIDATED "MINING AND METALLURGY."

VOL. LXXIV.

NEW YORK, SATURDAY, OCTOBER 25, 1902.

No. 17.

THE ENGINEERING AND MINING JOURNAL

(Incorporated.)

261 BROADWAY, NEW YORK.

TELEPHONE. 6865 CORTLANDT. P. O. BOX, 1833.
CABLE ADDRESS "ENGINJOUR" N. Y."

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

CHICAGO (Telephone, Harrison 3326)	520 Monadnock Building
DENVER	206 Boston Building
SALT LAKE CITY	Dooly Building
BUTTE	19 & 20 Owsley Block
SAN FRANCISCO	Mills Building
BRITISH COLUMBIA,	Victoria
LONDON, ENG.,	20 Bucklersbury, 368

DAVID T. DAY, Ph.D.	Editor in Chief
FREDERICK HOBART	Associate Editor
ROSSITER W. RAYMOND, Ph.D., M.E.	Special Contributor

SUBSCRIPTION

Single Copies, 15 Cents.

United States, Canada, Mexico, yearly, 52 copies, in advance, \$5.00
Other countries in Postal Union, \$7.00
By Bank Draft, P. O. Order or Express on N. Y.
English Subscriptions Payable at London Office, £1 8s 9d

CHANGE OF ADDRESS

Please give your old as well as your new address

NOTICE TO DISCONTINUE

Should be WRITTEN to the New York Office in every instance

ADVERTISING COPY

Should be at New York Office by 10 A. M. Tuesday of issue week

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

CONTENTS.

Editorial Notes	539
Market Conditions	540
Mistakes of the Anthracite Operators	540
The Anthracite Commission	R. W. Raymond 541
Cost of Cyaniding in Western Australia	541
*Fatal Accidents in Coal Mines in North America in 1901	F. L. Hoffman 542
Direct Cyaniding of Wet Crushed Ores in New Zealand	H. Wingate 543
*Some New Electrolytic Zinc Processes	544
New Haven Meeting of the American Institute of Mining Engineers	545
Vein Enrichment by Ascending Alkaline Waters	Walter Harvey Weed 545
Treatment of Zinc Precipitates Obtained in Cyaniding New Zealand Ore	H. Wingate 545
Present Condition of the Oil Industry in California	W. G. Young 545
Deep Level Mines on the Witwatersrand	546
*Green Back Copper Mines, California	H. W. Turner 547
White Arsenic Production	548
Electric Furnaces	548
Cyanide Treatment of Slimes	549
*Economy Derived from Reheating Compressed Air	549
Recent Decisions	551
*Abstract of Official Reports	551
Books Received	552
Books Reviewed	552
Correspondence	552
Questions and Answers	552
Robins Belt Conveyors as Tailings Stackers	553
New Works of the B. F. Sturtevant Company	553
*Patents	554

DEPARTMENTS.

Assessments	568
Chemicals: New York and Foreign	566
Coins, Foreign	567
Dividends	568
Financial Notes	567
Industrial Notes	556
Markets: Coal, United States and Foreign	564
Iron and Steel	565
Metals: Gold, Silver, Copper, Tin, Lead, Spelter, Antimony, Platinum, Quicksilver, etc.	566, 567
Mining News: United States and Foreign	558
Mining Stocks	563
Obituaries	555
Personals	556
Prices Current	579
Schools, Technical	556
Societies	556
Stock Market Review: United States and London	563
Stock Quotations	568, 569
Trade Catalogue	556

OWING to the onerous work and the responsibility devolving upon Mr. E. W. Parker, as a member of the Anthracite Commission, he has resigned his position as managing editor of the ENGINEERING AND MINING JOURNAL. We regret the loss of Mr. Parker's services, but we fully appreciate the importance of the work before the commission; and we wish Mr. Parker and all the members of the commission a successful outcome to their patriotic labors.



IN PURSUANCE of the constant intention to increase the usefulness of the ENGINEERING AND MINING JOURNAL to its subscribers, arrangements have been made to mail the paper from the New York office one day earlier than heretofore; the object being to place it in the hands of a much larger number of readers by the close of the week than has heretofore been possible. In order to do this it is necessary to close the forms one day earlier than we have done in the past. Our readers will, therefore, understand that, beginning with our next issue, the date of our news and market reports will be changed by one day; but that in succeeding numbers they will find each week the reports of prices, etc., for a full week, and that the news will reach them much more promptly than hitherto. We believe that the change will be found acceptable, and for the best interests of our subscribers.



THE ARTICLE on coal mine accidents during 1901, which will be found on another page, deserves careful reading. It is the nearest approach to an accurate presentation of the statistics which is possible under the present varying methods of collecting information in different States. The author, Mr. F. L. Hoffman, has made the subject of mortality and risks in different occupations a study for years past, and is, therefore, able to present the facts in a striking way, and in very brief space, so that they are readily understood.

In this connection we may note that all the averages presented are calculated on the basis of 1,000 persons employed. This is the only basis on which such averages can be made to mean anything. To the number of tons mined per employee killed or injured means absolutely nothing for purposes of comparison, since it is affected to a great degree by conditions of the coal seam mined, the use of machines or other methods in mining, and a variety of local conditions. No general comparisons on such a basis can be made, and it is to be regretted that it has been adopted in several State and Federal reports.



THE STATISTICS of coal mining accidents in the United States for 1901, which are given elsewhere, while not entirely complete, cover over nine-tenths of the coal mining operations in the United States and Canada. They show that last year there was a considerable increase in the number of fatal accidents and in the proportion of such accidents to the number of persons engaged in coal mining. In other words, there was retrogression instead of progress in the matter of safety in coal mining; and

the year's report shows that the percentage of risk last year was greater than in previous years—not less, as it should have been. Into the causes of this we cannot enter fully at the present time; and indeed the data are not available for any full explanation. One cause, which may have had some influence, is that the working of the coal mines in almost all parts of the country was carried on very actively last year. The production was the greatest on record, and this made it necessary to employ many additional men, among whom were doubtless a number inexperienced in mining, ignorant of the precautions needed, and not fully aware of the risks. It may also have been the case that work, in some cases, was pushed faster than the addition of new machinery for ventilation and other purposes warranted. These are suggestions only; and other causes may be found on further investigation.



ACCORDING to a recent report in Class 40 (metallurgy of metals other than iron) of the German patent office, there were 673 applications and 344 allowances during the 10 years, 1881-1890; 919 applications and 408 allowances during the 10 years, 1891-1900. The proportion of allowances to applications was 51 per cent in the first period and 44 per cent in the second. The large increase in the last decade was ascribable to the extension of interest in the fields of electrometallurgy, the extraction of gold from its ores and the treatment of mixed sulphide ores. Almost one-third of the patents issued from 1891 to 1900 were electrometallurgical.

This is very interesting as indicative of the direction of metallurgical investigation and practice. Officials in the United States Patent Office hold that the most reliable guide to the progress in the arts is the records of the various patent offices, and we have no doubt that view is to a large extent correct, because the commercial instinct of the present time impels almost every one who discovers or devises anything of possible value to patent it immediately. Formerly this was not done to the same extent, and consequently we find a good many patents which are granted nowadays anticipated by some old reference in technical literature, forgotten and lost in the great mass of unclassified matter.



THE GREAT STRIKE in the anthracite region, which began on May 12, was formally closed by vote of the Mine Workers' Convention, at Hazelton, Pa., on October 21, when it was decided that the members of the Union should return to work, pending the arbitration conducted by the commission appointed by President Roosevelt. The course of the strike has been very closely followed in our columns, and there is little to add to what was said last week concerning the appointment of the commission and the work before it. We referred then to the great opportunities presented to this body of men, and we have no doubt from their high standing and knowledge of the work before them that they will endeavor to realize the responsibility placed upon them and will perform the work entrusted to them in the best possible way open.

The miners return to work in pursuance of the vote at the Hazelton convention, on October 23. Some little trouble may arise over the retention by the companies of the men who stood by the operators during the strike, and thus prevented great damage to the mines. It must be remembered, however, that the demand for coal will be very great all through the winter. There are no stocks on hand, and it will tax the capacity of the mines to meet the current requirements. As soon as the mines are in good shape the operators will probably be able to take in all the experienced men who seek work. Already, as we write, cooler weather has set in, which will, of course, widen the demand for coal, and the public awaits the resumption of normal shipments with impatience.



THE PRODUCERS of zinc ore in the Joplin District, many of them at least, hold the opinion that the published quotations of the price of spelter are fictitious and considerably below the actual prices received. Inasmuch as the price of ore in the long run conforms closely to the price of spelter, this is considered to be evidence of unfair dealing on the part of some one. The impression to this effect is of long standing and difficult to dispel. The quotation of commodity prices, upon which many important transactions depend, is a serious matter, especially in the case of the metals wherein the market is subject to rapid changes, while the volume of business is large and to great extent is effected outside of organized exchanges, which could give an official stamp to the prices made. Not only with respect to spelter, but also with respect to lead (before the American Smelting and Refining Company undertook to fix the price) and copper, questions have frequently been raised as to the accuracy of published quotations in years gone by, as may be seen by reference to numerous discussions in our columns. But although it is true that certain published quotations have at some times been inaccurate, as we have shown, whether because of speculative manipulations, untrustworthy sources of information or inability for some reason to determine the actual market price, there are no grounds for the belief as to a persistent misstatement one way. There are generally three parties to a bargain, the producer, the consumer and the middleman and a concerted and sustained undertaking to deceive one of them, say the producer, all the time, would imply a conspiracy that it is not easy to conceive. The general concordance between the quotations derived from various sources and necessarily investigated by trade experts, does not indicate the existence of anything of that nature. Anyway the producer, if suspicious, can always test the situation by going into the market as a buyer. Certain producers in the Joplin District once tried that in an effort to bull the price of spelter, if our recollection is correct, and although we understand the speculation was not entirely successful, some valuable experience was certainly gained.



MARKET CONDITIONS.

Iron and Steel.—While there is little new to be reported in the iron and steel markets, it may be said that in this as in all other departments, the settlement of the coal strike has given an impetus to business. The removal of threatened difficulties in the way of fuel supplies has put matters again on their

normal footing. No special new demand can be reported, but business continues very active, and there has been some renewal in the placing of contracts for the second half of next year. Current business is, of course, limited to the purchases of small lots of material by parties who are in urgent need of supplies and who are forced to pay whatever premiums their necessities may warrant. Imports continue on a good scale. The furnaces in Western Pennsylvania and Ohio are still embarrassed by railroad delays and irregular deliveries of coke.

Copper.—The market during the past week has been somewhat quieter and has witnessed a slight reaction. The activity which followed the announcement of the probable termination of the coal strike last week has somewhat subsided, although inquiries for material continue to be frequently made. Moreover, a large producer which has been out of the market for some time offered metal freely when the prices approached 12 cents, and this caused a further reaction. The prospects, however, are good, and there seems to be little doubt that a gradual recovery is in sight. We referred last week to the large exports in September; and during the present month so far, the foreign market has taken metal very liberally, so that there is no question of increased stocks to be met.

Other Metals.—Lead continues quiet and unchanged in prices, with the steady consumptive demand which has marked affairs for some time past.

Spelter continues unchanged, with a good consumptive demand. The fire in the Edgar Zinc Smelting Works, which is reported by telegraph, appears to be serious, and will probably throw these works out of the market for some time. It is understood that the United States Steel Corporation, which has taken most of the surplus from these works, has been buying rather freely in the open market.

Tin continues with but little change. The demand from consumers is improved somewhat, and there has been quite an advance in prices.

Silver remains dull and weak. Demand from the East does not improve, and purchases for India, both in London and New York, have been comparatively light. There has been a little more indication of pressure to sell metal, which is probably due to the high rate of money in the American market, necessitating some realization by the principal producers. There is no prospect of an improvement in prices.

Coal.—The Western coal markets continue to be generally demoralized by the difficulties attending transportation from the mines. Every effort is now being made to furnish coal to the Lake shippers, and this has naturally disturbed trade to the large cities. A few weeks will probably see the close of navigation, which will enable the railroads to divert cars from the Lake ports to the local trade, but until that time arrives there will be a continual unsettled feeling.

The Seaboard bituminous trade is quieter. The probable settlement of the anthracite strike is permitting the diversion of coal shipments to the normal channels. This settling-down process will probably continue as the anthracite shipments begin to increase.

The settlement of the anthracite troubles is referred to elsewhere; and it is hoped that within two or three weeks we will be able to resume our usual reports of this trade, which have been practically suspended for several months past.

MISTAKES OF THE ANTHRACITE OPERATORS.

The great strike in the Pennsylvania anthracite coal region is now in process of settlement, chiefly because the operators have been forced by pressure from without to make concessions which in all probability they would not have offered a few months ago. The causes which have forced the operators to change front slightly can be found in their own attitude toward the public. They stood in the first place for a great principle, for individual freedom and the exercise of those rights which the United States Constitution guarantees to each citizen; and this constituted a very strong position.

Any fair-minded man living in the anthracite region and familiar with the methods employed by the United Mine Workers can testify that this organization has in many ways weakened discipline at the mines, has put checks on production and has persecuted non-union miners. The superintendents of the coal mining companies, knowing the numerous senseless strikes that have marked the growth of the union, have regretted to a man the settlement largely through political influences of the strike of 1900, since, had that strike lasted a while longer, the miners would have lost and the prestige of the United Mine Workers would have been greatly weakened. However, the strike being settled through the miners getting a 10 per cent. advance, another strike was inevitable. This was foreseen by the operators, and the convention of Mine Workers at Indianapolis last January by passing resolutions pledging aid to the anthracite miners gave warning that the struggle was at hand. Then came the formation of the Civic Federation through an Ohio citizen, not a United States Senator, who sought either political advantages or personal notoriety, the Federation being formed apparently with the sole object of dealing with a possible strike of anthracite miners. The meetings of the Civic Federation in New York City, the miners' convention at Shamokin, and the subsequent one at Hazelton are matters of history. In this preliminary playing for position the operators outgeneraled the union, and the strike was undoubtedly declared against the sober judgment of a majority of the miners and of John Mitchell himself. Having gained an advantage at the start, the operators adopted and maintained for weeks and months an unchanged and uncompromising front. They acted entirely on the defensive, and made no very determined effort to open mines by weakening the influence of the union. This policy of inaction was doubtless prompted by the highest motives, since the operators did not care to provoke riot and bloodshed by aggressiveness, but trusted that the miners, realizing that labor organizers had made promises which could not be fulfilled, and, tiring of the strike, would, after a while, return to work. The union, however, took advantage of these tactics, and by promises, by threats, by the boycott and even by arson and murder kept the great majority of the men, particularly the certified miners, away from the collieries, while their leaders, especially Mr. Mitchell, appealed to the public on the grounds of broad humanity, alleging that the men had been miserably paid, dishonestly treated, and that better wages and hours of labor were necessary for an American standard of living. These appeals, read by thousands of people absolutely ignorant of actual conditions in the anthracite region, no doubt greatly influenced public opinion. Mean-

time, the operators, so far as they spoke at all, spoke in a way which impressed the public as arrogant and offensive.

As autumn advanced and supplies of anthracite all over the country slowly vanished, this feeling against the operators became stronger, and the chance for gaining personal prestige tempted politicians to take a hand in the struggle and to threaten all manner of legislation, whether constitutional or not.

The short supply and high prices of fuel, particularly in the East, had interfered with many industrial enterprises, the stock markets became unsettled, and it is quite possible that certain large railroad interests known to be opposed to those dominant in the anthracite trade, used the strike as a weapon in the market. Apparently the combined effect of threatened hostile legislation, an unsettled stock market and checks to various industries proved so strong that the house most interested in anthracite securities finally decided to have the matter of wages and terms of employment put before an impartial arbitration committee.

The operators held advantages at the beginning of the strike that they did not hold to the end, and that the strike was not settled sooner is due largely, if not wholly, to their failure to recognize the necessity of conciliating public feeling in a controversy which was bound to cause widespread discussion. It was the duty of the presidents of the anthracite roads to state their position, reasonably as well as plainly, and make the public realize even before the strike began just what the United Mine Workers were aiming at. This would have necessitated no publication of mine and railroad accounts nor of any details that any operator might not care to have known. The operators neglected countless opportunities to enlist the public on their side, but their attitude was apparently, "We are right; we know we are. You don't." And the very positiveness of their statements estranged sympathy. They should have pointed out what has been done for better trade conditions and indirectly for the miner in the last three or four years, should have called early attention to Governor Stone's failure to repress intimidation and violence, and should have constantly opposed the inaccuracies in John Mitchell's statement, and have so put the facts that any one could see that either Mr. Mitchell was intentionally misleading or was ignorant of actual conditions. Had such a policy been consistently followed, it is altogether probable that Mr. Mitchell would now be thoroughly discredited and the strike would have been settled on the operators' terms long before this.

In brief, the operators spoiled a good case by their lack of tact in its presentation, and their apparent indifference to public interests and public opinion.



THE ANTHRACITE ARBITRATION.

My article of September 20, on "The Duty of an Executive," was both written and printed before the action taken by Mr. Roosevelt with regard to the anthracite strike, and, of course, was not intended as a criticism of him. At every stage of that proceeding he has taken pains to indicate that he was acting, not as the President of the United States, but only in his private capacity as an eminent and respected citizen. Mr. Mitchell, on the other hand, has been equally careful to represent the matter as an inter-

vention by the President in favor of the Mine Workers' Union.

While I have nothing to retract from the expression of my opinion as to the propriety and wisdom of the assumption of such double functions by an executive official, I do not wish to render the responsibility which Mr. Roosevelt has assumed an atom more difficult, or to hinder in the least the satisfactory outcome of his experiment, by further criticism. Inquiry as to the possible effects of such a precedent may well be postponed until it would not exacerbate the existing controversy.

For the same reason, I do not now discuss the merits and value of "arbitration" in such cases. Whatever this particular arbitration may secure, we will all accept, as a temporary result, at least.

But to those who expect this tribunal (eminently fair and able as, in my judgment, it is) to determine facts and decree justice, I may be permitted to suggest a practical warning which everybody seems to have overlooked.

Namely, this commission can neither compel testimony, administer oaths, nor punish perjury. Is there in these powers, with which our ordinary courts are clothed, any virtue at all? If not, why do we not abolish them, and let every court settle every question according to whatever the witnesses who choose to appear may choose to testify, with such cross-examination as they may choose to permit? But if, on the other hand, it be true, as hitherto supposed, that these powers are essential to the ascertainment of truth and the administration of justice, we must not expect too much from inquiries prosecuted without their aid.

R. W. RAYMOND.

COST OF MILLING AND CYANIDING IN WESTERN AUSTRALIA.

Mr. S. J. Truscott has reported (*Journal Chemical and Metallurgical Society of South Africa*, III, iv, 43, August, 1902) the following recent figures:

Ivanhoe Gold Corporation, year ended December 31, 1901. The mill crushed 88,084 tons, producing 50,543 ounces bullion, or 11.5 pennyweights per ton. The cost was 6s. 10.118d. in the old battery of 60 stamps (average duty of 3.63 tons per stamp) and 6s. 3.446d. in the new battery of 40 stamps (average of 3.97 tons per stamp). The treatment of 46,459 tons of sands yielded 19,763 ounces of bullion, or 8.5 pennyweights per ton. The cost per ton, all figures in pence, was: Superintendence, 2.112; engine driving, 2.327; filling and emptying vats, 14.937; removal of old tailings, 4.721; cutting zinc, 0.290; zinc, 0.702; potassium cyanide, 17.689; lime, 2.437; fuel, 6.457; stores, 1.910; repairs and renewals, 4.669; smelting, 0.529; condensed water, 3.368; assays, 1.661; total, 62.809 (5s. 2.809d., or about \$1.27). The treatment of 60,624 tons of slimes yielded 24,534 ounces of bullion, or 8.1 pennyweights per ton. The cost per ton was: Labor, 16.337; trucking, 7.491; engine driving, 1.978; compressed air, 3.773; smelting, 0.599; repairs and renewals, 4.094; cyanide, 18.497; lime, 2.041; zinc, 0.538; fuel, 5.881; filter cloth, 0.861; cutting zinc, 0.223; stores, 1.697; condensed water, 3.217; removal of old slimes, 7.967; salt water, 1.512; assays, 2.301; total, 79.347 (6s. 7.347d., or about \$1.61).

Golden Horseshoe Estates, same year. The mill crushed 77,801 tons, yielding 57,978 ounces of bullion, or 14.9 pennyweights per ton, at a cost of 9s. 7.691d. per ton, including pan amalgamation. In the treatment of the sands, 40,108 tons yielded 21,481 ounces of bullion, or 16.7 pennyweights per ton. The cost per ton was: Superintendence, 1.147; solutionists and pumping, 5.322; filling and emptying vats, 14.414; engine driving and firing, 1.848; cutting zinc,

1.057; assaying and retorting, 2.337; extension of tramways and repairs, 1.595; zinc, 0.946; fuel, 2.510; salt water, 2.243; fresh water, 2.158; lime and chloride of lime, 0.639; cyanide, 22.815; electric light, 1.050; general repairs and maintenance, 5.683; breaking slime and sands, 2.903; rehandling sands from dumps, 1.026; realization charges, 4.615; total, 74.308 (6s. 2.308d., or about \$1.50).

In the treatment of slimes, 51,588 tons yielded 22,971 ounces of bullion, or 8.8 pennyweights per ton. The cost per ton was: Superintendence and attending solutions, 6.034; engine driving and firing, 4.655; discharging presses, 13.118; dumping residues, 8.968; cutting zinc, 0.621; assaying and retorting, 2.914; cyanide, 23.033; filter cloth, 4.173; zinc, 0.954; fuel, 9.220; salt water, 4.642; general stores and repairs, 15.730; compressed air, 6.993; condensed water, 7.488; breaking stones and sands, 6.772; realization charges, 3.794; total, 121.446 (10s. 1.446d., or about \$2.46).

Lake View Consols, year ended August 31, 1901. The quantity of ore treated was 76,571 tons, which yielded 121,684 ounces of bullion. The cost of milling per ton was 6s. 10.5d.; sands treatment, 5s. 11d.; slimes treatment, 7s.

The Lake View bullion is about .877 fine; Golden Horseshoe, .912; Ivanhoe, .874; Great Boulder Proprietary, .747; Great Boulder Perseverance, .858; Great Boulder Main Reef, .863. Average of 734,884 ounces produced in 1901 by the above six companies, .855 fine.

IMPROVEMENTS IN BY-PRODUCT COKE MANUFACTURE.—At a steel works in Great Britain where there is an installation of coke ovens of the Semet-Solvay type, the washed fine coal is molded into cakes, by means of a compressor worked by a gas engine, before being charged into the ovens. According to the 38th annual report of the alkali inspector, this enables one-fourth more coal to be got into the charge, with an ultimate gain of 10 per cent. in product, and the time of charging is shortened. The incandescent coke drawn from the ovens is quenched by means of a needle bath, arranged to be moved from oven to oven, which improves the brightness of the coke. The draught of the combustion flues around the ovens is controlled by a fan, which renders the time of carbonizing more regular.

GAS ENGINES.—In a paper read before the engineering section of the British Association at the recent meeting at Belfast, Mr. H. A. Humphrey traced the development of gas engines and the remarkable progress that has been made, especially within the last few years. Engines of 1,200 and 1,500 horse-power are already in use, but larger ones are now being constructed and certain manufacturers are prepared to build them up to 5,000 horse-power. Exclusive of engines of less than 200 horse-power, there have been so far supplied in Great Britain 17,600 horse-power of Crossley and Premier engines, while of the Continental manufacturers, the Koerting Brothers, or their licensees, have built 32 with a total of 44,500 horse-power (averaging 1,390 horse-power per engine), the Société, John Cockerill 59, with an aggregate of 32,950 horse-power (average 558 horse-power), the Gasmotoren Fabrik Deutz, 51, with a total of 20,655 horse-power, and the Deutsche Kraftgas Gesellschaft, 28, giving 16,900 horse-power. America has been more backward in gas engine development, but the Westinghouse Company has made engines of 1,500 horse-power, and is prepared to build them of 3,000 horse-power, either horizontal or vertical, while the Snow Steam Pump Works, which has only recently entered this field, has already put in successful use six gas engines of 1,000 horse-power each, and is now constructing two gas-engine gas-compressors of 4,000 horse-power each, the first of which is expected to be in operation in November, 1902, and the second in January, 1903. Mr. Humphrey described the principal types of gas engines, and discussed the lines upon which development is progressing.

FATAL ACCIDENTS IN COAL MINES IN NORTH AMERICA, 1901.

By Frederick L. Hoffman.

The actual and comparative frequency of coal mining fatalities was higher during 1901 than during any year of the preceding decade. The record for the year is a somewhat unusual one and of special interest at the present time in view of the extensive and prolonged strike in the anthracite regions. The fatal accident rate has been gradually on the increase since 1897, the rate for 1901 being 3.5 per thousand against 2.3 for 1897. There has been much delay in the preparation of the tables for the present

here be given, but the rates have been very carefully calculated, and have been checked to insure absolute accuracy.

While the average death rate for the decade has been 2.76 per thousand, the rate during 1901 was 3.54, showing an actual as well as material increase in the ratio of fatalities in mining operations. If the returns are examined with special reference to individual States it will be observed that the rates during 1901 have been high in Colorado, Illinois, Indian Territory, Kansas, Maryland, Ohio, Pennsylvania, both anthracite and bituminous, Tennessee, West Virginia and British Columbia. This record

with a view to rendering such accidents of less frequent occurrence.

The highest accident rate during the year is reported for British Columbia, while the most favorable rate, as far as reported, was recorded for Missouri. The annual rates for the different States, however, are liable to very great fluctuations, although, as the result of a comprehensive investigation published in *The Mineral Industry* for 1897, the conclusion holds good to-day that the ratio of fatal accidents in coal mining operations is much greater in the West than in the Eastern States. As a means of ready comparison, the data have been brought together in table No. 3 for individual years since 1892 in continuation of previous communications on this subject to make possible a ready comparison with the fatal accident rates common to other employments.

As previously stated, the rate during 1901 has been the highest on record during the decade. A further comparison is made in table No. 4, showing the average number of accidents and the corresponding rates per thousand employed during the period 1896-1900 and the year 1901.

This table shows conclusively that the year 1901 was an exceptionally unfortunate one in coal mining operations, the rates having increased in twelve States and Territories out of the seventeen coal-producing States for which the information was received. The net increase in the death rate has been equal to 0.7 per thousand, which is indeed a most serious indication of unsatisfactory conditions regarding the life and welfare of the miners in the coal mining industry. The rates have increased in both the anthracite and bituminous coal-fields, but not to quite the extent of the increase in the country

No. 1.—Number of Persons Killed by Accidents in Coal Mines in the United States and Canada—1892-1901.

	1892	1893	1894	1895	1896	1897	1898	1899	1900	1901	Total
Colorado	34	46	19	23	68	35	24	41	29	55	374
Illinois	57	69	72	75	77	69	75	84	94	99	771
Indiana	19	22	*	23	28	16	22	16	18	*	164
Indian Ter.	*	*	13	6	12	22	17	25	40	44	179
Iowa	24	29	19	20	22	21	26	20	29	26	236
Kansas	*	15	26	10	12	6	17	16	22	26	150
Kentucky	8	12	10	8	6	12	6	7	17	*	86
Maryland	6	5	7	9	6	8	9	14	15	14	145
Missouri	20	21	19	13	16	8	7	15	15	9	88
New Mexico	*	*	*	28	7	7	7	7	7	7	77
Ohio	42	32	45	52	41	40	52	57	68	72	501
Pennsylvania (A.)	396	425	439	420	502	424	411	461	411	513	4,402
Pennsylvania (B.)	133	131	124	155	179	149	199	258	265	301	1,894
Tennessee	14	11	14	40	22	10	19	20	10	53	213
Utah	*	2	1	1	3	3	3	...	209	10	232
Washington	55	9	50	35	8	7	9	45	33	27	278
West Virginia	36	72	59	83	65	62	90	89	141	130	827
Brit. Columbia	6	16	4	10	9	6	7	11	17	102	188
Nova Scotia	9	2	13	9	8	7	7	19	21	14	109
Total	859	919	934	1020	1091	909	1004	1203	1456	1508	10,903

year in view of the fact that for certain States the data could not be obtained except after a lengthy correspondence. For two States—Indiana and Kentucky—the rates for 1901 are not yet available. This practice of long delay in publication of a very small matter of fact and record cannot be too severely criticised, for if the public is at all interested in the subject of coal mining casualties, the information can only be of value if furnished within a reasonable time after the close of the office year. It may reasonably be asked that information of this kind be given to the public in advance of the publication of the official report since many months necessarily elapse between the final tabulation and the printing and publication of the report.

The first table shows the actual number of persons killed while engaged in coal mining in the United States and Canada during each of the years 1892-1901. Proper distinction is made in the returns for Pennsylvania, showing respectively the number of persons killed in the anthracite and bituminous regions.

According to this table there have been reported 1,508 deaths in coal mining operations during the year 1901, while during the decade under observation there have been 10,903 deaths. The actual number, however, was probably from 5 to 10 per cent. greater, since casualties are not reported for a number of small mines not falling within the scope of

is not at all satisfactory, and gives evidence of conditions which cannot be brought into harmony with the general progress of industry in other directions. The year has been one during which there have been a number of accidents of more than usual seriousness, and it may not be out of place to touch

No. 2.—Fatal Accidents in Coal Mining in the United States and Canada—1892-1901. Number of Persons Killed per 1,000 Employed.

	1892	1893	1894	1895	1896	1897	1898	1899	1900	1901	Total
Colorado	4.49	6.31	3.06	3.05	10.07	4.99	3.23	5.60	3.99	6.88	5.16
Illinois	1.69	1.95	2.21	2.35	2.33	2.04	2.14	2.27	2.39	3.21	2.25
Indiana	2.59	2.96	*	2.92	3.94	2.00	2.63	2.07	1.82	*	2.56
Indian Ter.	*	*	3.95	1.64	3.26	6.34	4.82	6.24	7.59	8.44	5.57
Iowa	2.58	2.77	1.85	1.82	2.62	2.45	3.38	2.49	2.22	1.97	2.36
Kansas	*	1.52	2.58	1.11	1.36	0.71	1.95	1.57	2.06	2.28	1.72
Kentucky	1.04	1.41	1.25	1.02	0.79	1.55	0.67	0.83	2.06	*	1.18
Maryland	1.52	1.23	1.69	2.30	1.58	1.17	0.89	1.08	1.32	2.23	1.50
Missouri	2.48	2.70	2.49	1.84	2.41	1.22	1.22	1.80	1.31	1.63	1.91
New Mexico	*	*	*	16.88	4.87	5.13	3.71	7.98	7.44	4.81	7.26
Ohio	1.56	1.11	1.43	1.79	1.44	1.39	1.77	2.03	2.14	2.15	1.69
Pennsylvania (A.)	3.05	3.08	3.14	2.92	3.35	2.84	2.89	3.28	2.86	3.47	3.09
Pennsylvania (B.)	1.69	1.60	1.44	1.83	2.14	1.72	2.38	2.82	2.43	2.56	2.09
Tennessee	2.84	2.21	2.53	7.81	3.37	1.58	2.43	2.60	1.15	6.10	3.21
Utah	*	3.47	1.49	1.49	4.35	4.17	4.38	...	138.96	5.81	27.77
Washington	18.58	3.18	14.79	12.38	2.98	2.48	2.70	7.79	7.59	5.59	8.37
West Virginia	2.76	4.20	2.98	3.97	2.68	2.89	3.86	3.55	5.03	4.01	3.67
Brit. Columbia	2.24	5.12	1.25	3.42	3.27	2.49	2.46	2.91	4.22	25.67	5.84
Nova Scotia	1.55	0.34	2.41	1.55	1.33	1.35	1.50	3.39	3.17	1.83	1.86
Total	2.51	2.46	2.47	2.63	2.78	2.31	2.54	2.98	3.26	3.54	2.76

briefly upon the most fatal, which occurred in British Columbia, causing the death of 64 persons. This accident was the result of an explosion in shaft No. 6 of the Union Colliery, Vancouver Island, and not one of the men who were in the mine at the time escaped. An exhaustive investigation was made by

at large. The subject is one which any commission of inquiry appointed to investigate the causes and consequences of the present anthracite coal strike may properly take into account. It is very probable, however, that a thorough investigation into this subject will disclose that, apart from the inadequacy or inefficiency of mining inspection, the main cause of

No. 4.—Fatal Accidents in Coal Mines in 1901, Compared with Five Previous Years—1896-1900.

	No. of Persons Killed (Yearly Average)		Rate per 1,000 Employed		Increase or Decrease per 1,000 Employed—1901
	1896-1900	1901	1896-00	1901	
Colorado	39	55	5.50	6.88	+ 1.38
Illinois	80	99	2.24	3.21	+ 0.97
Indiana	20	...	2.44	...	...
Indian Ter.	23	44	5.81	8.44	+ 2.63
Iowa	24	26	2.58	1.97	- 0.61
Kansas	15	26	1.56	2.28	+ 0.72
Kentucky	10	...	1.17	...	...
Maryland	5	12	1.20	2.23	+ 1.03
Missouri	11	15	1.58	1.63	+ 0.05
New Mexico	10	9	5.94	4.81	- 1.13
Ohio	52	72	1.76	2.15	+ 0.39
Pennsylvania (A.)	442	513	3.04	3.47	+ 0.43
Pennsylvania (B.)	210	301	2.20	2.56	+ 0.27
Tennessee	16	53	2.18	6.10	+ 3.92
Utah	44	10	46.22	5.81	- 40.41
Washington	20	27	6.22	5.59	- 0.63
West Virginia	91	139	3.74	4.01	+ 0.27
Brit. Columbia	10	192	3.13	25.67	+ 22.54
Nova Scotia	12	14	2.22	1.83	- 0.39
Total	1,134	1,508	2.86	3.54	+ 0.68

Note: Returns for Indiana and Kentucky not received for 1901.

State supervision; while deaths resulting from accident after a long illness are not generally reported to the authorities.

Table No. 2 shows the corresponding death rates per thousand of persons employed, in a manner corresponding to the preceding tabulation. For want of space the number of persons employed cannot

mining engineers and an inquest held, the verdict reading, "The cause of the explosion is not disclosed by the evidence advanced at the inquiry." Verdicts of this kind are, unfortunately, far too frequent, and there would seem to be need of more thoroughness, impartiality and disinterestedness in investigations into the causes of mining accidents,

No. 3.—A Decade of Fatal Accidents in Coal Mining in North America—1892-1901.

	Employees.	Killed.	Rate per 1,000
1892	342,744	859	2.51
1893	374,017	919	2.46
1894	377,626	934	2.47
1895	387,303	1,020	2.63
1896	391,990	1,091	2.78
1897	393,045	909	2.31
1898	395,700	1,004	2.54
1899	403,676	1,203	2.98
1900	446,388	1,456	3.26
1901	433,131	1,508	3.54
Total	3,955,620	10,902	2.76

the increase is the introduction of inexperienced non-English-speaking common labor, represented by emigrants from southern Europe during recent years. Since it does not fall within the scope of this article to discuss the causes of accidents, but merely their number and relative frequency of occurrence, a further discussion of these points would be out of place. It, however, is but proper that attention should be called to the fact that the conditions of life in coal mining operations, as made evident by the resulting loss of life caused by mining accidents, are not showing an improvement, but rather the reverse, during recent years.

THE DIRECT CYANIDING OF WET-CRUSHED ORES IN NEW ZEALAND.*

By HAMILTON WINGATE.

Until recently, the universal practice in New Zealand was dry-crushing and direct cyaniding. With ores containing no mineral sulphides, and little or no coarse gold, this method, in spite of its many disadvantages, gave excellent results, and was by far the best available one, pending the solution of the slimes-problem. But the situation has now been changed. The successful treatment of the slimes, enabling the mines not only to do away with dry-

At this mine the usual method of kiln-drying, dry-crushing and subsequent cyaniding, for which the plant had been specially designed, was the system in vogue; but while the extraction was high, the working costs were heavy; and the treatment, though applicable to the oxidized surface ores, was not suited to those of deeper levels. The ore being, moreover, of low grade, a change of treatment became imperative. The experiments here described were consequently made after such alterations in the plant as was necessary and practicable.

The choice of a satisfactory process depended on

contain 5 per cent. of iron pyrites, with traces of calcium and manganese, the average value being from 0.3 to 0.4 ounce of gold and about 1.75 ounces of silver per ton of 2,240 pounds. The high cost for shoes and dies will convey some idea of the very hard nature of the ore, which, owing to the fine state of division of the gold, had to be crushed through a 40-mesh screen in order to secure an adequate extraction. A prolonged amalgamation test on a large amount of ore gave a very small percentage of the total bullion contents. This being the case, and as the ore carried no visible gold, any attempt at amalgamation was discarded.

After a number of tests a general plan of treatment was adopted. The mortar boxes, which had the double discharge for dry-crushing, were altered to single discharge for wet-crushing; but even after this change were obviously unsuited to the work. This fact, no doubt, increased the percentage of slimes; but it was found in actual practice much easier to get a good extraction from the slimes than from the sands. A number of sizing-tests on the sands residues showed that the greater part of the gold which they retained was in finely divided form in the coarser quartz particles.

The ore was crushed through a 40-mesh screen. The classification of 656 tons crushed gave 355 tons, or 54.11 per cent., of sand, and 301 tons, or 45.89 per cent., of slimes. Taking the sands and slimes together, 70 per cent. of the pulp, on an average, was crushed fine enough to pass through the 80-mesh sieve, this being the fineness, as determined by experiment, requisite for a good extraction.

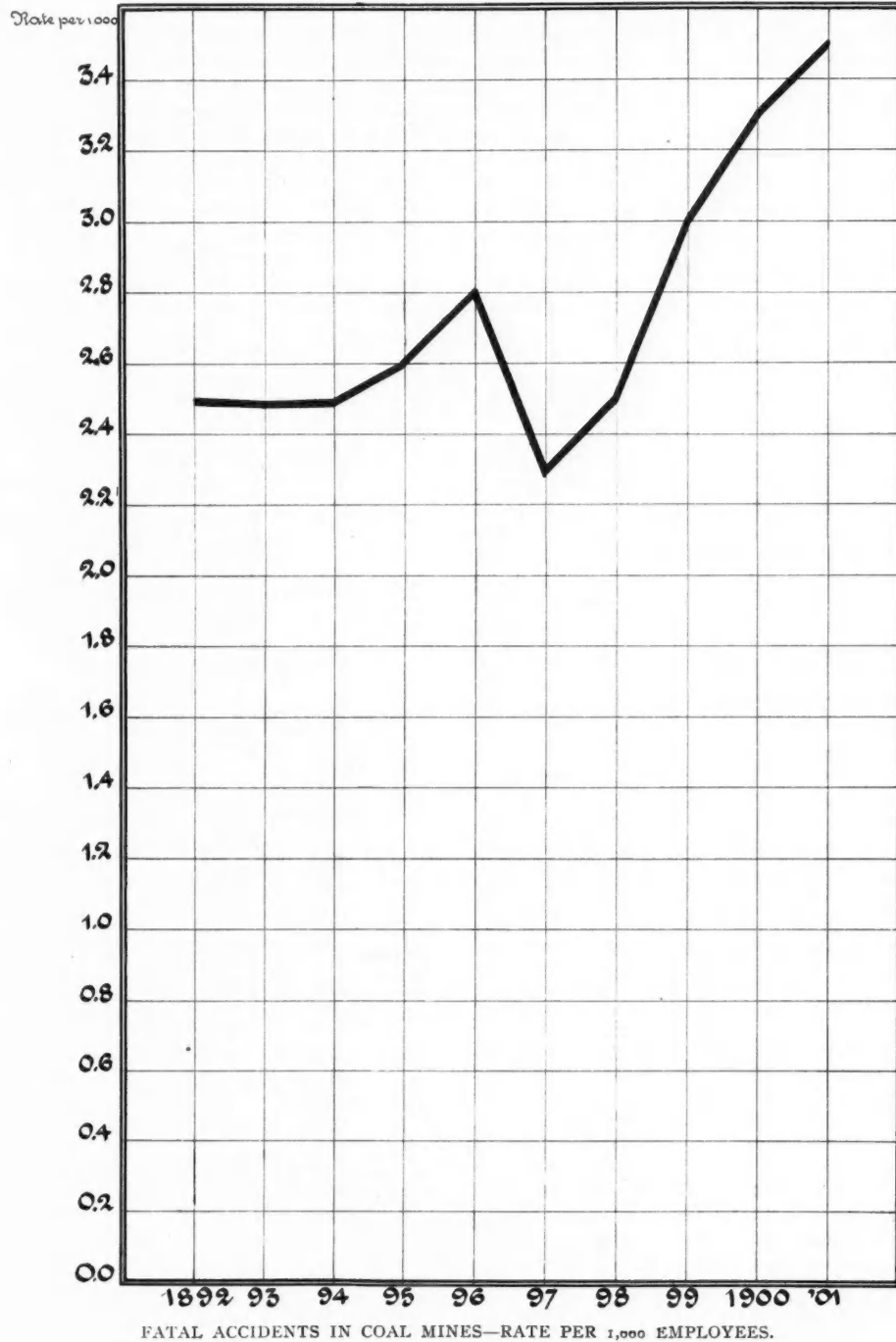
The crushed pulp passed direct from the mill to a spitzkasten, 5 feet square at the top, coming to a point 5 feet deep and provided with a 2.5-inch cock at the apex to regulate the discharge of the sand-pulp. A rose, connected with a 1.5-inch high-pressure pipe, is passed down the center of the spitzkasten to within a few inches of the bottom, the inclined sides only of the rose being perforated. When the spitzkasten is at work, this throws an upward spray of water under pressure.

The success of the treatment depends largely on good classification, since any slimes carried over with the sands are apt to be lost in the overflow from the sand-vats; while, on the other hand, any fine sands present in the slimes will cause a portion of the slime-pulp to set hard, at the bottom of the vat, in a mass too tough to be affected by the agitator. There is in this case a consequent loss in the ultimate cyaniding through non-treatment. It was only on the addition of the rose to the spitzkasten that a satisfactory separation was obtained.

The resulting products were treated quite separately. The discharge from the spitzkasten passed to a sand vat, where it was discharged through a Butters distributor; and the overflow of the spitzkasten, constituting the corresponding slime-charge, passed to one of the agitator-vats.

In the treatment of the sands the average charge was 30 tons, the vats being circular, 20 feet in diameter and 4 feet deep. The sands were treated in the ordinary way, after a preliminary alkaline wash according to requirements, followed by a wash from the No. 2 weak sump, in order to reduce the initial consumption of cyanide on the first contact of the strong solution with the ore. An 0.5 per cent. solution of cyanide for the dissolution of the gold and silver-contents was followed by the usual washes from the strong and weak sumps, with a final water-wash to displace the cyanide solution. The sands being a perfectly clean, uniformly leachable product, quite free from slimes, presented no special difficulties in treatment.

The slime vats were circular, 22 feet in diameter and 7 feet deep, and the average charge (corresponding to a 30-ton charge of sands) was 25 tons of slimes per vat. The overflow from the spitzkasten being carefully run in at one end of the vat, the clear liquor was allowed to flow away at the other; and when the vat had been charged, the slimes were allowed to settle, and the water was drained off by means of an inside syphon-pipe, leaving a pulp



crushing, but also to deal with the mineralized ores of the lower levels, which are, for obvious reasons, quite unsuited to that method of treatment, has made wet-crushing universal; and this may be taken as satisfactory proof of its superiority over the former practice.

In the lack of accurate information from plants operating successfully, particulars of experimental trials carried out on a working scale at the Waitekauri Extended mine, Maratoto, N. Z., while the writer was in charge of the cyanide works, may be interesting to members of the Institute.

* Abstract of paper read at the New Haven meeting of the American Institute of Mining Engineers.

the successful treatment of the slimes, which formed a large proportion of the crushed ore, and, as was subsequently discovered, also contained the larger part of the total value. The use of lime, successfully introduced on the Rand by Mr. Williams, was found to satisfy this condition; and the results, in view of the somewhat refractory nature of the ore, are interesting.

The ore is an extremely hard, flinty, bluish quartz, intermixed with finely-divided iron pyrites, the gold-contents being pretty uniformly distributed in an excessively fine state of division, and silver being present as sulphide. Analysis showed the quartz to

which contained, after draining, from 42 to 58 per cent of dry slimes. The agitator was now started, being at the same time gradually lowered. The value of the charge was ascertained by means of dip-samples, taken during agitation, which we found to give most accurately the value of the total bullion-contents. Lime was now added in sufficient quantity to coagulate the slimes (14 pounds per ton of dry slimes being the average amount required), and the charge was agitated for an hour in order to neutralize the effect of the free acid and other "cyanides" present in the ore.

In order to economize cyanide, and prevent the volume of the sump-solutions from becoming unmanageable (our sump accommodation, during these experiments, being limited), the amount of dry slimes and of water in the pulp was carefully estimated in the sample of the slimes charge, and the required amount of cyanide, dissolved in 5 tons of No. 1 "strong sump," was added, in order to bring up the total solution present in the charge to 0.16 per cent. of cyanide. This strength of solution, found in actual practice necessary for the effective solution of gold and silver, was higher than the preliminary laboratory experiments had indicated. These, however, were not made under exactly similar conditions. The charge of slimes pulp, which occupied a depth of from 3 to 4 feet in the vat, was now agitated at the rate of 40 revolutions per minute for 3 hours (the time necessary to obtain a satisfactory solution of the bullion contents); solution from No. 1 strong slimes sump was then pumped on, and agitation was continued until the slimes charge was complete, the pulp now occupying a total depth of 6.5 feet. The agitator was now raised, and the slimes allowed to settle, after which decantation began.

The arrangement for drawing off the cyanide liquors consisted of a 2-inch wired rubber hose, fixed inside the vat, and connected at the bottom and close to the side of the vat with the solution pipe to the extractor boxes. The end of the hose is held firmly in an iron collar, to which is attached an arm of $\frac{1}{2}$ -inch square iron. This arm passes through a guide, which can be moved freely along a $1\frac{1}{2}$ by $\frac{3}{8}$ -inch iron bar, 3 feet long, which is bolted to the inside edge of the top of the vat. A thumb-screw through the guide holds the arm in position; and, as the hose is lowered, the guide can be moved along the fixed iron bar and the arm securely clamped. When not in use, the arm is raised and clamped, and the hose, being drawn up close to the side of the vat, is clear of the agitator.

Since there was no intermediate storage tank, and the solutions had to be drawn off direct from the vats to the extractor boxes, this was found to be the safest arrangement. Care was taken not to set the mouth of the hose too close to the level of the slimes, as on draining off, the pressure of the top solution being removed, they rise. Automatic floats were found unsatisfactory, as they were both difficult to adjust and required a considerable amount of watching; while, with the arrangement described, once the hose pipe is properly set, it only requires lowering occasionally, and there is no risk that slimes will pass along with the liquors into the extractor boxes. After drawing off the first wash, agitation with sump solutions, followed by decantation, was continued, until a satisfactory extraction was obtained. Additional lime was added, if required; but the preliminary coagulation was usually sufficient.

From four to eight washes were required, according to the size of the charge and the nature of the slimes pulp, which was at some times more bulky than at others. The total weight of the washes required was from three to four times that of dry slimes present in the charge.

Each wash was in every case passed through the extractor boxes before being returned to the slimes vats. The precipitation was satisfactory even in the most dilute solutions. The rate of flow through the extractors was regulated to 2 tons of solution per hour per cubic foot of zinc shavings.

The extraction from a test lot of 1,440 tons was

81.4 per cent of the gold and 45 per cent of the silver. The consumption of cyanide was 2.7 pounds per ton; zinc, 0.75 pound; caustic soda, 0.75 pound; lime, 7 pounds. The total cost was \$2.07 per ton, including all charges.

The necessity of using stronger solutions, owing to the nature of the ore, and in order to obtain an adequate extraction of the silver (which is an important part of the total bullion value), makes the consumption of cyanide on these ores a good deal higher than the general average.

In view of the results, it is doubtful if the higher extraction which could be obtained by concentrating out and treating separately the mineral sulphides from both sands and slimes would compensate for the extra working costs which such a treatment would involve—to say nothing of the initial expenditure which would be necessary. Otherwise, this would seem at first sight to be the ideal method of treating such an ore. Several of the mills in New Zealand crush with a cyanide solution of about 0.1 per cent, thus obtaining a rapid solution of the bullion contents during crushing, sometimes amounting to as much as 60 per cent of the total value of the ore; but owing to the difficulty of preventing a large consumption of cyanide when the ore is mineralized, this method of treatment was not tried in the case discussed.

SOME NEW ELECTROLYTIC ZINC PROCESSES.

In a paper on the electrochemical exhibits at the Düsseldorf Exposition of the present year, in *Zeitschrift für Elektrochemie*, VIII, xxxix, 741, September 25, 1902, Dr. H. Danneel gives an account of Professor Borchers' new metallurgical laboratory at Aachen and certain new processes developed therein which are proposed for the treatment of zinky ores.

Borchers and Dorsemagen chlorinate raw ore in the presence of salt solutions (sodium chloride, magnesium chloride) at 30 to 40° C. in revolving lead-lined barrels, into which chlorine gas from a subsequent stage of the process is introduced through the trunnions. Chlorides of lead, zinc and silver are then leached out with hot water, or the hot dilute liquors of the process. From the residuum the free sulphur is distilled off under steam pressure by Schaffner's method. The final residuum which still contains a large percentage of zinc, in the form of undecomposed blende, together with the greater part of the silver, is then to be worked up as a zinc ore in the ordinary manner. The results of a test of a magnetically concentrated product from Broken Hill, computed on the basis of 1,000 kilograms, are given in the following table:

	Pb	Zn	Ag	S
1,000 kg. of ore contained.	140 kg.	310 kg.	0.59 kg.	...
Leached as chlorides.	140	175	0.11	...
Remaining in residuum.	...	135	0.53	115 kg.

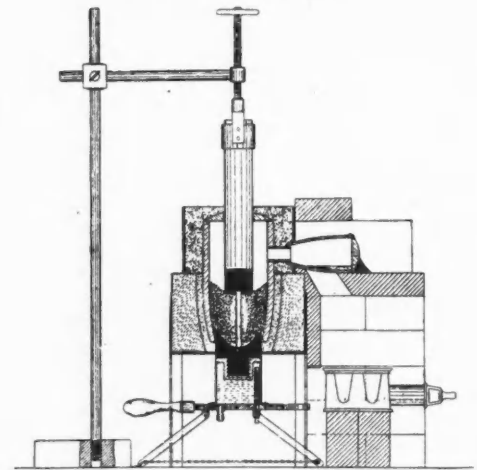
After distillation of the sulphur there remained a final residuum assaying 39.1 per cent. Zn and 0.168 per cent. Ag. (These figures are instructive in showing the preference of lead sulphide to chlorination over zinc sulphide, but they fail to convey all the information we should like to have. The 115 kilograms of sulphur in the residuum is doubtless free or volatile sulphur corresponding to the decomposed sulphides. If all the 135 kilograms of zinc remained in the final residuum, which assayed 39.1 per cent. Zn, the weight of the latter must have been $135 \div 0.391 = 345$ kilograms).

The chloride solution from the ore is purified by means of zinc oxide, or roasted zinc ore, and then is boiled down and dehydrated as completely as possible. The anhydrous, fused chlorides are electrolyzed, yielding chlorine gas for further use in the process and a mixture of metallic lead and zinc, which can be separated and refined in the ordinary manner.

Borchers and von Kugelgen propose to recover zinc from galvanizers' wastes by digesting with chlorhydric acid to obtain a saturated solution of zinc chloride, purifying it from iron by means of chloride of lime or other oxidizing agent, evaporating in lead-lined iron kettles, mixing the dry, pulverized zinc chloride with copper oxide and cal-

cium carbide and smelting for brass. The reaction between zinc chloride, copper oxide (or other metallic oxides) and calcium carbide is exothermic and goes on without extraneous heating after it has once been started, but to obtain a thoroughly liquid metal a subsequent heating of the crucible is advisable. (The reactions between metallic oxides and chlorides and calcium carbide have been described in detail by von Kugelgen in *Zeitschrift für Elektrochemie*, 1901, vol. VII. These and the process based on them have recently been discussed by B. Neumann, in *Chemiker Zeitung*, 1902, XXVI, lxii, 716 to 719, who stated that in the preparation of alloys it is necessary to use pure compounds, else the alloys will be impure, and in any case the composition of the alloy does not correspond to that which would be theoretically expected. Neumann computed that the cost of producing copper by the carbide process would be considerably higher than the present price of electrolytic copper and also showed it to be inapplicable to lead-zinc ores, concluding therefore that the carbide process has neither practical nor economic advantages.)

Dorsemagen proposes (German patent, No. 128,535, December 25, 1900) to smelt a mixture of calcined siliceous zinc ore and coal in an electrical furnace, constructed as in the accompanying sketch,



DORSEMAGEN'S ELECTRIC ZINC DISTILLATION FURNACE.

reducing and volatilizing the zinc, which is condensed in the ordinary manner, and reducing the silica of the ore to silicon carbide. The charge in the crucible is heated by the carbon electrodes; the zinc distills off into the condenser extending horizontally from the upper part of the crucible (retort) and the silicon carbide remains behind. The reduction temperature of the silica is said to be only a little above that required for distillation of the zinc. The same idea is proposed for the reduction of ferruginous ores, ferrosilicon being obtained instead of silicon carbide. This method might be adapted to continuous operation, the ferrosilicon being tapped off from time to time together with such slag as might be formed.

A GERMAN IRON ANNIVERSARY.—It is just one hundred years since the Königshütte of the Vereinigte Königs- und Laurahütte Gesellschaft were established, and the event was made the occasion of a brilliant celebration at Königshütte, on September 25.

LEACHING PROCESS FOR BISMUTH ORE.—According to German patent, No. 130,963, granted to F. G. Eulert, of La Paz, Bolivia, a row of wooden vats with filter-bottoms are arranged in steps. About 1,000 kg. of finely ground ore is charged in each vat, and a solution of common salt, saltpeter and sulphuric acid is introduced into the first of the series. The liquor flows through each vat in succession, a concentrated solution of bismuth being obtained from the lowest. This flows into a vat wherein it is diluted with water, and bismuth oxychloride is precipitated, which is smelted for metal in the usual way. (*Chemiker Zeitung*, 1902, 441).

THE NEW HAVEN MEETING OF THE AMERICAN INSTITUTE OF MINING ENGINEERS.

The opening sessions of the meeting of the Institute at New Haven last week were reported in our last issue. The evening session on Wednesday was opened by the reading of Mr. Atwater's paper on By-product Coke Ovens, which was illustrated by a number of lantern slides. This was followed by Prof. W. P. Blake's paper on the Blake Crusher and Its Applications to Various Industries. In this paper the development of this important machine and its widespread application were traced in a very interesting way. The paper was listened to with close attention.

At the Thursday morning session, Dr. Waldo read his paper on the Measurement of High Furnace Temperatures, which was illustrated in a practical way by means of a small furnace. The many important applications of the pyrometer were brought out in a very striking way. The reading of this paper was followed by a lecture on the Geology of the New Haven Region, by Prof. H. E. Gregory. This was illustrated by lantern slides. In the afternoon the members were taken in special cars to West Rock, where they had an opportunity of studying the remarkable contacts shown in that elevation, with other interesting points. In the evening a reception was given to the members and their friends at the Yale Art Institute.

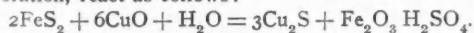
The concluding session was held on Thursday morning, when a number of papers were read by title and the routine business of the meeting was completed. After the adjournment a number of the members accepted the invitation to visit the buildings of Yale University, and especially the Peabody Museum.

We give in this issue several abstracts of papers presented at this meeting.

PRELIMINARY NOTE ON VEIN ENRICHMENTS BY ASCENDING ALKALINE WATERS.*

By WALTER HARVEY WEED.

Recognizing the occurrence of ore shoots of exclusively primary character in veins, and the widespread presence of later enrichments by descending waters, the author desires to distinguish and call attention to secondary enrichments of veins by ascending alkaline waters, similar to those of the Yellowstone Park. Where primary quartz-pyrite veins are reopened by later fracturing as, for example, at Butte, Montana, and alkaline waters ascended through such fractures, the primary pyrite has acted as a reducing agent, precipitating copper sulphide, sulpharsenide, etc. Recent experiments by Dr. H. N. Stokes in the laboratory of the United States Geological Survey show that pyrite and marcasite with CuO, or other metallic oxides in a bicarbonate solution, react as follows:



The latter as alkaline salt containing 25 per cent. sulphur. Experiments with both pyrite and marcasite at 200° show the theoretical amount of sulphuric acid is actually formed. But one actual example of an ore body of copper glance of the character is known, but bonanzas of silver ores inexplicable by ordinary enrichment by descending waters are well known, and it is believed that the great bodies of enargite found at Butte, Mont., are the result of a fracturing of the primary vein, during the rhyolite eruptions of the Middle Tertiary, with subsequent hot-spring action not yet entirely extinct near Butte, and the deposition of ores by reaction with primary pyrite. It is admitted that the chemistry of the formation of enargite, polybasite, pearoite, and ruby silver is unknown, but an investigation of the subject will soon be undertaken by Dr. Stokes. In this connection attention should be called to the analyses of the Yellowstone Park hot spring waters by Professor Gooch, of Yale University, and to the fact that the arsenical sulphides, realgar and orpiment and the mineral scorodites, are now being deposited by such waters in the Yellowstone.

In an account of mineral vein formation at Boul-

der Hot Springs, Mont., I have argued that the fissures forming hot spring conduits have deep-seated zones of solution, an intermediate zone of saturation, an upper zone of deposition, and that commonly this deposition of metallic minerals is complete and only silica and soluble salts are left in the waters when they emerge; and in the fissured rhyolite about the Monarch Geyser in the Yellowstone Park such waters are, however, now depositing auriferous pyrite, and the Boulder deposit is also slightly auriferous and argentiferous. The vertical distribution of ores described by Rickard, Van Hise and others follows as a legitimate conclusion from the theory outlined, and hence neither the primary ore shoots nor later enrichments must necessarily extend down to great depths.

TREATMENT OF ZINC-PRECIPITATE OBTAINED IN CYANIDING NEW ZEALAND ORE.*

By HAMILTON WINGATE.

In view of the fact that the fineness of the resultant bullion varies with the particular treatment to which the zinc-precipitate is subjected, and since there are considerable losses attributed to both methods, the following notes on the results obtained at the Waitekauri Extended Mine, Maratoto, N. Z., may be of interest.

The ordinary method of roasting the vacuum-dried precipitate was adopted instead of the treatment with sulphuric acid, the necessary facilities for the latter method not being available. Moreover, provided the ordinary method is carried out with the necessary care, it is questionable if it is not the most satisfactory where large quantities of precipitate have to be handled, and where (as is generally the case in this district) a considerable amount of silver is present.

All the precipitate was first washed through a 40-mesh sieve. If it was necessary to recover the bullion at once from the accumulated short zinc, it was placed on the bottom of the trays at the top end of the extractor-boxes, where it acted as an excellent precipitant, the bullion being recovered at the next clean-up.

After drying on a filter with the aid of a vacuum-pump, the precipitate was weighed, and removal to the oxidizing furnace, which is similar to that generally in use in New Zealand, consisting essentially of an ordinary square tray of cast-iron, with 6-inch sides, built over a brick furnace. Wood is used as fuel. The tray is hooded over with sheet-iron, fitted with a sliding-door, and the fumes pass through a flue at the top into a dust-chamber, then into the open air.

The oxidation of the precipitate was conducted first at a low temperature, which is gradually raised, until finally the iron tray is at a very dull-red heat, the precipitate being kept broken up with a suitable rake, and great care being exercised to avoid loss by dusting, especially as the last stage is reached. After cooling, the precipitate was carefully weighed, the time occupied in oxidizing being from two to four hours.

The oxidized precipitate was fluxed as follows: 100 parts of oxidized precipitate; 50 parts of anhydrous borax; 15 parts of anhydrous sodic carbonate; and, after mixing, carefully charged into a No. 50 plumbago crucible, and melted at a moderate heat, the pot being kept carefully covered during fusion, and recharged in each case before fusion was quite complete. When three-quarters full, the temperature was raised, the slag, now thoroughly liquid, was ladled off into moulds, and the crucible recharged as before, until about two-thirds full of molten bullion.

The bullion was now poured into moulds, each bar being again melted in a crucible of smaller size, and skimmed, if necessary, before pouring. After washing, the bars were then sampled and weighed.

In eight consecutive clean-ups the bullion averaged over .941 fine. This fineness was mainly due

to the passing of the precipitate through the 40-mesh sieve, thus eliminating the short zinc. It is impossible to oxidize such zinc, scattered throughout a mass of bulky precipitate. Its presence causes both mechanical losses and losses through volatilization, and it is most important that it be either eliminated or oxidized, if subsequent losses in melting are to be avoided.

The bars obtained were of very uniform composition, and the drillings from a hole right through the bar gave very accurately its actual value. The base metals present were zinc, together with lead, iron and copper, in small quantities, the latter being derived most probably from the fulminate-caps used in the mine, as no trace could be detected of its presence in the ore.

The slags, etc., were crushed in the mill, giving a return equal to 1½ per cent. of the total bullion recovered, the tailings, as bagged for shipment to the smelter, being worth, according to careful sampling, £25 per ton. The sweepings from the dust-chamber and flue resulted in the recovery of bullion of a total value of £9 after the oxidizing of some £6,000 worth of precipitate, showing the loss from this source to have been small.

THE PRESENT CONDITION OF THE OIL INDUSTRY OF CALIFORNIA.

By W. G. YOUNG.

While the oil industry of California has not been exploited as generally through the press as it was a year ago when the novelty of the business alone gave it an unusual interest and the excitement of new discoveries prevailed, it must not be concluded that the petroleum deposits of the State have dwindled away. On the contrary there never was a time since the discovery of oil in the Golden State when the industry was more important commercially or in a more substantial condition than at the present time. Like all great discoveries of mineral wealth the petroleum interests attracted wide public attention combined with more or less excitement which resulted in a sudden abnormal growth of oil companies, many of which were engaged in the experimental work of testing new fields. The established oil centers also received an unusual amount of attention with the inevitable outcome that oil was produced at a more rapid rate than was warranted by the consumption. The unsettling of the economic adjustment between supply and demand was such as might have been expected to result from similar conditions in any other field of production. Prices fell off at a remarkable rate and in some instances reached a point below the cost of production. More oil was produced in the developed fields than could be absorbed by local consumption and the problem of inadequate transportation was added to the already complex conditions. While it is generally stated that over-production is the main cause for the depression in the California oil industry, the fact remains that transportation has really been the main drawback to a satisfactory solution of the difficulties which have confronted producers.

The demand for oil has been rapidly increasing for the past two years and with proper facilities for supplying it, would no doubt have expanded at a much more rapid rate. The conditions which governed, however, were temporarily unsurmountable and brought about a depression of the oil business which in some cases forced the weaker producers to the wall and generally reduced the profits of larger operators. While drilling operations did not cease entirely, in many places they were suspended and large plants in the Kern River, Coalinga, McKitt-rick, Sunset, Los Angeles, Whittier and Fullerton fields were operated only to a limited extent, sufficient to supply enough oil to fill outstanding contracts. These adverse conditions served to create a pessimistic feeling among a great many oil men and gave a bad tone to the industry generally.

In the meantime, greater forces were in operation in the direction of improvement. The economic advantage which fuel oil enjoys over coal was be-

* Abstract of a paper read at New Haven (Conn.) meeting of American Institute of Mining Engineers, October, 1902.

* Abstract of paper presented at the New Haven meeting of the American Institute of Mining Engineers.

coming better known and new consumers were daily adding their quota to the ever-increasing demand. The Standard Oil Company, taking advantage of the depression entered the principal oil-fields, erected huge storage tanks and purchased great quantities of oil at the extremely low rate which conditions had forced upon the producers. At the same time that company was engaged in solving the problem of transportation and soon had a pipe line under construction reaching from the principal oil-fields to the port of San Francisco.

Another event which has had its influence on the oil situation in California was the formation of the Associated Oil Company, a combination of numerous oil corporations operating in the Kern River field which represent a large percentage of the output of that district. The union of many divided interests in one company has put the Kern River producers in a position to control the output and has also given them a financial ability, not possessed by any single company, for laying a pipe line to tide-water. Such a project has been under consideration by the Associated Company, it is said, but as yet it has not materialized. If the association intends to occupy the field as a competitor of the Standard such a course will ultimately be forced upon it, as the cheap oil accumulated by the Standard during the past year may soon be delivered through the company's pipe line at San Francisco. This could be done at a profit at the rate of 25 cents per barrel, although it is extremely doubtful whether such low figures will ever prevail.

Still further influences which are operating for the betterment of the petroleum interests might be enumerated at length. Let it suffice to mention one or two of the more important, one of which is the rapid conversion of coal burning locomotives to oil burners. This has already been accomplished to a considerable extent by the Santa Fe and the Southern Pacific Railroad companies, the latter having gone farther in this direction than any other. It is stated that orders have been given to convert the remaining coal burners of the 700 locomotives of this system to oil burners. On the western division of the road, it is estimated that the net saving will approximate \$75,000 per month. This object lesson by a large and influential corporation is having its effect among the smaller power-producers, the aggregate of whose consumption makes an appreciable increase in the demand for fuel oil. With the conversion of locomotives to oil burners has also come similar action on the part of steamship companies. Many large vessels on the Pacific Coast are now burning petroleum and the conversion of many others is either in process or is contemplated.

Add to the above factors, which are working towards a satisfactory solution of the oil problem, the foreign market for the California product which has been secured in the Pacific Islands and it may be readily seen that the difficulties which have temporarily retarded the petroleum interests of the State are now in a fair way to be speedily righted by a process of natural economic adjustment.

From the foregoing it must not be inferred that the oil industry has been suffering from a serious set-back. It has rather been a healthy check upon a sudden boom movement, the reaction from which has been viewed by some local operators, accustomed to the exaggerated conditions of former times, as a symptom of decadence, but which was in fact simply a return to a more stable condition.

The actual amount of development work now being done in the various fields of California is limited to a certain extent. There are, nevertheless, a large number of wells that could be brought in on very short notice at a minimum of labor and expense. These, of course, are located in the well established centers. There are also several new fields of importance, the principal one of which is situated in Los Alamos Valley in the northern part of Santa Barbara County. Here has been discovered a prolific petroleum deposit, of which more detailed mention will be made in a subsequent article. From this field other extensions will undoubtedly be made

in the near future to the north through San Luis Obispo, San Benito and Monterey counties. The actual condition as represented by development work may best be shown in the accompanying table, No. 1, covering the six months from April to September, inclusive:

No. 1. Development Work for Six Months.

	April	May	June	July	August	September
Wells completed	32	30	25	33	36	19
New productions	935	625	1,030	850	1,095	613
Failures	8	10	4	15	9	5
Rigs	107	122	113	108	103	107
Wells drilling	536	533	529	517	525	537
Total new work	653	655	642	625	628	644

To show the distribution of this work through the State, the Los Angeles Herald, which is considered one of the best authorities on petroleum matters in California and which has perhaps taken more pains to keep an accurate check on development work furnishes the accompanying table, No. 2:

No. 2. Rigs and Wells Drilling.

	Aug. 31, 1902.			Sept. 30, 1902.		
	Rgs.	Drig.	Total	Rgs.	Drig.	Total
Shasta	3	3	3	3	3	3
Humboldt	1	2	3	1	2	3
Tehama	5	5	5	5	5	5
Colusa	8	8	8	9	9	9
Yolo	1	1	1	1	1	1
Glenn	4	4	4	3	3	3
Butte	2	3	5	2	3	5
Napa	1	5	6	1	5	6
Solano	4	4	4	4	4	4
Marin	1	1	1	1	1	1
Mendocino	1	1	1	1	1	1
Contra Costa	7	7	7	8	8	8
Santa Clara	11	11	11	11	11	11
Stanislaus	3	4	7	3	4	7
San Mateo	12	12	12	11	11	11
San Benito	4	19	23	4	19	23
Santa Cruz	6	6	6	6	6	6
Fresno	2	13	15	1	14	15
Kings	1	9	10	1	9	10
Kern River	56	73	129	65	64	129
McKittrick-Sunset	13	182	195	11	184	195
Monterey	5	5	5	6	6	6
San Louis Obispo	1	6	7	1	6	7
Santa Barbara	2	5	7	1	6	7
Los Alamos	5	4	9	3	7	10
Summerland	2	2	2	2	2	2
Fillmore	3	4	7	2	5	7
Piru	1	9	10	1	8	9
Santa Paula	2	20	22	2	19	21
Newhall	1	23	24	1	20	21
Los Angeles	1	15	16	1	15	16
L. A. County	3	4	7	2	4	6
Whittier	4	13	17	3	14	17
Puente	6	6	6	6	6	6
Fullerton	1	24	25	1	21	22
Riverside	2	2	2	2	2	2
San Bernardino	3	3	3	3	3	3
San Diego	10	10	10	10	10	10
Totals	103	525	628	107	537	644

* Of the 73 wells drilling, work is suspended on 53, leaving actual drilling work in progress on 20 wells.
 † Of the 182 wells drilling, work is suspended on 91, leaving actual drilling work in progress on 91 wells.
 ‡ Increase in new rigs 4
 § Increase in wells drilling 12

While the above figures do not show as large a percentage of new operations as was to be noted some months ago, they nevertheless indicate the constant growth of the industry, some of the principal reasons for which have been presented in the foregoing lines.

The petroleum interests of California are to-day in a healthier state and growing at a normal rate; of this no doubt exists in the minds of conservative men who are conversant with prevailing conditions.

DEEP LEVEL MINES ON THE WITWATERSRAND.

The special commissioner of the London Economist, to whose work we have heretofore referred, says, in concluding his series of articles, that on the Witwatersrand, in a year or two, are going to be located the deepest mines in the world, and others, still deeper, will be drawing nearer to a state of production. To-day the deepest shafts in the world are those of the Tamarack and Calumet & Hecla copper mines in Michigan. These are 5,000 feet vertical. The deepest gold mines are those in Bendigo, Australia, several of which extend to 3,500 or 3,600 feet vertical. But already the shafts of the Jupiter and Simmer West mines on the Rand have reached these points, and have not yet got down to the reef. Engineers are confident of being able to sink shafts on the Rand to 6,000 feet vertical, and from there, by the erection of electric engines underground, to go

down a further distance on the incline. Conservative estimates seem to draw the limit at about 6,000 feet vertical, but the company promoter evidently does not; for there are mines already floated which will require shafts of 7,000 feet vertical to reach the reef! If the public continues to gamble in the shares of such ventures there will be a lot more flotations of a similar nature. When we see a shaft started on one of these very deep mines we will understand that in the sinking of it there are involved problems of engineering, finance, and ore values at depth which are of no little magnitude.

Subjoined is a list of the Rand deep levels classified from the depths, or probable depths, of their shafts:

- A.—Mines requiring shafts less than 1,000 feet deep:
 - Geldenhuis Deep Lancaster
 - Rose Deep Witwatersrand Deep
 - West Roodepoort Deep Langlaagte Block B Deep
- B.—Mines requiring shafts less than 1,500 feet deep:
 - Crown Deep Roodepoort Central Deep
 - Ferreira Deep Main Reef Deep
 - Glen Deep Main Reef West
 - Knight's Deep Langlaagte Deep
 - Jumpers Deep Village Main Reef
 - Durban Roodepoort Deep East Rand Extension
- Nourse Deep
- C.—Mines requiring shafts less than 2,000 feet deep:
 - Vogelstruis Deep Chimes Mines
 - Robinson Central Deep North Geduld
- Main Reef East
- D.—Mines requiring shafts less than 2,500 feet deep:
 - Robinson Deep Village Deep
 - Simmer East Tudor
 - South Rose Deep Violet
 - Knight Central Central Geduld
 - City Deep East Rand Deep
- E.—Mines requiring shafts less than 3,000 feet deep:
 - Modderfontein Deep Rand Central
 - South Nourse Leeuwpoort
 - South Geldenhuis Deep Coal Trust
 - Wolhuter Deep Geduld Deep
- South Rand
- F.—Mines requiring shafts less than 3,500 feet deep:
 - Steyn Estate South City
 - Rip South Wolhuter
- Cinderella Deep
- G.—Mines requiring shafts less than 4,000 feet deep:
 - Simmer West Randfontein Deep
 - Jupiter East Proprietary Deep
- Angelo Deep
- H.—Mines requiring shafts less than 5,000 feet deep:
 - Driefontein Deep Turf Club
 - Rand Victoria Klip Deep
 - Rand Victoria East Suburban Deep
 - Bantjes Deep South Randfontein Deep
 - French Rand Deep
- I.—Mines requiring shafts over 5,000 feet deep:
 - South Knights Rand Mines Deep (portion)
 - South Angelo
 - Daggafontein Elandsfontein Estate
 - Klipriversburg (portion)
- J.—Mines requiring shafts over 6,000 feet deep:
 - South Village Deep Rand Mines Deep (portion)
 - Simmer East Deep (portion)
 - Consolidated South Rand Elandsfontein Estate
 - Mines Deep (portion)
 - Southeast Rand Deep

The proprietary companies holding the deepest ground are the Consolidated Goldfields, the South African Gold Mines, the New Era, Freeman Cohen's Consolidated, and Henderson's Corporation. Much of the ground owned by these corporations contains the reef at a greater depth than 6,000 feet.

POLONIUM.—The radio-active substance occurring in pitchblende, which was discovered by M. and Mme. Curie and designated by them a new element, polonium, was subsequently considered through investigations of Giesel to be only a form of bismuth made active by induction. Marckwald, however, has recently obtained results which indicate that polonium is, after all, a new element.

THE GREENBACK COPPER MINE, KERN COUNTY, CALIFORNIA.

By H. W. TURNER.

In California nearly all the copper deposits of commercial value are in schists or slates or in igneous rocks associated with rocks of sedimentary origin. The lode here described is essentially all in granite, or, more specifically, granodiorite.

The Greenback Copper Mine is located in Northern Kern County about 35 miles by wagon road from Bakersfield and about 18 miles nearly due east of Jasmin, on the Potterville branch of the Southern

blende and minute crystals of titanite. Frequently this rock is foliated or gneissic as along the Greenback lode. The granite is intersected by a parallel system of joints or fractures which usually trend approximately east and west. The foliated or gneissic granite seems usually to contain little hornblende. It contains abundant black mica. There are blocks and slabs of a dark fine-grained micaceous rock often showing porphyritic feldspars in the granite. This rock on closer inspection appears to contain little or no quartz and is probably a diorite-porphry. This diorite-porphry is found as inclusions in the

some of these are developed sporadically as bunches of white quartz ("bull" quartz), which usually contains chunks of potash feldspar (orthoclase). Such bunches of bull quartz are found in many places in the great granite mass of the high Sierra, and it is not known that they ever contain gold and silver in commercial quantity.

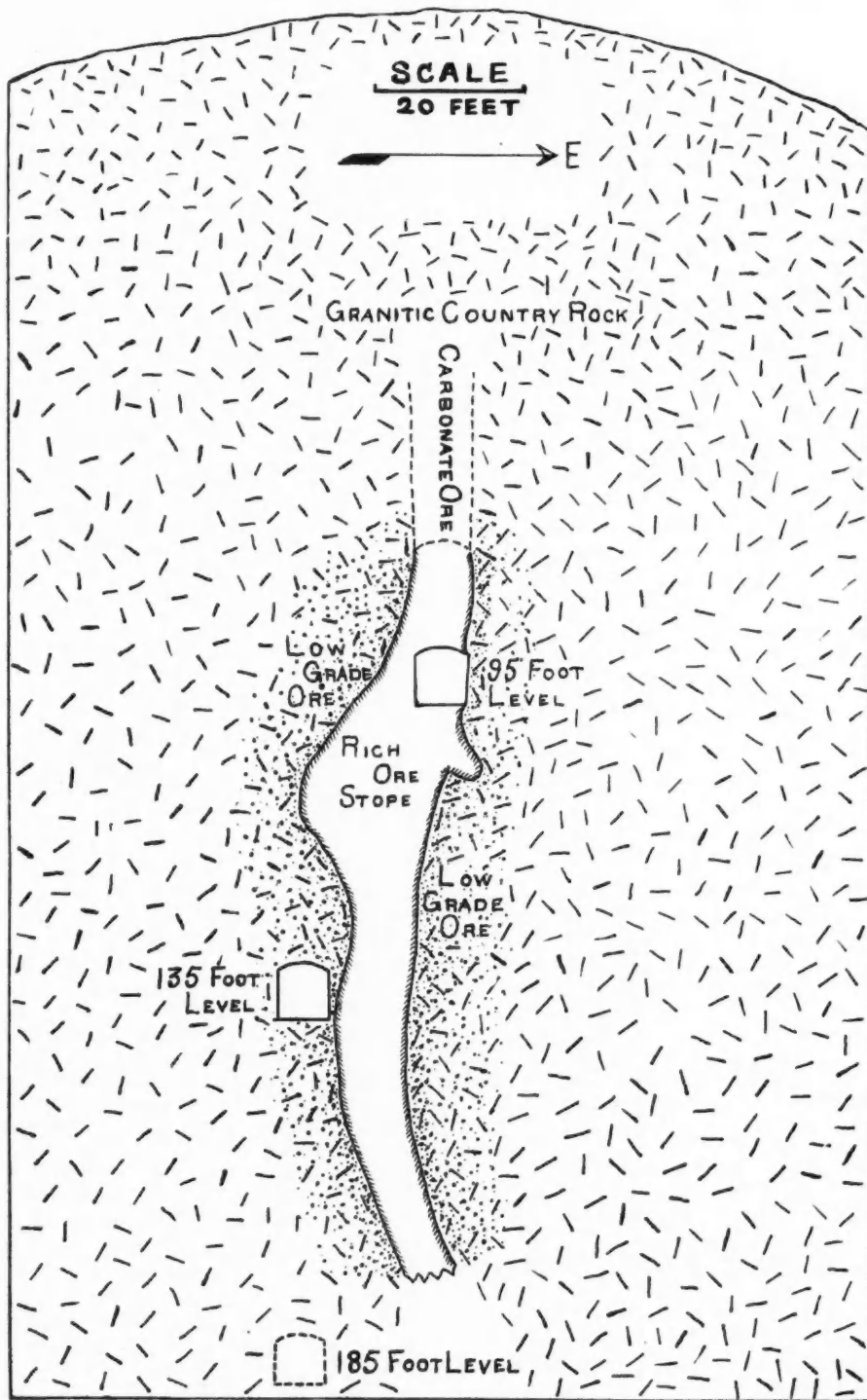
Copper has been found at a number of points in the neighborhood, and the ledges are usually more or less parallel to the structure planes of the enclosing rocks, but this is not the case with the Greenback lode, the general trend of which is east of north, or across the east-west fracture system of the granodiorite.

About one mile southwest of the mine lies a high east-west ridge known as Iron Mountain. The upper part of this ridge is composed of a variety of rocks, some of which strongly resemble quartzite, but the slopes of the mountains are all of granitic rocks. There are several cuts and shafts on the top of the mountain in the hard quartzite-like rock, but no strong indications of copper appears to have been found except on the north slope just west of the line of Section 3 and on the south slope of the east end of the mountain, where some work is now being done on a copper lode. Several claims are located on this lode. Some of the shafts and cuts on top of Iron Mountain show no copper, but appear to have been sunk on garnet-quartz veins and veins of epidote, the green color of which may have deceived the prospector. One shaft on the highest part of the mountain follows down a nearly vertical streak of a dark, glassy rock resembling obsidian, but which proves to be an opalitic form of silica, perhaps hyalite, which is a water deposit and not of volcanic origin. There is no indication of any ore in this siliceous deposit. It is quite probable that in depth copper ore of commercial value will be found in Iron Mountain. Except some of the quartzite-like rock of Iron Mountain and a little of similar rock in the Greenback Mine, no rocks of sedimentary origin are found near the mines, so far as my examination went.

At most of the points where copper has been found the lode at the surface is composed of a gossan of rusty iron-stained material, often apparently rotten granite, generally somewhat gneissic and not always showing copper carbonate.

The croppings of the Greenback lode consist of altered granite decomposed and impregnated with iron oxide and at some points with copper carbonate, and there is more or less quartz mixed with it. The Greenback lode has been opened up by a shaft which inclines to the north about 60°, and from this shaft 3 levels have been run to the north, which are vertically below the croppings, respectively 95, 135 and 185 feet. The upper part of the main ore-shoot is composed of carbonate ore and has not been stoped out, but from a point about 65 feet below the croppings to a point 170 feet below this ore-shoot has afforded nearly all the ore that thus far has been shipped, the average content being 5.7 ounces of silver and 19.4 per cent. copper per ton of 2,000 pounds. As seen in the cross section, the ore-shoot is lenticular in form, with a maximum width of about 20 feet. On the surface vertically above the lode, at the point of the cross section, no definite croppings appear. Outside of this ore-shoot the granite is irregularly impregnated with copper pyrite, so that there is a much larger amount of lower grade ore in the mine than of shipping ore. The main ore-shoot has produced about 2,000 tons of ore of all grades. About 590 tons of selected ore had been shipped to the smelter up to September, 1901, and this had a gross value of about \$60 per ton.

While the chief rock of the lode is a gneissic granite containing black mica, there are also minor amounts of the diorite-porphry before referred to and of a quartzose rock which is possibly a true sedimentary quartzite or possibly a granite rock impregnated with secondary silica. This quartzose rock contains grains of chalcopyrite. A piece of the diorite-porphry was assayed and found to contain \$1.24



VERTICAL SECTION THROUGH STOPE, GREENBACK COPPER MINE.

Pacific Railroad. Jasmin would be the point for freighting inasmuch as it is the nearest railroad point and there is an easy grade between the mine and the station. The property of the Greenback Copper Company consists of Sections 1 and 3 and the southern part of Section 2, Township 26 south, Range 29 east, embracing in all 1,520 acres.

The mine lies on a slight elevation in a basin which drains to the northwest. The rock forming this basin is granodiorite, showing black mica, horn-

blende at many places, and is therefore undoubtedly older than the granite.

In addition there are abundant dikes of a white, fine-grained granite (aplite) in the coarse granite or granodiorite. Frequently these dikes are intruded along the east-west fracture system, and hence have an east-west trend. At other points they trend in other directions. They are from a fraction of an inch to 10 feet in width. There are also white, coarse, pegmatic dikes or veins in the granite, and

per ton in gold and 0.75 ounce silver. There is also more or less vein quartz in the lode.

The Greenback lode does not appear to show any well defined fissure. While there are walls and seams along which movement has taken place, and these usually have a trend to the east of north, yet these walls and seams appear to dip both to the east and west at high angles. As indicated by the croppings, the lode may be said to have a length of perhaps 350 feet measured from the south base of the dump to the old shaft on the top of the hill. The position of the new 185-foot level is shown on the cross-section, but there are no data at hand as to the width or grade of the ore-body on this level.

Crystals of micaceous ilmenite 2 inches in length and light-colored prismatic crystals were also found in the Greenback lode. The light-colored prisms are nearly square in cross section, with a diameter of more than $\frac{1}{4}$ inch. They were examined by Prof. L. V. Pirrson, of the Sheffield Scientific School, who states that this mineral is a pseudomorph, after some orthorhombic form, probably iolite (cordierite). The pseudomorph may be designated pinite, which is a term given to a number of micaceous alteration products, which resemble muscovite in chemical composition.

WHITE ARSENIC PRODUCTION.

The production of white arsenic at the Deloro Mines in Ontario is increasing steadily. In 1899 the output was 113,937 pounds; in 1900, it was 606,000 pounds; and in 1901 it rose to 1,389,056 pounds. The Deloro Mines were the property of the old Canada Consolidated Gold Mining Company, and now are owned by the Canadian Goldfields, Limited. An adjoining property is owned by the Atlas Arsenic Company. The method of arsenic recovery employed by the Canadian Goldfields, Limited, which does not differ materially from that which is practised elsewhere, is described by J. W. Wells in the *Report of the Ontario Bureau of Mines, 1902, XI, 101 et seq.*

The mispickel of the district when pure has the composition: 34.35 per cent. Fe; 19.64 S; 46.01 As. The ore as mined is chiefly quartz, more or less heavily impregnated with mispickel, which is gold bearing. It is crushed in a 30 stamp mill, where in an average of 57 per cent. of the gold value is recovered by amalgamation and the tailings from the plates are concentrated on Wilfley and Bartlett tables to a product assaying about 18.63 per cent. silica, 29.26 per cent. iron, 15.44 per cent. sulphur, 28.75 per cent. arsenic and 7.92 per cent. undetermined. The gold is extracted therefrom by the Sulman-Teed bromo-cyanide process, whereby a recovery of about 90.5 per cent. is effected, which added to the recovery by amalgamation gives a total winning of 88 to 90 per cent. of the gold contents of the original ore.

After the leaching of the gold, the concentrates (which are of 40-mesh size) are roasted in two Oxland furnaces, arranged in series. The first is 29.5 by 5.5 feet, and the second is 60 by 6.5 feet. A tube conveys the ore from the first to the second furnace, which is placed lower down. The furnaces differ from the usual construction by being divided internally into quadrants by means of tiling (evidently an adaptation of the Rothwell diaphragms) which stops 4 feet short of the feed and where spiral ribs are arranged to enable the ore to work down into the compartments. The first cylinder is operated by mechanical draft; the second has an independent fireplace and is worked by a chimney. Nearly all of the arsenic is volatilized in the first furnace, the burnt ore therefrom assaying about 43.23 per cent. silica, 44.66 ferric oxide, 5.06 sulphur, 0.36 arsenic and 6.69 per cent. undetermined.

The fumes from both furnaces pass into a dust chamber, which is arranged so as to discharge automatically the settlings back into the first furnace, and thence into brick condensing chambers, 12 feet wide, and so designed that the crude arsenic can be drawn by gravity into cars beneath the chambers. The crude arsenic is refined in a reverberatory furnace, fired with hard wood, of which the hearth is

16 by 24 feet and the arch is 20 inches above the hearth. The fumes are drawn mechanically through a dust chamber 100 feet long and then through 12 zig-zag chambers in which the pure white arsenic is deposited. The crystals are ground with buhrstones and barreled mechanically. The refined white arsenic is upward of 99.6 per cent. pure and commands a high price.

In the United States the only producer of arsenic is the Puget Sound Reduction Company, which made an output of 300 tons in 1901. The Carmichael Reduction Company made some experiments at South Boston, Mass., in the treatment of mispickel from Nova Scotia, but they do not appear yet to have materialized into a steady business.

In Wales the arsenic industry has suffered severely from the fall in prices which occurred in 1901, and made it unprofitable in some cases to treat the ores at all. The Devon Great Consols Mine had to suspend operations. An improvement in arsenic manufacture in Great Britain, according to the 38th report of the alkali inspector, has been the erection at one works of a condensing tower containing two tons of iron rods suspended about an inch apart, whereby 70 per cent. of the arsenious acid passing

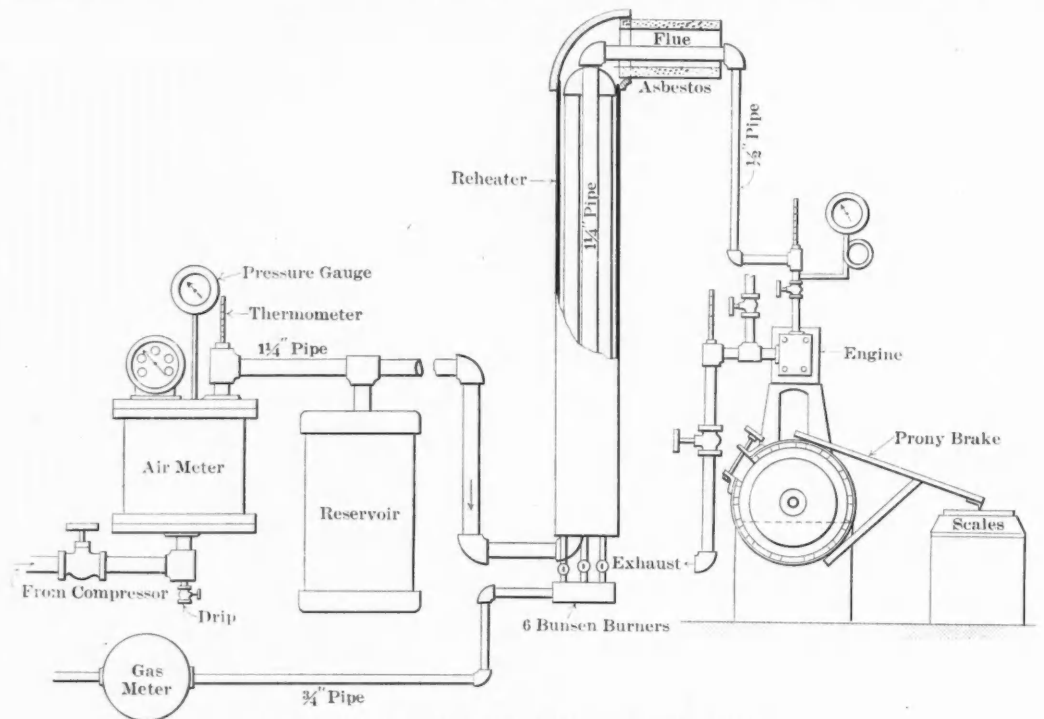
railway, substations will be erected, obtaining their supplies from Dalny."

ELECTRIC FURNACES.

A method of preheating the charge for electric furnaces is described by A. Minet and A. Neuburger in *Elektrochemische Zeitschrift, IX, vii, 139 to 142, October, 1902.* An adaptation of the method to the Reuleux furnace is described. Three vertical, cylindrical shafts are arranged. The middle one is charged with the coke; the outer ones with the ore. Each shaft has three tuyeres, which are sufficiently high above the hearth not to interfere with the operation of the electric furnace proper. Air is blown into the middle shaft, partially burning the coke; fuel gas is blown into the outer shafts. At the bottom the three shafts unite into one of rectangular cross-section, at the bottom of which the electrodes are introduced. The ore and coke thus come down hot into the electrical furnace proper. A modification adapted to the utilization of blast furnace gases is also described. The method has been patented.

ZINC DUST AS PRECIPITANT FOR GOLD.

—Zinc dust is now in use at numerous cyanide mills



APPARATUS USED IN COMPRESSED AIR EXPERIMENTS.

through the tower is removed. This appears to be an adaptation of the Roesing wire system to arsenic condensation.

RUSSIAN OIL IN THE EAST.—United States Commercial Agent R. T. Greener writes from Vladivostok, August 2, 1902, as follows: "The East Asiatic Lloyd reports that Russia's policy in the Far East to lessen the import of foreign goods by abolishing free ports and introducing customs at Vladivostok (where matters go on much the same as before), is not a success. It also confesses that the expectation of an increase in the import of Russian petroleum from the Caucasus into eastern ports has not been fulfilled. From trade returns of China and Japan for 1899, 1900 and 1901, it is shown that the import of Russian oil in these countries has decreased, while American oil has actually doubled.

"The *Novoe Vremya* says that the Chinese Eastern Railroad has decided to organize the sale of Russian kerosene in the Far East, on a scale calculated to capture the market. The president of the company will build at Dalny a central distributing station, with a capacity of 1,500,000 poods (54,000,000 pounds). A special tank steamer will bring the oil from Batum. At the most thickly inhabited places, at mouths of rivers, at steamship landings, and along the line of

in the United States for the precipitation of gold from the solutions instead of filiform zinc. It has the advantages of being already prepared and affording a greater surface area than shavings, which leads to a greater precipitation of gold per pound of zinc consumed, while there are some further advantages in the cleaning up. The Waldstein patent (United States, 607,719, March 9, 1896) covering the use of zinc dust for precipitating cyanide solutions came up in a case before the United States District Court for Idaho last year and failed to be sustained. Zinc dust is a between-product in the ordinary process of zinc smelting, which collects chiefly in the prolongs connected with the condensers. American smelters rarely use prolongs and the zinc dust, or blue powder, which they collect is of low grade and is resmelted for spelter. The commercial zinc dust is imported chiefly from Europe. By a recent decision of the Board of Appraisers it is admitted free of duty as an unmanufactured product. It undergoes only a sifting as a preliminary preparation before package for shipment. Its value depends upon its percentage of metallic zinc, which ought to be about 90. The remainder of its composition is chiefly zinc oxide. In estimating the value of zinc dust it is necessary to employ an analytical method which will show the percentage of metallic zinc independently of that existing as oxide.

CYANIDE TREATMENT OF SLIMES.

The extraction of gold from ore slimes is always a question of absorbing interest on the Rand. As is well known, the common practice there has become the decantation method, while in Western Aus-

ECONOMY DERIVED FROM REHEATING COMPRESSED AIR.*

The object of the experimenters in these tests was to ascertain the exact gain derived from reheating compressed air used in small motors, with the idea

through a meter, and then before being admitted to the engine, was passed through a reheater. The arrangement of the apparatus is plainly illustrated in the accompanying diagram.

The amount of air used in each run was recorded by the meter, which was furnished for the test by the Equitable Meter Company, of Pittsburg. The meter was especially designed to withstand high pressures. The air passed through the meter at the temperature of the atmosphere.

The meter was calibrated for the pressures used in the experiments, before and after the runs were made. The meter readings were then corrected from this calibration. The results therefore show accurately the amount of air used in each case.

The reheater was constructed out of pipe. It consisted of a coil of three lengths of 1¼-inch wrought iron pipe, which was surrounded by an outer casing of 6-inch pipe. This casing was also covered with an asbestos non-conducting covering, which prevented the escape of heat. The construction of the reheater is indicated in the diagram.

Gas was used for fuel, and was burned in a burner placed at the base of the reheater. Gas was selected as the fuel on account of the ease with which the supply of heat could be governed. A gas meter recorded the amount of gas used in each run. The amount of heat supplied to the reheater is then easily computed, when the heat value per cubic foot and the number of cubic feet of gas supplied per hour are known.

The engine was equipped with a Prony brake, and an indicator was attached to the cylinder, which enabled both the developed horse-power and the indicated horse-power to be computed.

In every case the temperature of the air was taken at the meter, and again after it had passed through the reheater, at a point as near to its entrance to the engine as possible.

General Results—Series I.

	1	2	3	4	5	6
1 Number of run	1	1	1	1	1	1
2 Length of run, hours	29.41	28.97	28.89	28.89	29.0	29.32
3 Barometer	57.6	55.	55.4	57.5	58.7	58.7
4 Gauge pressure at meter (corrected)	55.	53.	53.8	56.	57.	57.0
5 Gauge pressure at engine	51.2	86.8	86.3	79.1	81.5	74.3
6 Temperature at Meter	59.	176.5	236.	306.	348.	401.
7 Temperature at engine	7.	87.6	147.	177.	198.	236.
8 Temperature of exhaust air	48.	79.	83.	78.	76.	70.
9 Temperature of room	—	220.	309.	352.	—	421.
10 Temperature of flue in heater	—	371.	319.5	300.	270.	248.5
11 Cubic ft. of air per hour from meter	—	—	—	—	—	—
12 Cu. ft. of air per hour corrected from calibration of meter	377.	323.4	303.4	274.4	252.6	238.
13 Cu. ft. of air per hour at standard conditions	1,877	1,445	1,367	1,295	1,204	1,150
14 Increase in temp. of air by heating	—	89.7	169.7	226.9	266.5	326.7
15 Corresponding increase in vol., per cent.	—	16.4	31.0	42.0	49.4	61.1
16 Weight of air supplied per hour, pounds	143.5	110.4	104.4	99.0	92.2	87.8
17 B.T.U.'s absorbed by air per hour	2,659	2,350	4,210	5,340	5,840	6,820
18 Cu. ft. of gas per hour from meter	—	9.5	10.5	22.2	—	28.8
19 Cu. ft. of gas per hour, actual	—	8.7	15.7	21.4	—	28.0
20 B.T.U.'s contained in 1 cu. ft. of gas	530	530	530	530	530	530
21 B.T.U.'s supplied to heater, per hour	—	4,615	8,320	11,350	—	14,840
22 Efficiency of reheater	—	51.0	50.6	47.1	—	45.9
23 Ave. cut off, head and crank, per cent.	56.	36.5	35.	32.2	29.4	28.
24 Ave. ratio of expansion	1.79	2.74	3.86	3.11	3.40	3.57
25 Range of temp. of air in engine	52	88.9	109.	129.	150.	165.
26 Revolutions per minute	330.5	363.	375.	378.9	381.5	357.5
27 Brake load, pounds	5	5	5	5	5	5
28 D. H. P.	.629	.693	.7175	.7235	.727	.682
29 I. H. P.	.909	.976	.945	.956	.910	.860
30 Mechanical Efficiency, per cent.	69.2	71.	75.9	75.6	79.9	79.3
31 Cu. ft. of free air used per D. H. P. hour	3,030	2,085	1,901	1,790	1,658	1,688
32 Cu. ft. of free air used per I. H. P. hour	2,650	1,480	1,446	1,355	1,330	1,338
33 Cu. ft. of free air used per D. H. P. per min.	50.5	34.75	31.75	29.86	27.7	28.15
34 Pounds of air used per D. H. P. hour	228.	159.3	145.5	137.	127.	128.9
35 Cu. ft. of free air saved per D.H.P. hour	—	945	1,129	1,240	1,372	1,352
36 Gain in air saved, per cent.	—	31.2	37.25	40.9	45.25	44.6
37 Equivalent H. P. from heater per hour	—	31.196	32.58	40.96	45.25	44.6
38 Percentage of power from heater	—	31.2	32.25	40.9	45.25	44.6
39 Heat equivalent of work done per hr. (I.H.P.)	2,315	2,485	2,450	2,430	2,320	2,190
40 Work done per lb. of air (n = 1.408) adiabatic expansion, B. T. U.	9,170	5,130	5,000	4,690	4,600	4,630
41 Efficiency of the fluid, per cent.	253.	48.5	49.0	51.8	50.4	47.2
42 Thermal cost of air saved per D.H.P. hr.	—	6,670	11,600	15,700	—	21,800
43 Thermal cost of equivalent amount of air from compressor, B. T. U.	—	131,500	15,700	172,500	191,500	188,500
44 Ratio: Cost of air by compressing	—	19.7	13.5	11.0	—	8.62
45 Thermal cost of air from compressor in B. T. U.'s per D. H. P. hour	415,000	292,000	264,200	249,000	231,000	234,000
46 Total thermal cost of air used per D.H.P. hr.	415,000	298,670	275,800	264,700	—	255,800
47 Gain in Economy, per cent.	—	28.1	31.2	36.3	—	38.4

General Results—Series II.

	1	2	3	4	5
1 Number of run	1	1	1	1	1
2 Length of run, hours	29.4	29.28	29.24	29.38	29.34
3 Barometer	79.6	81.	82.	82.5	82.
4 Gauge pressure at meter (corrected)	76.6	78.	79.	79.6	79.2
5 Gauge pressure at engine	64.	63.	66.	64.2	63.
6 Temperature at meter	63.	160.5	252.5	307.5	395.
7 Temperature at engine	9.	81.	146.	192.4	248.
8 Temperature of exhaust air	51	63	63	64	64
9 Temperature of room	—	213.	299.	360.	455.
10 Temperature of flue in heater	315	293	252	237	214
11 Cubic feet of air per hour from meter	331.5	308.5	266.	252.	226.
12 Cubic feet of air per hr. corrected from calibration of meter	2,105	1,992	1,725	1,646	1,474
13 Increase in temperature of air by heating	—	96.5	186.5	243.3	332.
14 Corresponding increase in volume, per cent.	—	18.5	35.5	46.5	63.5
15 Weight of air supplied per hour, pounds	161.	152.2	132.	125.7	112.8
16 B. T. U.'s absorbed by air per hour	—	3,490	5,840	7,250	8,870
17 Cubic feet of gas per hour from meter	—	13.5	19.4	22.	33.6
18 Cubic feet of gas per hour, actual	—	12.7	18.6	21.2	32.8
19 B. T. U.'s contained in one cubic foot of gas	—	530	530	530	530
20 B. T. U.'s supplied to heater per hour	—	6,730	9,850	11,220	17,380
21 Efficiency of reheater, per cent.	—	51.8	59.3	64.6	57.1
22 Average cut off, head and crank, per cent.	30.	26.2	20.2	18.5	17.4
23 Average ratio of expansion	3.33	3.82	4.95	5.4	5.75
24 Range of temperature of air in engine	54.	79.5	106.5	115.7	147.
25 Revolutions per minute	360.	395.3	396.	403.3	396.
26 Brake load (net), pounds	5	5	5	5	5
27 D. H. P.	.685	.753	.755	.770	.755
28 I. H. P.	.999	1.11	1.027	.953	.903
29 Mechanical efficiency, per cent.	68.5	67.9	78.6	80.8	83.5
30 Cu. ft. of free air used per D. H. P. hour	3,120	2,650	2,286	2,137	1,951
31 Cu. ft. of free air used per I. H. P. hour	2,110	1,800	1,682	1,725	1,632
32 Cubic feet of free air used per D. H. P. per min.	52.	44.16	38.1	35.6	32.5
33 Pounds of air used per D. H. P. hour	235.	202.	175.	163.2	149.
34 Cu. ft. of free air saved per D.H.P. hr. (from 60 degs. F.)	10.	480.	844.	993.	11.79
35 Gain in air saved, per cent.	—	15.35	27.	31.7	37.7
36 Equivalent H. P. from heater per hour	—	11.58	204.	244.	285
37 Percentage of power from heater	—	15.35	27.	31.7	37.7
38 Heat equivalent of work done per hour, I. H. P.	2,544	2,825	2,616	2,430	2,300
39 Work done per lb. of air (n = 1.408), adiabatic expansion, B. T. U.	8,200	7,760	6,720	6,420	5,750
40 Efficiency of fluid	31.	36.4	39.	38.8	40.
41 Thermal cost of air saved per D. H. P. hr., B. T. U.	—	8,930	13,050	14,600	23,000
42 Thermal cost of equivalent amount of air from compression	—	73,100	129,000	152,000	180,000
43 Ratio: Cost of air by compressing	—	8.2	9.88	10.4	7.84
44 Thermal cost of air from compressor in B. T. U.'s per D. H. P. hour	470,000	404,000	350,000	326,400	298,000
45 Total thermal cost of air used per D. H. P. hour	470,000	412,930	363,050	341,000	321,000
46 Gain in economy, per cent.	—	10.	22.7	27.5	31.7

tralia the filter-press treatment has generally been adopted. The filter-press process was once tried on a small scale in South Africa, but failed to give satisfactory results. Similarly, the decantation method had a trial in Western Australia, but was abandoned because of the heavy losses of gold in the treatment of the rich slimes of that country. The same objection obtains in South Africa, although it is of less consequence there because of the lower grade of the slimes treated. The cost of plant for the decantation method (£150 to £200 per head of stamps, according to Mr. J. Yates) is objectionably high, and although the method has the good points of simplicity in operation and comparatively low working costs the percentage of gold extracted is quite unsatisfactory. Mr. Yates states (*Journal Chemical and Metallurgical Society of South Africa*, III, iv, 41, August, 1902) that an average extraction of about 60 per cent. is the best the united efforts of the metallurgists of the Rand have been able to accomplish. It is therefore of interest to know that Mr. John R. Williams is about to make a test of the two methods on a working scale, side by side. Mr. Yates himself is of the opinion that the use of large presses, such as are employed in Western Australia, will develop a process that may in certain cases be convenient and profitable on the Rand.

LEAD ANODES IN ELECTROLYSIS OF SODA SOLUTIONS.—The behavior of lead as anode in solutions of sodium hydroxide and the electrolysis of sodium hydroxide solutions containing lead oxide are discussed by K. Elbs and J. Forssell in *Zeitschrift fur Elektrochemie*, VIII, xl, 760 to 772,

AUSTRIUM, A NEW ELEMENT.—At the meeting of the chemical section, September 23, 1902, of the *Versammlung der Gesellschaft deutscher Naturforscher und Aerzte* at Karlsbad, Pribram, of Czernowitz, announced the discovery of a new element in orthite from Arendal, which he has named Austrium, symbol At. It was isolated electrolytically and appears to belong to the ϕ gallium-indium series.

also, that some such method as this could be advantageously put into application in connection with the use of compressed air in railroad shops, mines, etc., where compressed air is extensively used.

A small 2 horse-power vertical engine with a shaft governor was used as the motor. The compressed air coming from the compressor, was first passed

*Tests performed by W. G. Edmondson and E. L. Walker, students in the Railway Engineering department of Cornell University.

In conducting the experiments, three series of runs were taken as follows:

Series I, in which six runs were taken, all at about 57 pounds gauge pressure, while the temperature of the air entering the engine was varied from 60° F. to 401° F.

Series II, in which five runs were taken, all at about 82 pounds gauge pressure, while the temperature of the air entering the engine was varied from 60° F. to 395° F.

Series III, in which two runs were taken at about 77 pounds gauge pressure, and the temperature of the entering air 42° F. and 266° F., respectively.

The average results from each "run," were then taken from the log of each run and are shown on the general result sheet.

The tests were performed during the month of April, 1902, in the mechanical laboratory of Sibley College, Cornell University.

The term "cubic foot of free air" is used to represent the volume of air at standard conditions, which are taken in this case to be at a pressure of 14.7 pounds, absolute, and at a temperature of 60° F.

CONCLUSIONS.

The net gain in economy obtained with the lower pressure was 38.4 per cent., while with the higher pressure it was but 31.7 per cent. with the same conditions. In other words, we get a reduction of from 31 to 38 per cent. in the cost of the production of compressed air, by reheating the air from 60° F. to 400° F.

The curves on Plate I illustrate how the economy is raised by increasing the temperature. It is seen that the increase in economy is gradually lessened

General Results—Series III.

1	Number of run	1	2
2	Press. at meter	76	78
3	Press. at engine	73	75
4	Temp. at meter	44	67
5	Temp. at engine	42	266
6	Temp. of exhaust air	—	149.5
7	Temp. of room	42	65
8	Temp. in flue of heater	—	—
9	Cu. ft. of air per hr., from meter	367	249
10	Cu. ft. of air per hr. corrected from calibration of meter	383	259
11	Cu. ft. of air per hr. at standard condition	2,430	1,606
12	Increase in temp. of air by heat	0	199
13	Corresponding increase in volume, per cent.	0	38.
14	Wt. of air supplied per hr., lbs.	185.6	122.7
15	Bt. T. U.'s absorbed by air per hour (from 67 degs.)	—	5,790
16	B. T. U.'s required to raise temperature from 42 degs. F.	—	6,500
17	Total thermal cost of air used per hour, B. T. U.	352,500	146,000
18	B. T. U.'s supplied to heater per hour (from 42 degs.)	—	13,000
19	Efficiency of reheater (assumed), per cent.	—	50.
20	Revs. per minute	392	396
21	Brake load	5	5
22	D. H. P.	.73	.755
23	I. H. P.	1.40	.974
24	Mechanical efficiency, per cent.	52.1	77.5
25	Cu. ft. of free air per D. H. P. hour	3,380	2,130
26	Cu. ft. of free air per I. H. P. hour	1,735	1,700
27	Cu. ft. of free air saved per D. H. P. hour	—	1,200
28	Gain in air saved, per cent.	—	36.4
29	Thermal cost of air saved per D. H. P. hour, B. T. U.	—	13,000
30	Thermal cost of equivalent amount of air from compressor, B. T. U.	—	174,600
31	Ratio: Cost of air by compressing	—	13.4
32	Cost of air by heating	—	30.2
33	Gain in economy, per cent.	—	30.2
34	13.091 cubic feet of air at 60 degs. F. and 14.7 ft. pressure equals one pound.	—	—

after the temperature reaches about 300° F. By continuing the curve it would indicate that the point would soon be reached where an increase in the temperature would not cause any further increase in economy, this point being reached at about 450° F.

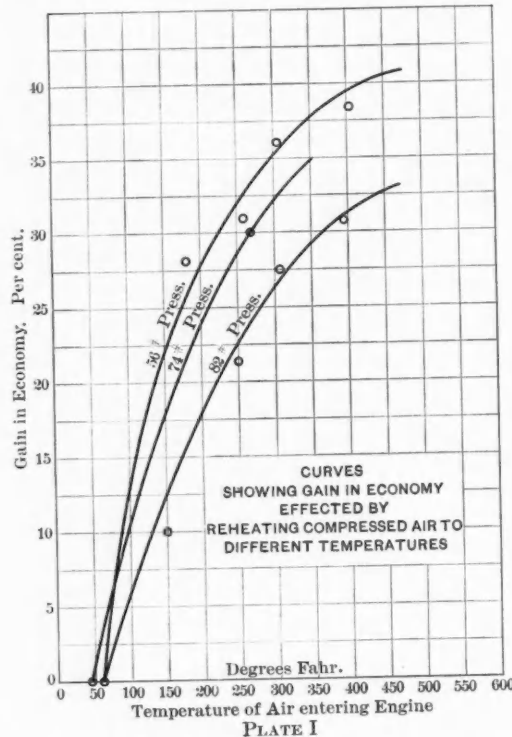
The results obtained in these experiments afford an interesting comparison of the effects produced by different degrees of reheating, as well as by the use of different working pressures. Of the three different series of runs taken, the one employing the lowest pressure (56 pounds) seemed to give the most efficient results.

It was not considered advisable with our engine to raise the temperature of the entering air much above 400° F., on account of the bad effect it would have upon the packing in the valve-rod and piston-rod glands, and also upon the lubricant; however, a much higher temperature could have been attained with the reheater used.

Although the economy derived from the application of heat to the air, may result from the increased volume, we are led to believe that the high results obtained are due partly to other changes of condition in the working of the engine resulting from the higher temperatures. By reheating the air, the engine is relieved from the difficulties due to freezing

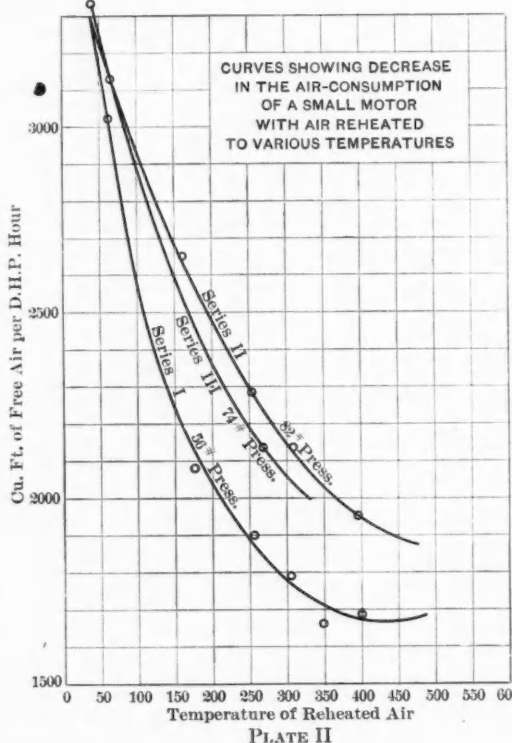
of the moisture in the exhaust passages, and the choking up of the valve.

It was noticed that as the temperature of the air was raised while the pressure remained constant, that the speed of the engine was increased, the cut-off



was made shorter, and in general the operation of the engine was rendered much more smooth.

The results appear to be approximately those that are indicated theoretically with the same conditions, and prove conclusively the many advantages to be



gained by reheating, which was the object of the investigation.

For instance, it is seen that the reduction in the air consumption of a small motor is in almost direct proportion to the increase in temperature. By referring to the curves on Plate I, it is seen that the decrease in the consumption of air is in almost direct proportion to the increase in temperature, until the higher temperatures are reached, when the decrease becomes more gradual and finally ceases, when the temperature is raised above the limit of practicability.

In Series I., which employed a pressure of about

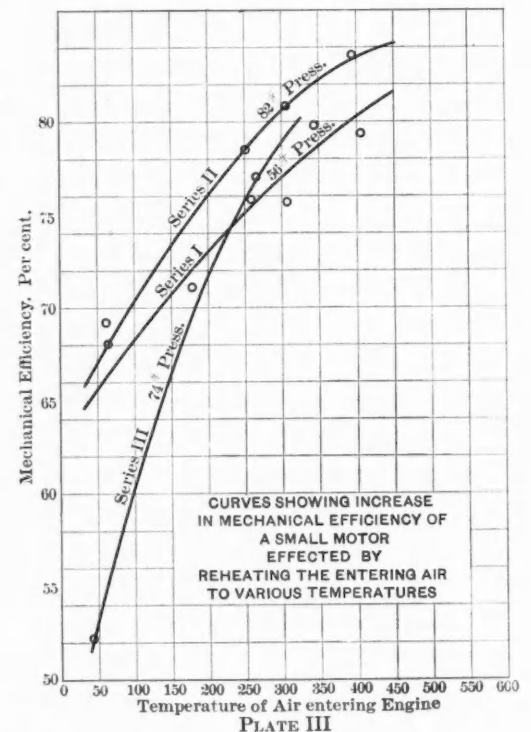
56 pounds, it is seen that a saving of 44.6 per cent. of the air used cold was effected by reheating it from the temperature of 59° F. to 401° F.

With Series II, and III, in which higher pressures were used, the gain was not quite as much on account of the lower efficiencies which always accompany higher pressures with compressed air.

As shown by item No. 44, on the result sheets, the results obtained by applying heat in this manner to compressed air are from 8 to 18 times more important than would be obtained if the same amount of heat were expended under the boiler back of the compressor.

The results obtained in these experiments may be represented clearly by means of a simple proportion. Referring to the results obtained in Series I., we find that the maximum gain in air saved with the highest temperature is 44 per cent. of the amount of cold air required to produce the same amount of power.

Let us assume that 100 pounds of compressed air at 60 pounds pressure are required to produce one horse-power per hour at 60° F. Then if we reheat this air to 400° F. we effect a saving of 44 per cent., and we will then require but 100 - 44 = 56 pounds per horse-power hour. At this rate if we take 100 pounds of cold air and reheat it to the



above temperature, the increase in the power produced will be:

$$56 : 100 :: 100 : x.$$

$$x = 178.6$$

which indicates that the power derived from the same weight of air would be increased about 78 per cent. by reheating it from 60° F. to 400° F. In other words, a compressor which is able to supply 100 horse-power at the motor with cold air, could be made to supply 178 horse-power by the use of reheaters.

As the increase in volume obtained by raising the temperature of the air from this amount, is only 65.3 per cent., it will be observed that the increased saving must be due partly to the more favorable conditions that the heated air provides for the engine.

The percentages of gain given in the results, refer to the developed horse-power, and the increased mechanical efficiency caused by the use of heated air must have a considerable effect upon the results. The increase in mechanical efficiency is shown by the curves on Plate III.

Thus three important points are secured by the use of a reheater:

1. Absence of freezing.
2. Reduced cost of plant throughout.
3. Great increase in permanent economy.

RECENT DECISIONS AFFECTING THE MINING INDUSTRY.

SPECIALY REPORTED.

NEGLIGENCE A QUESTION OF FACT FOR THE JURY TO DETERMINE.—A stone quarry containing a rock which had been charged with dynamite was flooded for a week or more, and when the water was pumped out, one who had only worked in the quarry for six or eight days, and who had no knowledge of the dynamite, was told by another employee to drill a hole in the rock, and on doing so the dynamite exploded and he was injured. It was held that the mere fact that the superintendent having charge of the quarry had no knowledge of the existence of the dynamite in the rock was not a defense as a matter of law, and the question was one of fact as to whether the superintendent was guilty of negligence in failing to ascertain the presence of the dynamite and the existing danger.—*Robinson Mining Company v. Tolbert* (31 *Southern Reporter*, 519); Supreme Court of Georgia.

DUTY OF A MINING COMPANY TO SUPPLY SAFE ANIMALS IN ITS WORK.—If a mule furnished by a mining company for the use of its employee was dangerous and vicious and the company knew, or might have, by the exercise of ordinary care, known that fact, it is liable for an injury resulting therefrom; unless the employee knew that the mule was dangerous and after that went on voluntarily hauling with him, in which event he assumed the risk. And even though the hands at the stable whence he had taken the mule had told him that it was dangerous, yet if his boss told him that the mule was safe it was a question of fact for the jury whether he knew that the animal was dangerous, and as the boss, who had employed, and was, therefore, the agent of the mining company, had told him to get that particular mule, the company was bound by its agent's statements.—*East Jellico Coal Company v. Stewart* (68 *Southwestern Reporter*, 624); Court of Appeals of Kentucky.

SUFFICIENT DESCRIPTION OF MINING CLAIM AND PRESUMPTION AS TO LOCATION.—The description of a mining claim as "beginning at the northwest corner of El Williams 1-16, at a black oak post; thence 1,500 feet north between sections 10 and 11 to a dogwood brush; thence 600 feet east to a dogwood brush; thence 1,500 feet south to oak post in William's field; thence 600 feet to the place of beginning. This being in the northwest quarter of the southwest quarter section 11, T. 17, range 15 W.," is sufficient, it being presumed, in the absence of any contrary evidence that "El Williams 1-16" is some well-known natural object. Also, where locators of mining claims never undertake to develop and maintain them, and other claimants take possession and hold and develop them for a longer period than the period of limitations, the title of the last claimants is good, as against any one except the Government. And, where a purchaser of mining claims has held them adversely for the period of limitation it will be presumed as against adverse claimants that the claims were regularly located.—*Buffalo Zinc and Copper Company v. Crump* (69 *Southwestern Reporter*, 572); Supreme Court of Arkansas.

OFFICIAL SURVEY NOT NECESSARY TO DESIGNATE TEXAS MINERAL LANDS.—The law of Texas, act of 1889, provided that all public lands containing valuable mineral deposits are reserved from sale to settlers, and open to purchase as described by the act. Act of 1895, section 1, provided that all public lands specially included under the operation of the act, containing minerals, were reserved from sale, except as therein provided; and by section 2, it is made the duty of the Mineralogical Survey to examine all public lands, and designate such as are mineral. Section 6 requires a locator applying for mineral land to make affidavit that he has discovered mineral. Section 10 provides that on the doing of certain things, on an application for mineral

lands, the same shall be reserved from sale, and that any land of the State specified or included in section 1 may be so acquired. The court held, that the statute not providing that the lands specially included were those designated by the Mineralogical Survey, and it appearing from section 6 that other evidence of minerals than the result of such survey is to be submitted to the commissioner, and section 10 not referring to the lands open to application as those designated by the survey, and making other provisions for reservation, save such designation, an applicant for mineral land (it being made to appear by evidence provided for in the statute that the land is mineral) is entitled to a patent, though the land has not been designated by the survey, and the commissioners can be compelled by mandamus to issue the patent; and in such proceeding a subsequent adverse claimant is not a necessary party.—*Colquitt-Tigner Mining Company v. Rogan* (68 *Southwestern Reporter*, 154); Supreme Court of Texas.

ABSTRACTS OF OFFICIAL REPORTS.

Philadelphia & Reading Coal and Iron Company.

This company owns, leases and works a very large estate in the anthracite coal region of Pennsylvania. It is entirely controlled by the Reading Company, constituting a branch of that company's operations. The report is for the year ending June 30, 1902.

The company's property is represented by the following capital account: Capital stock (owned by Reading Company), \$8,000,000; divisional liabilities and mortgages, \$274,500; general mortgage loans, \$5,010,000; due Reading Company, \$79,002,920; current accounts and balances, \$729,245; profit and loss balance, \$652,116; total, \$93,668,581.

The income account for the year is as follows:

	1901.	1902.	Changes.
Gross receipts	\$28,917,858	\$26,519,529	D. \$2,398,329
Operating expenses	\$26,300,336	\$25,530,994	D. \$769,342
New work at collieries	806,308	863,428	I. 57,120
Total expenses	\$27,106,644	\$26,394,422	D. \$712,222
Net earnings	\$1,811,214	\$1,251,107	D. \$560,107
Interest and taxes	\$369,315	\$419,858	I. \$50,543
Interest on debt to Reading Co.	886,504	888,780	I. 2,276
Total charges	\$1,255,819	\$1,308,638	I. \$52,819
Net or deficit	N. \$555,395	—\$1,183,531	D. \$1,738,926

The net result last year was a deficit of \$1,183,531 on the year's operations, against a surplus of \$555,395 in the preceding year, showing a loss of \$1,738,926.

The coal produced by the company and from its lands was as follows, in long tons:

By Company:	1901.	1902.	Changes.
From lands owned	6,697,122	5,985,032	D. 712,090
From lands controlled	326,897	267,281	D. 59,616
From other lands	992,917	716,253	D. 276,664
Total by company	8,016,936	6,968,566	D. 1,048,370
By Tenants:			
From lands owned	1,118,214	1,084,154	D. 34,060
From lands controlled	118,124	145,554	I. 26,730
Total by tenants	1,237,038	1,229,708	D. 7,330
Total mined	9,253,974	8,198,274	D. 1,055,700

The coal purchased by the company for the year was as follows:

	1901.	1902.	Changes.
From tenants (included above)	689,904	769,900	I. 79,996
From others (not included)	277,531	264,390	D. 13,141
Total	967,435	1,034,290	D. 66,855

The report says: "The total production of anthracite coal from lands owned and leased by the Philadelphia & Reading Coal and Iron Company in the year 1901-1902 was 8,198,274 tons, a decrease of 1,055,700 tons from the production of the previous year, or 11.4 per cent. The decrease in production of the whole anthracite region for the year ended June 30, 1902, was about 10.2 per cent. as compared with the year ended June 30, 1901. The decrease in the production of the whole region resulted from floods and strikes. The United Mine Workers of America ordered a strike of the miners on May

12 last, from which date to the end of the fiscal year all the collieries were idle. The production of the Coal and Iron Company was also considerably reduced by the freshets of December, 1901, and March, 1902, when many of the collieries were flooded and a few drowned out; some of the latter being unable to resume full operations for several months.

"The coal purchased aggregate 1,034,290 tons, an increase of 66,855 tons, or 6.9 per cent., and the sales amounted to 8,289,828 tons, a decrease of 810,688 tons, or 8.9 per cent. from the previous year.

"The cost of coal mined and purchased for the year was \$2.028, which is 20.5 cents higher than the cost for the previous year. This higher cost resulted principally from the following causes: The increased cost of labor, due to the advance in October, 1900, which affected the whole of the fiscal year ended June 30, 1902; the additional expenses attending the freshets of December, 1901, and March, 1902; the increased amount expended for colliery and other improvements, and to the expenses in connection with the strike, with the consequent reduction in our tonnage.

"The total sum expended for colliery improvements, etc., for the past fiscal year was \$863,428, as against \$806,308 for the previous year.

"The funded indebtedness of the Coal and Iron Company has been reduced by payments on account of the principal of divisional loans of \$234,500; leaving a balance still outstanding of divisional mortgages of \$274,500, the larger part of which matures in 1904, and of collateral sinking fund loan, \$1,410,100. These bonds were paid by the issue of general mortgage bonds, and credit was given to Reading Company for the amount issued.

"In pursuance of the policy of the company to make provision against the depletion of the company's estate there was set aside, out of the revenue of the company, the sum of \$374,101, being 5 cents per ton on all coal mined from the Company's lands during the fiscal year. This sum, in addition to the amount not invested at the close of the previous fiscal year, has been used in the purchase of securities and the total amount now in this fund, including the cash, is \$1,626,516.

"The management has decided that, in view of the steady increase in the consumption of anthracite coal, and in order to meet the loss of production caused by the lessened efficiency of labor and by reason of the exhaustion of certain collieries, to expend about \$3,500,000 in the sinking of seven new shafts and the construction of new breakers, machinery, etc.

"This amount will be expended proportionately during the next five or six years and can be paid for either out of the net revenues of the company or from the depletion of coal lands fund."

The total tonnage of coal carried by the Philadelphia & Reading Railroad Company for the year is reported as follows:

	1901.	1902.	Changes.
Anthracite	10,523,891	9,465,953	D. 1,057,938
Bituminous	5,018,491	6,087,088	I. 1,068,597
Total	15,542,382	15,553,041	I. 10,659

The revenue of the railroad from this traffic was \$12,436,159 last year, a gain of \$44,852, or 0.4 per cent. over the previous year. This revenue last year was 42.6 per cent. of the total gross earnings.

Alaska Treadwell Gold Mining Company, Alaska.

This company owns a large property on Douglas Island in Alaska. The report covers the year ending May 15, 1902. During that period 682,983 tons of ore were taken out and passed through the mill. From the mill tailings 12,408 tons of sulphurets were saved by concentration. The total bullion return was: Free gold from amalgamation in mill, \$665,591; gold from 12,660 tons sulphurets treated, \$639,129; total, \$1,304,720. In addition, there were 368 tons of sulphurets on hand at the close of the year.

The statement of earnings and expenses, the latter being given in very full detail, is as follows:

	Total.	Per ton.
Bullion sold	\$1,304,720	\$1.9106
Merchandise profits, etc.....	34,799	0.0509
Total earnings	\$1,339,519	\$1.9615
Mining 682,893 tons	\$573,554	\$0.8399
Milling and concentrating	125,636	0.1840
Sulphuret expense, 12,660 tons.....	97,332	0.1425
General expense, Douglas Island.....	10,656	0.0157
San Francisco office	6,636	0.0097
London office	1,224	0.0018
Paris office	224	0.0003
Consulting engineer	1,253	0.0018
Legal expenses	125	0.0002
Interest on over-drafts	405	0.0006
Bullion charges	6,042	0.0088
Total working expenses	\$823,087	\$1.2053
Construction	52,942	0.0775
Total expenses	\$876,029	\$1.2828
Net earnings	\$463,490	\$0.6787

From the net earnings shown above dividends amounting to \$300,000—being \$1.50 per share, or 6

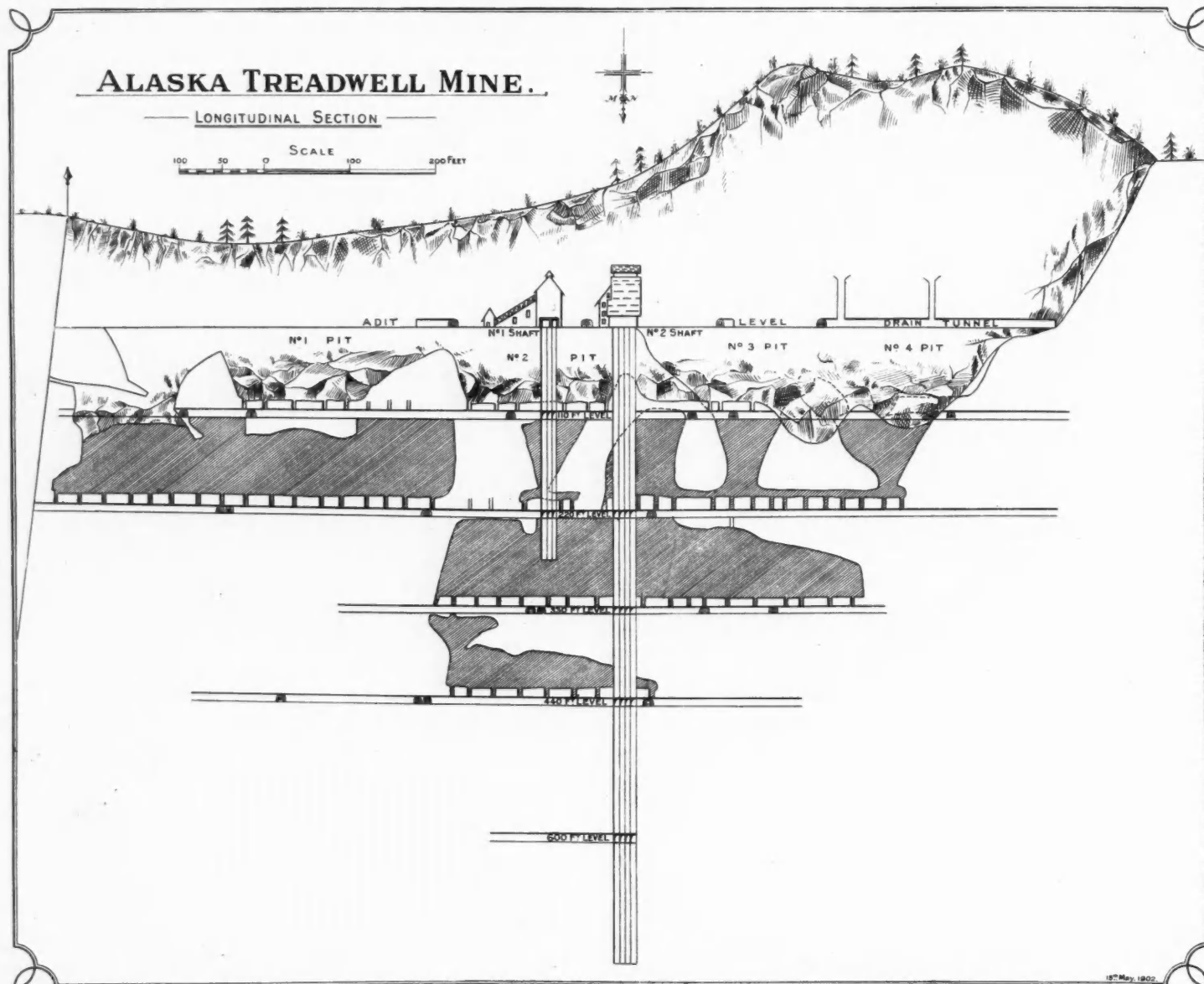
to expect an increase in values here.

The estimate of ore in sight and available for mill on May 15 last was 3,234,260 tons; in addition to which it was estimated that there was 800,000 tons on the 600-foot level not yet developed.

The mill record shows that the 300-stamp mill, using water power only, ran 214 days 6 hours 6 minutes, crushing 308,632 tons. The 240-stamp mill ran 338 days 23 hours 53 minutes, crushing 374,261 tons. The average duty was 4.80 tons per stamp per day in the 300-stamp mill, and 4.60 tons in the 240-stamp mill. In the 240-stamp mill steam was used for power 139 days 19 hours 17 minutes, and water for 199 days 4 hours 36 minutes. In the 240-stamp mill one pound of chrome and Koppel steel in the shoes crushed 4.33 tons of ore, and in the 300-stamp mill 4.29 tons. There were a larger number of new

Whenever the supply of either air or steam is short, we can get what the Alaska United Gold Mining Company is able to spare, for which we pay to the Alaska United Gold Mining Company at the rate of \$5 per drill for each 24 hours. A flume has been built in the 300-stamp mill that carries water from the Pelton wheels between the stamp mill and the vanner room and through the tailings launders. This was necessary to carry off the greater amount of tailings resulting from the increased duty of the stamps.

"Owing to the increased duty of the stamps and the consequent great increase in the annual tonnage, the mine has not sufficient air-compressing capacity to keep the necessary amount of machine drills going. I, therefore, recommend that a new air-compressor of 25 to 30 drill capacity and 400 horse-power of



per cent. on the par value—were paid, leaving a balance of \$163,490. Adding \$650,408 carried forward from previous year, made the total surplus \$813,898 at the close of the year. The cash on hand at that date was \$123,581; supplies and merchandise at mines, \$211,700.

The development work done during the year included 231 feet shaft sinking and 5,328 feet drifting and cross-cutting, a total of 5,559 feet. The present condition of the mine is shown on the map accompanying the report, which is reproduced herewith.

The results of the development work done during the year have been very satisfactory. The pay ore in that part of the vein opened up by the 600 foot level is 130 feet wide, which is 40 feet more than the average width on the 440 foot level. The average value of 74 samples taken from the ore body, 120 feet wide, on this level, is \$3.69, and as in the upper levels the best ore is to the east, it is only reasonable

shoes in the mill at the end of the year than at the beginning. In the 240-stamp mill one pound of iron in the dies crushed 7.88 tons of ore, and in the 300-stamp mill 5.60 tons. These dies were cast in the company's foundry. During the winter shut-down the feeders were all renewed in the 300-stamp mill. The new ones are much heavier in the places where there is much wear. All the castings were made in the company's foundry.

Additions to plant included a bin for sulphurets with a capacity of 1,000 tons; an addition to the machine shop; a round house for the locomotives; a steam-heating plant; and a timber-framing shed with circular saw. The Fish Creek flume was partly rebuilt. Additions were made to the docks and storehouses at several points.

The superintendent's report says: "A double pipe line, one for steam and one for air, has been built between the 700-foot Mine and the Treadwell Mine.

boilers be installed at the mine. This new machinery should be in place and running early this autumn, so that we can add materially to the stock of broken ore in the slopes and ensure the running of both mills to their full capacity."

Labor was plentiful during the year. It is of interest to note the wages paid in Alaska, and we give the rates paid by this company during the year. In addition to the money wages paid, the company furnished board and lodging to all its employees, except the Indian laborers. The rates were: Machine drillers, \$2.50 a day in summer and \$3 in winter; machine helpers, \$2.25; amalgamators, \$90 per month; feeders, \$70; vannermen, \$65 to \$100 per month; machinists and helpers, \$2 to \$6 per day; blacksmiths, \$4; tool sharpeners, \$3.50; blacksmiths' helpers, \$2; white mine laborers, \$2 per day, with board; Indian laborers, \$2 per day, without board or lodging.

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.

Movimento Commerciale del Regno d'Italia. 1901. Prepared by the General Direction of Statistics in the Ministry of Finance. Rome, Italy; published by the Ministry. In three volumes, 1,200 pages in all.

Transactions of the American Ceramic Society. Fourth Annual Meeting. 1902. Edward Orton, Jr., Secretary. Columbus, O.; published by the Society. Pages 300; illustrated.

Records of the Geological Survey of New South Wales. Volume VII, Part II. Sydney, N.S.W.; Government Printer. Pages 112; with 26 plates.

Statistics of Mineral Production in India in the Ten Years, 1892-1901. Prepared under the supervision of the Director General of Statistics. Calcutta, India; Government Printing Office. Pages, 8.

Statistical Tables Relating to the Production, Consumption and Exports of Coal in the British Empire, 1883-1901. London; H. M. Stationery Office. Pages, 48.

Monographs of the United States Geological Survey. No. XLI. Glacial Formations and Drainage Features of the Erie and Ohio Basins. By Frank Leverett. Washington; Government Printing Office. Pages, 802; illustrated.

Twenty-fifth Anniversary of the American Chemical Society. Reports and Addresses. Being a special supplement to the *Journal* of the Society. Easton, Pa.; The Chemical Publishing Company. Pages, 168.

Bulletins of the United States Geological Survey, No. 179. Bibliography and Catalogue of the Fossil Vertebrata of North America. By Oliver Perry Hay. Pages, 870. No. 182. *Report on the Economic Geology of the Silverton Quadrangle, Colorado.* By Frederick L. Ransome. Pages, 266.

No. 188. *Bibliography of North American Geology, Paleontology, Petrology and Mineralogy, 1892-1900.* By Fred Boughton Weeks. Pages, 720.

No. 189. *An Index to North American Geology, Paleontology, Petrology and Mineralogy, 1892-1900.* By Fred Boughton Weeks. Pages, 340. No. 190. *Gazetteer of Texas.* By Henry Gannett. Pages, 164; with maps. No. 192. *Gazetteer of Cuba.* By Henry Gannett. Pages, 116; with maps. No. 193. *Geological Relations and Distribution of Platinum and Associated Metals.* By James Furman Kemp. Pages, 96; illustrated. No. 194. *Northwest Boundary of Texas.* By Marcus Baker. Pages, 52; with map. Washington; Government Printing Office.

BOOKS REVIEWED.

Anuario de la Minera, Metalurgia y Electricidad de Espana, 1902. Prepared under the direction of Don Adriano Contreras. Madrid, Spain; published by the *Revista Minera.* Pages, 576.

The publication of this annual volume, which was begun several years ago by the late Don Roman Oriol, has been continued by his successor, Don Adriano Contreras in substantially the original forms. It gives a great deal of information about the mineral industries of Spain and the companies and individuals engaged in their exploitation and in metallurgical work. In addition it gives lists of officers and members of Spanish technical societies, and many particulars relative to railroads, electrical companies, etc. It is a most useful manual, and contains data not elsewhere to be found.

Report of the State Board of Geological Survey of Michigan for the Year 1901. Alfred C. Lane, State Geologist. Lansing, Mich.; State Printers. Pages, 304; with maps and illustrations.

This report from the Michigan Survey covers the year 1901, showing the work that has been done by the survey and including a number of papers on dif-

ferent subjects. It is much fuller than the previous reports, which were simply records of the progress made. In this report the description of the geology of the State by counties has been continued, those treated being Arenac, Alcona, Alpena, Kent, Lapeer, Muskegon and Washtenaw. In addition there are a number of articles on more general subjects, the list including, first, a general statement on the economic geology of the State in its relation to the business world. This treats of the different metals and minerals of value produced by the State, including iron, copper, coal, salt, building stone and many other materials. A special paper by A. W. Grabau is on the Stratigraphy of the Traverse Group, a very interesting geological subject. Other papers are on deep wells and prospecting for oil and gas, on salt and on the general geology of the Upper Peninsula. The report on economic geology is especially valuable. Taken as a whole the report shows a very creditable amount of work accomplished by the Survey, indicating that the resources at its command have been well utilized. The volume is illustrated by maps, geological sections and several half-tone engravings.

The Phosphate Rocks of Arkansas. By Dr. John C. Branner and Dr. John F. Newsom. Fayetteville, Ark.; published by the Arkansas Agricultural Experiment Station. Pages, 64; illustrated.

The material for this bulletin is taken from notes and observations made by Dr. J. C. Branner while State Geologist of Arkansas; also from notes made by him while on subsequent trips to the region, and from notes made by Dr. J. F. Newsom while doing private work in the phosphate region. Both of these gentlemen are now in the Faculty of Leland Stanford Junior University. The bulletin is issued to furnish information and to encourage the development of these phosphate deposits, which promise to be of great extent and richness.

The most important deposits now known are in north-central Arkansas, lying within parts of the counties of Independence, Stone, Izard, Searcy, Marion, Baxter and Newton. The deposits of this locality are now attracting attention, as two railroad companies are building lines into the region. One line is building up White River from Batesville, on the north side of the phosphate area, and the other line is building southeast of Harrison through the south side of the locality. These two railroads in providing transportation, will render possible the development of the phosphate deposits, which have heretofore been without transportation. One company, the Arkansas Phosphate Company, on the line north of Batesville, is now manufacturing acid phosphate. The rock this company is mining works up into a dry, friable acid phosphate. This rock is soft and easily crushed, and in appearance is identical with some of the Tennessee phosphate rocks.

The deposits of this region promise to be of considerable extent and richness, and with the extension of these lines, of transportation development of the deposits will doubtless begin at various points at an early date.

COAL IN SOUTH RUSSIA.—An important deposit of coal has lately been discovered at Tiraspol in the Russian Government of Kherson. It is located under land belonging to an Odessa merchant, who is reported to be in negotiation with a foreign syndicate with regard to the opening up and working of the deposit.

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: It is possible that some of your readers may have had experience in the treatment of gold and silver ores containing selenium. I have been unable

to find any references to that element in technical literature, and would like to know if there is anything on record upon the subject. I have met with an ore in which selenium is associated with the values; it is not shown by assay, but is undoubtedly present, as is shown when the zinc slimes are being cleaned up after cyaniding the ore. I do not know what effect this has on the results of treatment, and should be much pleased to have some opportunity of comparing notes with others.

MILL MANAGER.

London, October 10, 1902.

"The Unconsidered Heroes."

Sir:—May I add my testimony to the article on "Unconsidered Heroes," over the honored signature of Dr. Raymond, in your issue of October 4? Only those who have been through labor troubles can appreciate the quiet devotion to principle and real heroism of the so-called "scabs." We mining engineers and superintendents at least have our reputations to uphold and the approval of our fellows to console us; these men have no special inducement in money or repute to take such a stand, are neglected by the newspapers and busybodies who cover the walking delegates with glory, bear the brunt of the brutality and lawlessness which labor organizers pretend so strenuously to discourage; and are then only too often sacrificed when differences are settled.

The enclosed "Scab List" distributed by the local Miners' Union at the time of a recent strike here will show the methods of gentle persuasion on which certain Unions rely; the description which follows the names so pilloried shows the feeling.

Not a single one of the 81 men here attacked was asked to remain at work during the strike—nor paid a cent extra for so doing. And it is remarkable that in a district where two-thirds of the miners are Austrians, Finns and Italians nearly all these "unconsidered heroes" have American names, while many were old-timers and pioneers in the San Juan Mountains.

When I add that from this one short list, two men have since disappeared under grave suspicion of murder, several others have been brutally attacked and injured, and the local newspaper boycotted for "unfriendly" comments thereon, the force of Dr. Raymond's appeal to American institutions and ideals will be appreciated.

ARTHUR L. COLLINS.

Telluride, Colo., Oct. 9, 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.)

Fluorspar Producers.—Who are producers of fluorspar in the United States?—H. S. M.

Answer.—In addition to the names of producers of fluorspar given in answer to this question in our issue of August 16 last, we have to give that of the Grand Pierre Lead and Zinc Mining Company, which has its office and mines at Golconda, in Pope County, Illinois.

Copper in the Philippines.—Are there any copper mines or copper deposits in the Philippines?—B. B.

Answer.—Copper deposits are reported on the Island of Mindanao, in the region inhabited by the Moro tribes. These deposits have been worked in a crude way by the natives and by Chinese miners. The ore was heated, then crushed by hand or by stone rolls and smelted in small furnaces built on the spot. A German company did some work there and built a smelting furnace, which was run for a time. Full and definite information about these deposits is lacking. It is hoped that before long there will be opportunities for intelligent prospecting.

Prices of Anthracite.—Can you give the highest and lowest wholesale prices of anthracite coal for the years 1897-1901, inclusive? Dates on which extremes were reached? Also prices by months for the current year to date?—M. B.

Answer.—The usual basis taken for wholesale prices is that for stove size of free-burning white ash anthracite, f. o. b. New York Harbor shipping ports. The highest regular price on this basis in the four years named was \$4.50 per ton; this was the regular price from September 1, 1901, to March 3, 1902. The lowest regular price was \$3.50, which ruled during January, 1901. In December, 1900, the average price was \$4.45. For 1902, by months, the prices were: January, \$4.50; February, \$4.50; March, \$4.50; April, \$4; May, \$4.10. No regular prices can be given for the months later than May, as the producers restricted sales; though it is understood that a very few favored old customers got some coal at the nominal regular price of \$4.20 in June and \$4.30 in July. Outside of such sales, there was no regular market price, nor none that could be taken as a standard, since prices were largely speculative, and it is utterly impossible to give any general average price during August, September and October. The largest single consumer—the Elevated Railroad—probably got coal on more favorable terms than small jobbers and dealers. Towards the end of the strike, say, from October 1 to October 10, stove size sold at wholesale as high as \$14, and at retail up to \$27.

Sulphuric Acid in South Africa.—Is any sulphuric acid made in the Transvaal, or elsewhere in South Africa?—E. W.

Answer.—The general stoppage of industries which resulted from the war, of course, upset chemical as well as mining operations, but no doubt work will be resumed in the near future in the chemical department on the same lines as before, so we may refer to the practice before the war broke out. Sulphuric acid was made by the dynamite factory at Modderfontein and by the New Transvaal Chemical Works. Both imported sulphur from Sicily, as no deposits of pyrites could be discovered locally, and there were not enough concentrates from the outlying quartz mining districts. Nitric acid was also made on the spot from imported Chile nitre. In addition to the uses of sulphuric acid in dynamite manufacture, there is a

acid for making superphosphates, but no phosphate deposits have been found locally, so the enterprise was not continued. Up to the present time sulphate of ammonia has not been made at gas works. In a few years' time, when the oil shale deposits of the Southeast Transvaal are opened up, there should be a large use for sulphuric acid for the manufacture

inch. The season at Breckenridge is limited to 200 working days, and it was, therefore, important that the plant should be equipped to handle large quantities of gravel. As the river has not sufficient volume to take care of the desired amount, it became necessary to dispose of the tailings in some other way, and it was found that the only mechanical device hav-

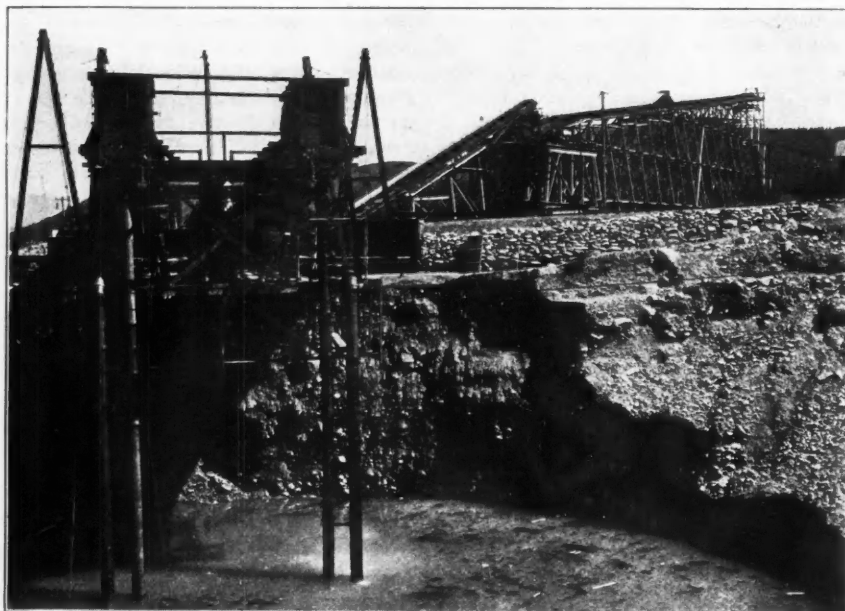


FIG. 1.—EVANS HYDRAULIC ELEVATORS AT BRECKINRIDGE, COLO.

of sulphate of ammonia. The dynamite factory has some undisposable by-products, and in the future efforts will be made to work up these and so reduce the general expenses. One of these by-products is acid sulphate of soda, which is a by-product in the manufacture of nitric acid. It is proposed to use it instead of sulphuric acid for the removal of zinc from the slimes, and it is already in use for this purpose at the Rose Deep Company's works.

ROBINS BELT CONVEYORS AS TAILINGS STACKERS.

The plant of the Gold Pan Engineering and Mine Supply Company is without doubt the largest placer mining operation in the world. It is situated at Breckenridge, Colo., on the Colorado & Southern Railroad. Some three years have been required to

ing the great capacity required was the Robins belt conveyor, two of which were installed, as shown in the photographs here reproduced.

Fig. 1 shows the Evans hydraulic elevators sinking to bedrock, the outside pipes being the downtakes and the inside pipes, entering the bottom of the flumes, the up-lifts. The water rushing through the downtakes sucks the gold-bearing gravel in and lifts it to the sluices, stones up to 10 inches, being lifted in this way. In the bottom of the sluices are the riffles which collect the gold.

Fig. 2 shows the other end of the sluices at the start of operation, when the water and stones are simply discharged from the end of the sluices to fill up a hollow which existed at this point. In this photograph Conveyor B is in course of construction. In the present operation a grizzly is placed at the end of each sluice, which allows the water and fine gravel to pass through it and fall into the natural channel of the river. The material which is too large to fall through the grizzlies goes to the receiving hopper of Conveyor A. This hopper can be seen under the temporary flumes in Fig. 2. Conveyor A elevates the material to a point over the track of the Colorado & Southern and discharges to Conveyor B, which is equipped with an automatic tripper, and running at an inclination of 7°, reaches a height at its further end of 80 feet. The tailings will be discharged by the conveyor about the trestle on which it runs, and when the trestle is completely covered by them the Conveyor B will be moved on to the pile thus formed. By keeping the conveyor moved close to the edge of the pile and allowing the tailings to fall over the edge a pile of enormous size can be formed. Both conveyors are 36 inches wide, A being 110 feet long, running at an angle of 23°, and B 300 feet long, running at an angle of 7°. They have a capacity of from 400 to 500 cubic yards of material per hour. This interesting plant was designed and built by the Robins Belt Conveying Company, of New York.

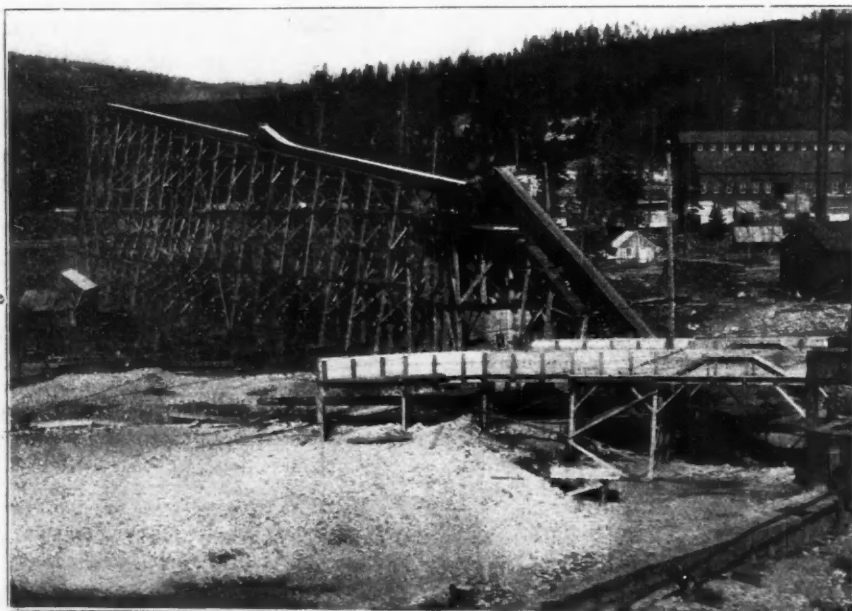


FIG. 2.—ROBINS CONVEYORS AT BRECKINRIDGE PLACER, COLORADO.

local market for the acid for the removal of zinc from the slimes in the cyanide plants. It was also sold to the chlorination works for the liberation of chlorine from bleach. The chief user in this direction was the Robinson Mine, which bought up concentrates and chlorinated them. The New Transvaal Chemical Works at one time used sulphuric

prepare the plant for operation. This work consisted of building a large ditch or canal 3 miles long and 8 feet wide, into which the water from the river is diverted when desired. At the lower end of the ditch the water enters a 60-inch pipe line, 1½ miles long, which feeds the hydraulic elevators and giants, the pressure at the elevators being 170 pounds per square

THE NEW WORKS OF THE B. F. STURTEVANT COMPANY.

The new works of the B. F. Sturtevant Company now nearing completion at Hyde Park, Mass., present an excellent opportunity to study the factors that control in the location and design of the modern manufacturing plant. The present plant at Jamaica Plain, Mass., is limited in its opportunity for growth, its capacity has long been strained to the

utmost, and, as a consequence, the question of removal has continued to present itself with ever-increasing force. The best combination of advantages was presented by a lot of nearly 20 acres of land in the town of Hyde Park, Mass. The lot selected has a frontage of about 1,300 feet upon the freight yard of the New York, New Haven & Hartford Railroad, etc., at Readville Station, the distributing point for all freight passing over either the Midland or Providence divisions of the road. One side of the lot is bounded by a plentiful stream known as Mother Brook, and the adjacent shore is at a level of nearly 10 feet below that of the yard and buildings, thus providing sufficient space for dumping waste material for years to come.

The site having been selected, consideration was first given to the question of the number of floors to be provided in the various buildings. The lay of the land and its availing area being somewhat against a group of one-story buildings, and a simple calculation showing that the actual cost of the power expended in a single year for lifting the entire product of the works through a distance of 20 feet would be very small, determined the company upon the building of multi-storied buildings.

The arrangement of the buildings was determined by the provision to be made for growth. The construction of the buildings next received consideration. The type finally selected is composite in its character, consisting of steel interior columns and main steel girders, with heavy brick walls, wood timbered floor and plank roofs. In the case of the one-story foundry, the roof is supported by steel trusses; in the other buildings open timbering with wooden columns in the upper floor is employed. The main floor in the machine shop is of tar concrete with spruce and maple flooring. The upper floors are carried upon wooden beams spanning the spaces between the steel girders, which follow a unit system of 20 feet on centers through the building. All roofs are of 3-inch plank, with tar and gravel top.

The question of power was early decided to the extent that the entire plant would be electrically driven from a central power house; that the engines would run condensing, that the exhaust steam derived from engines under test, which is considerable, would be utilized for heating with supplementary amount of live steam admitted at reduced pressure as might be required. The final decision regarding the power house placed it sufficiently far from the ends of the buildings to permit sufficient extension of each and near enough to the water supply to reduce to a minimum the expense of conveying condensing and other water.

The pattern building provides at one end a two-story portion, 80 feet square, for carpenters and flask makers on the first floor, and for pattern-makers upon the second floor. The balance of the building, which is devoted to pattern storage, is provided with intermediated floors, making four in all, separated from the other portion of the building by double fire walls and automatic fire closing doors.

The foundry, 170 by 350 feet in dimensions, is designed with the idea of distributing iron upon a track system, and is to be equipped with narrow gauge railways bedded in concrete, making runways between the moulding floors. Two craneways run lengthwise through the building the greater part of its length, and the tracks extend beneath the crosswise traveling crane in the cleaning room at the end of the building. The brass foundry is located in one corner, a wash room in the adjacent corner, a core room between the two.

From the foundry the castings will pass to the rear of either the machine shop or the fan shop. The former is of the familiar gallery type, 500 feet long, with wings 40 feet wide, and central runway of the same width for crane of 20-ton capacity. The upper floor of this building together with portions of the adjoining buildings is devoted to the electrical department and provided with individual small traveling cranes.

The building devoted to the manufacture of fans,

heaters, etc., is 80 feet in width, of the same length as the machine shop, is three stories in height, of typical mill construction, provided with all conveniences for handling material and arranged so that shipment can be made from numerous points along one side, while supplies are brought in from the court between it and the machine shop.

The smith shop, 40 by 80 feet, serves both buildings with equal facility while the wash house and locker room measuring 40 by 100 feet and three stories in height, is so located as to reduce to a minimum the distance to be traversed by the individual workman. The third floor will be used as a lunch room.

The standard first floor height in the main buildings is 17 feet, that of the second and third stories is 15 feet. The windows are large and numerous.

The office will contain the correspondence, designing and drafting offices, the superintendent's quarters, and the cost department, the advertising bureau and a printing office which will be located in the basement. It will be three stories in height with a finished attic to provide additional drafting room space.

The equipment of this plant will be largely "Sturtevant" in its character. Beginning with the power plant, the mechanical draft apparatus, the engines and generators and the exhaust head will be of Sturtevant make. The buildings will be heated by the Sturtevant system, the shafting and individual machines driven by motors of the same make, the refuse from the wood-working machinery, the dust from the cleaning room of the foundry, the ventilation of the offices, toilet rooms, and wash house, and the removal of smoke from the smith shop will be accomplished by the Sturtevant exhaust fans, while Sturtevant blowers will be used for brass and iron foundry, forge shop blast and the like, and Sturtevant steam traps will be employed upon the steam driers.

PATENTS RELATING TO MINING AND METALLURGY.

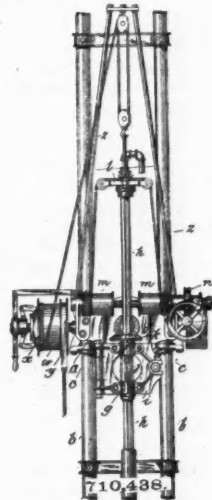
UNITED STATES.

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 October 7, 1902.

710,415. BRICK-KILN.—Luman Blackman, Topeka, Kan., assignor of two-thirds to Leslie Earnest and Edwin Sills, Topeka, Kan. The combination with the floor, walls and arched roof of a brick-kiln; of a central longitudinal flue in the floor thereof extending the full length of the kiln, a chimney at each end, a series of transverse, perforated areas of floor between the walls of the kiln and the central flue, a series of separate and independent transverse flues in the floor, one being provided for each area.

710,438. ROTARY DRILLING-MACHINE.—Francis H. Davis and Coleman A. Terry, New York, N. Y., assignors to Davis Calyx Drill Company, New York, N. Y. In a core-drilling machine, the combination with a stationary



supporting member, and a drive-shaft whose bearings are stationary with said member, of a member vertically swiveled upon said stationary member, a revoluble drill-rod mounted in bearings upon said swiveled member, means for applying continuous rotary movement to said drill-rod

from said drive-shaft, a winding-drum carried by said swiveled member, and a flexible connection between said winding-drum and said drill-rod, said winding-drum and flexible connection constituting a feeding means for the drill-rod.

710,462. SETTLING-TANK.—Robert D. Jackson, Reno, Nev. In a settling-tank, a movable distributor having a receptacle or hopper, inclined channels extending from said receptacle, and a plurality of discharge-outlets from said channels.

710,484. ROCK-DRILLING-MACHINE BIT, OR THE LIKE.—Donald Mackenzie, Randfontein, near Krugersdorp, Transvaal. In combination, a holder, split longitudinally through the center in two directions at right angles forming jaws for a portion of its length, taper holes and through the splits, taper plugs in such holes for expanding the split portion, dovetailed grooves in the end of the holder coinciding with the mouth of the splits, and triangular cutters removably held in said grooves by the normal inward spring of the jaws.

710,492. CONVEYING APPARATUS.—Thomas S. Miller, South Orange, N. J. In a conveying apparatus the combination with a trackway-cable, and two separated supports for the cable, of means for raising one of said supports above and for lowering it below the level of the other support, and a yielding and recovering, strain-supporting or tension device attached to one end of the cable.

710,493. PRODUCTION OF THE METALS OF THE ALKALIES.—Ludwig T. Moeser and Wilhelm E. Eidmann, Giessen, Germany, assignors to Firm of Chemische Fabrik Griesheim Electron, Frankfurt-on-the-Main, Germany. A process of producing the metals of alkalies which consists in heating a mixture of calcium carbide and alkali fluoride to a red heat in the absence of oxygen.

710,495. APPARATUS FOR TREATING ORES.—Sidney T. Muffly, Bowdre, Ga., assignor of one-half to Runyon Pyatt, New York, N. Y. An apparatus for treating ores comprising a rotary cylinder, air inlet and outlet passages communicating therewith, and check-valves within the cylinder governing the said inlet and outlet.

710,521. PROCESS OF MAKING MINERAL ABSORBENT PREPARATIONS.—Alfred G. Saunders, Adelaide, South Australia, Australia. A process for manufacturing an absorbent mineral preparation wherein carbonaceous clay is first ground to a powder then soaked in tanks of water to allow impurities to settle subsequently adding caustic soda to the clean carbonaceous clay and boiling the mixture at high temperature, the mass being kept in a state of agitation during the process of boiling subsequently washing the material with a weak solution of sulfuric acid when cool again washing and drying the resultant composition.

710,580. PROCESS OF MANUFACTURING ARTIFICIAL FUEL.—Charles J. Holmes, San Francisco, Cal. A process of manufacturing concrete artificial fuel containing liquid hydrocarbon as an element, consisting, first, in saturating dry, absorbent, combustible substances with the liquid hydrocarbon at normal temperature, secondly, confining said saturated substances so as to prevent the escape of any of the volatile parts of the hydrocarbon, thirdly, agitating said saturated substances, while so confined with a fusible combustible substance in the presence of heat, and lastly, casting or molding the combined substances into briquets or blocks.

710,588. METHOD OF FORMING THE LINING OF CONVERTERS OR FURNACES.—William J. Knox, Edgewood Park, Pa., assignor to George Westinghouse, Pittsburg, Pa. A process of lining vessels for metallurgical work, which consists in forming a dry mixture of pulverized magnesite and oxysulphide of iron, adding thereto soluble glass, forming the mass into a plastic condition by the addition of water, applying the mass thus formed to the surface to be lined, drying the same, and then applying thereto a solution of calcic chloride, thereby forming a calcic silicate throughout the mass.

710,589. CONVERTER.—William J. Knox, Edgewood Park, Pa., assignor to Geo. Westinghouse, Pittsburg, Pa. A vessel for treating copper matte, consisting of an external shell,



and a lining composed of a mixture of magnesite and oxysulphide of iron and calcium silicate and sodium chloride, and a water-cooled tuyere in contact with said lining.

710,603. PNEUMATIC GRADER.—William S. Osborne and Elwin C. Bryant, St. Louis, Mo. The combination with a casing having an enlarged head and a tapered lower portion, a substantially tangential inlet-pipe leading into said head, an outlet-pipe leading laterally from said head at a point approximately opposite and in substantially the plane of the inlet-pipe, a discharge-pipe leading from the lower end of the tapered portion, a valve in said pipe, and a suction-fan connected with the outlet-pipe leading from the head.

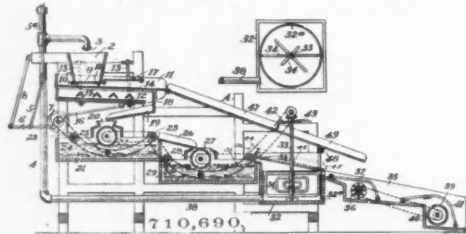
710,604. SYSTEM FOR PULVERIZING AND GRADING MATERIAL.—William S. Osborne and Elwin C. Bryant, St.

Louis, Mo. In a system for pulverizing and grading material, the combination with a machine for reducing the material to powdered form, a grader, a separator, an auxiliary separator opening to the atmosphere, and a discharge spout.

710,605. DUST COLLECTOR OR SEPARATOR.—William S. Osborne and Elwin C. Bryant, St. Louis, Mo. The combination with a casing having an enlarged head and a conical lower portion, an inlet-pipe leading into said head, a discharge-pipe leading from the lower end of said conical portion, a hood arranged in the head of the apparatus, deflector-pipes arranged around said hood, and a perforated pipe arranged beneath said deflector-pipes for admitting a fluid into the apparatus.

710,643. COAL RAMMING AND TRANSFER APPARATUS.—John F. Wilcox, Cleveland, Ohio, assignor to the Retort Coke Oven Company. The combination, in a cooking plant, of a ramming-station a plurality of rammers and ramming-boxes, a series of ovens, a main track for the delivery of charges to the ovens, and auxiliary tracks for the delivery of the ramming-boxes to the main track.

710,690. GOLD-SEPARATOR.—White Wolf M. Hickey, San Francisco, Cal. The combination of inclined suspended sluices connected and movable in unison, the uppermost of said sluices having a perforated or screen bottom, a close bottom in the lower sluice and angular riffles having upwardly-converging sides, said riffles extending across the

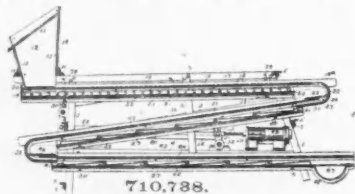


sluice and having their wide bases out of contact with the bottom of the sluice, whereby the finer material may pass beneath the riffles and the greater portion of the material may pass up the inclined sides of the riffle and over the top thereof, and a hopper through which material is delivered into the upper sluice.

710,712. REGULATOR FOR AIR-COMPRESSORS.—William Prellwitz, Easton, Pa., assignor to the Ingersoll-Sergeant Drill Company, New York, N. Y. The combination with a valve for closing or choking the inlet to a compressor, of a stationary cylinder to which there is an inlet from the receiver to which the compressor delivers, a movable outer cylinder fitted to the exterior of said stationary cylinder, connections between said outer cylinder and the valve, and a double-acting liquid dash-pot the cylinder of which is carried by said movable cylinder and the piston of which has a stationary support.

710,718. CRUDE-OIL BURNER.—John B. Seeger, Dallas, Tex. The combination of a burner-head provided with a jet-duct, an atomizing-chamber suitably connected to said duct, a sprayer-wheel located in the entrance to said chamber and a spreader between the chamber and duct for delivering the atomized oil to said duct in a spray.

710,738. MACHINE FOR SEPARATING GOLD, ETC.—Walter J. Barron, Brooklyn, N. Y. A gold-washing machine comprising, in combination, an inclined trough or pan, value-retaining devices arranged therein, a screen ar-



ranged over said value-retaining devices, a reversely-inclined pan arranged below the first, a hood provided at the adjoining ends of the two pans, a screen arranged in said second pan and projecting into said hood, the perforations of the second screen being finer than those of the first, and a series of amalgamating-plates arranged in said second pan.

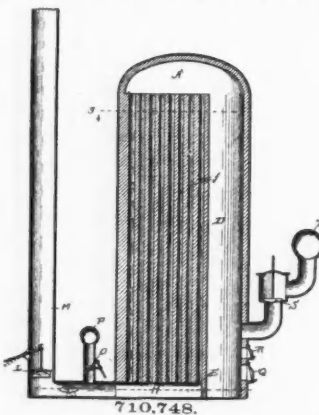
710,764. APPARATUS FOR MOVING STEAM-SHOVELS, EXCAVATORS, OR THE LIKE.—Hugh Crowe, Eldon, Mo. An apparatus comprising the combination with a steam-shovel, excavator or the like; of two pairs of rails; bars removably hooking said rails together in pairs, one pair of said rails being adapted to support the machine while the other pair is unhooked and separately removed from one end of the machine to the other; runners mounted under said rails; means of raising said rails and runners from the road-bed out of alignment with the wheels of the machine; and means of drawing said rails and runners from one end of the machine to the other.

710,777. ACTUATING MECHANISM FOR JIGS FOR WASHING MINERALS OR ORES.—Charles J. Hodge, Houghton, Mich. The combination of a shaft, a pair of eccentrics through which said shaft passes and which are adjustable transversely of said shaft, a fly-wheel mounted between said eccentrics and a sliding connection between said fly-wheel and eccentrics.

710,743. APPARATUS FOR PRESSING BRICKS OR BLOCKS. Albert E. Blizzard and Henry Todd, Newcastle,

England. A brick-pressing machine provided with a mold open at the top and bottom, a vertically-movable bar, two dies connected therewith and adapted to enter the mold from the top and bottom and means for preventing stoppage or breakage of the apparatus when too large a quantity of unpressed material is acted upon in the mold.

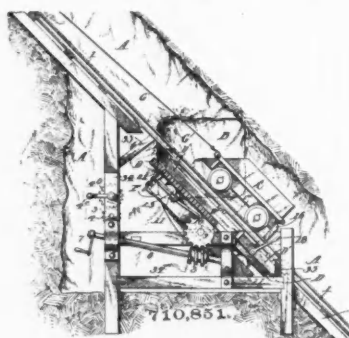
710,748. SELF-CLEANING HOT-BLAST STOVE.—John W. Cabot, Johnstown, Pa. A hot-blast stove comprising a metallic casing, a chimney, a fire-brick lining, a combustion-chamber with gas and air valves, a cold-blast main, a



hot-blast valve, a regenerator divided into two or more compartments, separated at the bottom, and separately connected at the bottom by valved passage-ways to said chimney, and by valved passage-ways to the cold-blast main.

710,778. OIL-WELL PUMP.—James Horsley, Glade Mills, Pa., assignor of one-half to John B. Gregory, Glade Mills, Pa. In an oil-well pump, the combination of a stationary tubular stand-pipe provided with means for locating it in a working barrel, surrounding expansible packing-rings, and an upper check-valve; and an outer movable barrel provided with a check-valve at its upper end, a connecting-rod, and means at its lower end, adapted to facilitate circulation to the interior space on the downstroke and to retard circulation therefrom on the upstroke.

710,851. TURN-TABLE FOR USE IN MINES.—William L. Eppers and James Hamilton, Mount Washington, Md. The combination, with an inclined mine-shaft and a lateral level communicating therewith, and tracks of like gauge



laid in both of a table having a track-section adapted to form part of the shaft-track or level-track as the case may be, the said table being pivoted and adapted to rotate vertically and horizontally, and means for effecting such movement, the same consisting of worm-wheels, worms, and rotatable shafts suitably geared and connected with the table and its frame.

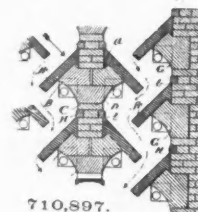
710,860. DRIVE-HEAD FOR CASINGS FOR GAS, OIL, OR OTHER WELLS.—George H. Guthrie, St. Marys, Ohio, assignor to Muncie Gas Engine and Supply Company, Muncie, Ind. A drop drive-head for oil-well casings, consisting of a hollow body portion provided with a pair of openings for the purpose of connecting a suitable means thereto to fasten the drive-head for the purpose set forth, and an elongated hollow shank integral with said body portion and having a smooth periphery, said shank of less diameter than said body portion, said body portion adapted to rest upon the upper end of the casing when the drive-head is in operative position and said shank adapted to extend within and be freely removable from the casing when the body portion engages the top thereof.

710,882. ART OF MOLDING SLAG.—Sheldon Norton, Catsauqua, Pa., assignor of one-half to W. L. Sims, Catsauqua, Pa. An improvement in the art of molding slag consisting in pouring molten slag into a crucible heated to a fusing temperature to sustain the fusion, then mixing earthy material with the fused slag, then restoring the mixture to fusion, then pouring the fused mixture into traveling molds, then continuing the movement of the filled molds through an elongated flue of gradually-decreasing temperature to anneal and solidify them, and then discharging the molded articles from the carrier.

710,889. COMPRESSED-AIR RESERVOIR.—Thomas D. Prescott, Philadelphia, and James C. Prescott and Henry A. Prescott, Minersville, Pa., assignors of one-fifth to Henry Bell, Philadelphia, Pa. A compressed-air-storing device, comprising in combination, a closed cylinder having

fixed upper and lower heads, an inlet-pipe connected to the lower head, a check-valve in said pipe, a valved discharge-pipe also leading into the lower end of the cylinder, a piston fitting snugly within the cylinder, a piston-rod extending out through a guiding-opening in the upper cylinder-head and provided with a threaded upper end, a spider comprising a central hub and a series of equidistant radially-projecting arms, each having at the outer end a vertically-disposed bolt-receiving opening, upper and lower nuts carried by the threaded upper end of the piston-rod and engaging respectively with the upper and lower sides of the spider-hub, to permit of the vertical adjustment of said spider on the piston, and the upper nut serving not only to lock the spider in position, but to maintain the same in a horizontal plane by clamping it against the lower nut, a series of eyebolts adapted one to each of the openings in the spider-arms and having upper and lower adjusting-nuts, a series of coiled springs of equal size and strength, having their upper ends connected to the eyebolts, a base supporting the cylinder, fixed eyes carried by said base to which the lower ends of said springs are secured.

710,897. QUICKSILVER FURNACE.—Robert Scott, San Jose, Cal. In combination with a tile for quicksilver-furnaces, a wall, a bracket built into the wall of the furnace



and forming an inclined surface on which said tile rests, and a lip formed on said tile and lapping over the edge of said bracket for the purpose of preventing slipping of said tile.

710,902. BOX-CAR LOADER.—William A. Smith, Aylmer, and William R. Harp, Denver, Colo.; said Smith assignor to said Harp. The combination with a stationary foundation, a platform movable thereon and arranged to project into the door of a car, and a suitable framework mounted on the platform and adapted to enter the car, of a conveyor adjustable endwise on said frame, and suitable means mounted on the frame for moving the conveyor endwise in either direction independently of gravity, said means being adapted to automatically hold the conveyor in any desired position.

710,916. LINING FOR CONVERTERS OR FURNACES.—William J. Knox, Edgewood, Pa., assignor to George Westinghouse, Pittsburgh, Pa. A material for lining vessels, consisting of a mixture of basic refractory oxide, oxysulphide of iron, and calcic silicate.

710,920. HOISTING AND CONVEYING APPARATUS FOR LONG METAL BARS OR FOR SIMILAR PURPOSES.—Charles H. Morgan, Worcester, Mass., assignor to the Morgan Construction Company, Worcester, Mass. In an apparatus for hoisting and conveying long metal bars or for similar purposes, the combination of a plurality of lifting devices having inclined-faced carrying-arms arranged to drop down at the sides of the bars and to be swung or turned together under the bars, and means for simultaneously actuating the lifting devices.

710,922. ROCK-DRILLING MACHINE.—William Prellwitz, Easton, Pa., assignor to the Ingersoll-Sergeant Drill Company, New York, N. Y. A cylinder, a drill-holding piston having a longitudinal water-feeding duct therein, a front head having a water-feed chamber therein and means for reciprocating the piston to open and close communication between the chamber and duct.

GREAT BRITAIN.

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

- Week ending September 11, 1902.
- 11,339 of 1901. ZINC FUME MAKING.—J. Armstrong, London. Manufacture of zinc fume by passing the products of the furnace through incandescent fuel.
- 17,415 of 1901. ZINC REDUCTION.—L. Braunfels, Frankfurt a. M., Germany. Conducting zinc reduction at a lower temperature in vacuum so as to obviate the disadvantages of the high temperature.
- 21,307 of 1901. MINE TIMBERING TOOL.—W. Sylvester, Tunstall. Improved tool for use in withdrawing pit props.
- Week ending September 18.
- 19,899 of 1901. COAL COMPRESSING.—J. H. Darby, Wrexham. Method of compressing moistened coal for coking.
- 20,460 of 1901. GUIDE ROPE FRAME.—O. Morgan, Penkridge. A supplementary frame for gripping the guide ropes, suspended from the pen of the shackle holding a mine cage, to prevent accidents.
- 20,716 of 1901. COOLING FURNACE GASES.—T. Rigby, St. Helens. An apparatus for recovering tar and ammonia from furnace gases, improved method for cooling the gases.
- 4,851 of 1902. SAFETY LAMP.—M. D. Mackie, Scranton, Pa., U. S. A. Improved apparatus attachable to safety lamps for indicating the amount of fire damp in mine.

PERSONAL.

Mr. J. W. Cairns is now manager of the Eureka-Ophir group, Tooele County, Utah.

Mr. E. Van Cortlandt, who has been in New York City, left for Denver, Colo., on October 21.

Mr. Frank L. Sizer, who has been in Mexico for several months, has returned to Montana.

Messrs. John Dern and E. H. Airis, of Salt Lake, Utah, have been on a visit to Baker City, Ore.

Mr. Harold Rickard, who has been recently on the Ivory Coast of West Africa, is now at Denver, Col.

Mr. B. V. Nordberg, of Milwaukee, Wis., recently visited the mines of the Lake Superior copper district.

Mr. James Colquhoun, president of the Arizona Copper Company, recently returned to Clifton, Ariz.

Mr. G. D. B. Turner, manager of the J I C Mine, has returned to Salt Lake, Utah, from Silverton, Colo.

Mr. R. T. Grant, formerly assistant manager of Stratton's Independence, has obtained an appointment in Mexico.

Mr. L. G. Bell, Pacific Coast representative for the Ideal stamp mill, is in the East in the interests of his company.

Mr. H. W. Paulsen has resigned as superintendent of the Standard Smelting and Refining Company, at Val Verde, Ariz.

Mr. Morris McCarty, owner of mining properties in the Rosario District, Lower California, Mexico, is in Los Angeles, Cal.

Mr. A. E. Roth, notary of the royal court at Stockholm, Sweden, was a recent visitor in the Lake Superior copper district.

Capt. William Davidson, of Salt Lake, Utah, has been at Ophir, Colo., to examine mining properties for Eastern investors.

Mr. James MacNaughton, superintendent of the Calumet & Hecla Mine at Calumet, Mich., recently returned from Chicago, Ill.

Mr. C. B. Markland, manager of the Conklin sampling works, who has been in Portland, Ore., has returned to Salt Lake, Utah.

Mr. H. A. Shipman, lately manager of Stratton's Independence, sailed on the *Oceanic* on October 22, en route to West Australia.

Mr. Carl Landen, an engineer at the Grangesburg mines of Sweden, recently inspected the copper mines of the Lake Superior district.

Mr. A. E. Salwen, manager of the Grangesburg iron mines of Sweden, recently visited the mines in the Lake Superior copper district.

Mr. J. S. Free has been appointed superintendent of the Park City Gold and Silver Mining Company's properties at Park City, Utah.

Mr. L. H. Mitchell, president of the Joaquina Gold Mining Company, recently left Los Angeles to visit the company's mines in Lower California.

Mr. J. W. Goodman, chief engineer of the Creston-Colorado Company, at Minas Prietas, Sonora, Mex., recently returned there from Nogales, Ariz.

Mr. W. A. P. Davis, of Philadelphia, Pa., who is interested in mining in Gilpin County, Colo., was a visitor to mines there during the past week.

Mr. Leo Von Rosenberg, of New York City, has been several weeks in the Cape region of Lower California, Mex., examining gold mining properties.

Mr. George A. Bethune, of the firm of Bethune & Trua, assayers, of Los Angeles, Cal., is in Searchlight, Nev., examining some mining properties.

Mr. Wright H. Aubury has left Los Angeles, Cal., for Sandy, Nevada, to take charge of the cyanide plant of the Nevada-Keystone Mining Company.

Mr. H. Witteborg, who recently had charge of the Chamberlain-Dillingham Sampler at Breckenridge, Colo., is now manager of a mine at Los Cerrillos, N. M.

Mr. J. E. Beveridge has been appointed consulting engineer for the Dixie Mine below St. George, Utah, owned by the Utah & Eastern Copper Mining Company.

Mr. Edward McGinnis, who recently resigned as superintendent of the Druid Gold Mining Company, near Central City, Colo., is to examine mines in California.

Mr. E. Melarkey, former superintendent of the Sheeptrail and Gold Road mines in Mohave County, Ariz., is now foreman at the Quartette mines, Searchlight, Nev.

Messrs. Jones and Edwards, English mining experts from Rhodesia, South Africa, were visitors to the mines in Gilpin County, Colo., during last week. They may decide to locate in Colorado.

Mr. A. B. Frenzel recently returned to Telluride, Colo., from a year's absence in Europe to look up markets for the deposits of vanadium and uranium ores which he owns in San Miguel County.

Mr. James R. Focht, who had charge of the erection of the smelter at Murray, Utah, has been asked to return to the plant to direct the construction of further improvements. Mr. Focht has opened an office in Salt Lake.

Mr. Arthur Howland has returned to Grant's Pass, Ore., after an absence of some 18 months, having spent most of that time at Natal, Sumatra, in the interest of the Sabonak Mining Company, whose headquarters are at Batavia, Java.

Mr. N. T. Brandon, interested in the North Star Mining Company, operating near Custer, S. Dak., recently returned to his home at Omaha, Neb., after examining the properties of the company.

Mr. C. R. Corning, of Olcott, Corning & Peale, New York City, has been at Ely, Nev., making an examination of the properties of the McKinley Mining Company and of the Chairman Company.

Mr. Alexander Mackenzie, formerly of the Toronto Railway Company, has been appointed vice-president and general manager of the Sao Paulo Tramway Light and Power Company, of Sao Paulo, Brazil, and has sailed for Brazil.

Mr. W. Q. Wright, of the Wright-Gilman Company, a mining and metallurgical engineering company of San Francisco, has returned from a professional trip to Stockton, Cal., where he has been examining mining properties.

Mr. Frank Klepetko, formerly general superintendent of the Boston & Montana and other Amalgamated properties of Butte, sailed recently for South America to take charge of Mr. J. B. Haggin's copper properties at Cerro de Pasco, Peru.

Dr. Ernesto Angerman, of the Geological Institute of Mexico, is in Lower California, Mex., studying the geology and hydrography of that section. He began his work in the southern, or Cape, region, and will soon make a report to the Institute.

Mr. Leonard D. Sivy, mining engineer of Spokane, Wash., has been examining copper ore deposits near the head of White River, on Mt. Rainier, for Milwaukee parties. Mt. Rainier, southeast of Seattle, is the highest mountain in Washington.

Mr. William C. Nichols, president of the Nichols Chemical Company, copper refiners, of New York City, recently visited the Granby Consolidated Mining, Smelting and Power Company's mines and smelter in the Boundary District of British Columbia.

Mr. A. G. Burrows, who succeeds Mr. Walter Wells as provincial assayer at the Belleville, Ont., assay office, has done field work in all parts of Ontario, particularly for the Crown Lands Department in the Rainy River Country and in the territory around James Bay.

Mr. Henry K. McHarg has been chosen to succeed Mr. Grant B. Schley as president of the Virginia Iron, Coal and Coke Company. Mr. McHarg has also been made president of the Virginia & Southwestern Railroad. Mr. McHarg, as one of the receivers of the company, has been in charge of its affairs for about 2 years.

OBITUARY.

Francis Kiernan, one of the oldest and best-known residents of Latrobe, Pa., died October 12, aged 82 years. Until a year ago he was superintendent of the Saxman mines, just east of Latrobe. Mr. Kiernan was born in Somerset, Pa., but had lived for many years at Latrobe.

Francis Albert Bates, who was for nearly 20 years a well known figure in Lake Superior mining circles, died recently in New York City, of heart disease, aged 58. Mr. Bates started in the coal business in Cleveland in 1877, and later was connected with furnace and coal interests in the Hocking Valley. In 1880 he located at Steubenville, O., and built a blast furnace there. He was a pioneer in the development of the Gogebic Range, being connected for several years with Moore, Benjamin & Co. When developments on the Mesabi Range began he assisted in the development of the Cincinnati and Hale mines, and later was identified with the ore firm of Drake, Bartow & Co., of Cleveland. He aided in the organization of the Cuban Steel Ore Company and explored its properties west of Santiago.

Robert E. Lee Brown, who died recently of quick consumption at Phoenix, Ariz., was widely known by his sobriquet of "Barbarian" Brown. Mr. Brown was born in Philadelphia, Pa., 37 years ago. In 1888, as a mining engineer, he went to the Coeur d'Alene country in Idaho, where his keenness and some peculiarities of mind made him a striking figure. He published a paper at Wallace called the "Barbarian," and from this gained his nickname. After the panic of 1893, Mr. Brown was interested in the publication of a paper called "Coin," in Chicago. Late in 1894 he went to South Africa, and was at Johannesburg during the Jamieson raid. He took sides with the Boer government during that period, and was an exceedingly prominent figure. He advised all Americans to have nothing to do with the Jamieson raiders, and

was a sort of mediator between the Kruger government and the Jamieson raiders after the trouble was over. It is said to have been partly through his instrumentality that John Hays Hammond and V. S. Clement were pardoned by President Kruger after having been convicted of high treason.

The Boer government threw a large quantity of land open to mineral entry about this time, and Brown, organizing a number of men, entered on a vast amount of it. Then the government refused to recognize his entries and set them aside. Brown promptly brought suit in the Transvaal courts to recover damages from the government, and after considerable litigation was awarded judgment for \$5,000,000 by the supreme court of the Transvaal in 1898. This judgment President Kruger arbitrarily set aside, and Brown had never, up to the time of his death, realized anything on it.

A year or so ago Brown disposed of a two-thirds interest in his judgment to Lord Strathcona, of Canada, and at his death had little property.

SOCIETIES AND TECHNICAL SCHOOLS.

Colorado State School of Mines.—At this school at Golden, Colo., Mr. C. W. L. Filkins, of the engineer's staff of Cornell University, has been appointed professor of civil and mining engineering, and Mr. H. C. Berry has been appointed instructor in algebra and field surveying. Prof. W. C. King, of the Montana School of Mines, has been appointed professor of a new chair, metallurgy and mining, but will not begin his work until about the middle of the year.

Engineers' Club of St. Louis.—At the meeting on October 15, 23 members and 5 visitors were present. The subject of the evening was a paper by Dr. A. P. Winston on "The Good and Evil of Trades Unions." The speaker discussed the different methods of regulating wages and the advantages and disadvantages of each system, both to the workmen and their employers.

INDUSTRIAL NOTES.

The Engineering Company of America will remove its office from 141 Broadway to 74 Broadway, New York City, on or about November 1.

The Locke Drill Company, of Denver, Colo., reports the sale of one of its new electric drills to the Pride Mining Company, Montezuma, Colo.

It is stated that a plant is to be equipped in New York State—the exact location is not determined on—to manufacture the specialties of the Robb Engineering Company, of Amherst, N. S.

McFarlane & Co., of Denver, Colo., have sold a 9 by 15 Dodge crusher to the A. Y. & Minnie Mine at Leadville, and a fuel oil heater to the Portland Cement Company, of Florence, Colo.

The F. D. Cummer & Son Company, of Cleveland, Ohio, manufacturer of Cummer dryers, has just closed a contract with the Midland Portland Cement Company, of Indianapolis, Ind., for three dryers—one for coal, one for stone and one for clay.

The Stanley Electric Manufacturing Company has recently opened a sales office in Atlanta, Ga., to take care of the increasing demand for S. K. C. apparatus in the South. The office is in the Empire Building, and is in charge of George P. Hardy.

A complete briquetting plant with a capacity of 240 tons per day, for use on roasted copper ores and flue dust, will be shipped to the Compania Metallurgica de Torreon, Torreon, Coahuila, Mexico, in a few days, by the Henry S. Mould Company, of Pittsburgh, Pa.

The Contractors' Plant Manufacturing Company, of Buffalo, N. Y., reports that its business is steadily increasing. The company manufactures hoisting engines, horse and hand power derricks, derrick fittings, such as guys, blocks, sheaves and hoisting lines and plows for stripping quarries or breaking hard pan in making roads. The company also makes a horse whim especially adapted for the use of prospectors and for small mines.

Sargent, Conant & Co., of Boston, Mass., will shortly complete the electric power and lighting equipment of the Hampton Company, Easthampton, Mass. The entire plant will then be electrically driven, current being supplied from two multiphase generators, one direct coupled to a Corliss type engine, the other belted from a waterwheel; either or both being used as desired for operating motors, arc or incandescent lamps.

The large Jeanesville pumping engine, having a capacity of 1,000 gals. per minute, against a lift of 1,000 ft., for the Golden Cycle Mine, at Independence, Colo., was shipped from the factory at Jeanesville, Pa., on October 10. This pump was sold by the Western office of the Jeanesville Iron Works Company, 1328 Seventeenth Street, Denver, Colo., and is fitted with the latest improvements, such as Corliss valves, Rochester automatic power lubricator, Wyoming steam eliminator, and a 10 in. by 14 in. by 18 in. steam condenser.

The Goodall Worsted Company, of Sanford, Me., is building a large addition to its present works, and has found it necessary to considerably enlarge the power plant. A recent purchase from the Westinghouse Electric and Manufacturing Company includes a 400-kw., two-phase, alternating-current generator, which will be belted to an 800-h.p. Brown engine. The generator will furnish power to all departments of the plant by means of Westinghouse induction motors, and will also provide current through transformers for lighting at 104 volts.

The Londonberry Iron Company's blast furnaces, iron and coal mines and other property at Acadia Iron Mines, near Londonberry, Nova Scotia, have been purchased by a syndicate composed of George E. Drummond, Thomas J. Drummond, Jas. T. McCall, Lieutenant-Colonel Fred. Henshaw and Edgar McDougall, of Montreal, and Charles W. Brega, of Chicago. George E. Drummond is managing director, and Thomas J. Drummond is secretary of the Canada Iron Furnace Company, Limited, which has a furnace at Radnor Forges, Que. The Londonberry furnaces have been idle since 1896. The purchasers will expend \$100,000 putting the properties in shape.

The use of telephones in mines is steadily increasing. The Central Telephone and Electric Company, of St. Louis, Mo., reports that it has furnished special instruments to various mining companies, among which may be mentioned Cambria Mining Company, Cambria, Wyo.; Crescent Coal Company, Gallup, N. Mex.; Madison Coal Company, Glen Carbon, Ill.; Donk Bros. Coal Company, Troy, Ill.; Colorado Fuel and Iron Company, Denver, Colo. The Central Telephone and Electrical Company has recently opened an office in Chicago at 59 West Jackson Boulevard, where a full line of samples will be carried.

The Keystone Coal and Coke Company, of Greensburg, Pa., has contracted with William B. Scaife & Sons Company, of Pittsburg, Pa., for a large filtering plant for the water works at Madison, Pa. Among some of the other recent contracts taken by the William B. Scaife & Sons Company for the Scaife and We-Fu-Go water filtering systems, of which it is the sole manufacturer, are the following: Union Steel Company, Donora, Pa., 500,000 gal. plant; Lancaster Mills, Clinton, Mass., 1,000,000 gal. plant; W. D. Boyce Paper Company, Marcellus, Ill., 1,000,000 gal. plant; Thomas Phillips Company, Akron, O., 750,000 gal. plant; Gibson Manufacturing Company, Concord, N. C., 125,000 gal. plant.

The Electrical Equipment Company, Monadnock Building, Chicago, Ill., has been awarded a contract for the installation of a lighting plant for the City of Washington, Ia. The equipment includes a Westinghouse 3-phase 60-cycle generator, direct connected to an Ideal engine. Work is now under way, and the plant will be in operation about January 1, 1903. The same company has also been awarded a contract for the complete installation of a water power electric transmission plant for the Rouge River Light and Power Company, at Rockford, Mich. The equipment includes two General Electric generators and various motors ranging in size from 10 to 50 h.p. The plant will be in operation about December 1.

The S. H. Supply Company, of Denver, Colo., which has taken from the Cripple Creek District alone this year 120 car-loads of milling machinery from plants which could not treat successfully the ores of the district, recently brought 28 car-loads of silver mining machinery from Aspen, Colo. This machinery consists of pumping machinery from a compound condensing pump capable of 1,000 gal. per minute against 1,000-ft. head, to a small sinker pump of 40 gal. capacity; the electric hoisting plant of the Free Silver Mine, installed in 1897, with its fine galows frame, and the Corliss hoisting plant, with 20 by 48-in. cylinders, 8 air compressors and 57 air drills. The company's warehouses are at Twenty-second and Larimer streets, Denver, and its yards and warehouses at Thirty-first street.

The J. George Leyner Engineering Works Company, of Denver, Colo., has been incorporated to acquire the business of J. George Leyner, the rapid growth of the latter's business necessitating enlargement of manufacturing facilities. The company will erect a new plant. The company is capitalized at \$650,000. J. George Leyner is president and general manager; Luther H. Wygant, Jr., vice-president; Clarence A. Lawson, secretary-treasurer and business manager.

The new machine shops which will be built by the company are to be located at some point between Denver and Littleton, either on the Denver & Rio Grande line or the Santa Fe. The entire plant is to be run by electricity and 3 electrical cranes will be installed with a capacity of 20 tons each. All the larger machines will be operated by individual electric motors, and the smaller machines and tools will be run by groups of individual motors. The walls will be of brick, but otherwise the plant will be constructed of steel throughout. The company recently shipped 18 rock drills to South Africa and a few days ago re-

ceived a cablegram order for 62 more, making in all 80 rock drills which will be used in the Transvaal.

TRADE CATALOGUES.

"Bosalt" is a crystalline boiler compound, designed to neutralize the action of acids and fatty substances in feed water and to prevent the deposition of calcium, magnesium or other compounds in boiler tubes. The compound is manufactured by the Thomsen Chemical Company, of Baltimore, Md., and is described in circulars.

Buffalo down draft stationary heating forges for industrial work are described in a neat little pamphlet of 52 pages, sent out by the Buffalo Forge Company, of Buffalo, N. Y. The pamphlet comments on the typical features of these forges, and gives particulars and prices of the large variety of styles manufactured. The company also makes volume and pressure blowers and exhaust fans.

One of the preparations put upon the market by the Joseph Dixon Crucible Company, of Jersey City, N. J., is Dixon's graphite pipe-joint compound, by which through the use of flake graphite the company claims that a perfectly tight joint can be made, yet one that can be easily taken apart if desired. The Dixon Company will send a booklet describing this compound and a sample of it to any one interested.

The Woodward friction waterwheel governor made by the Woodward Governor Company, of Rockford, Ill., is described in circulars sent out by the company. It is driven by power supplied from the main shaft of the waterwheel. On the governor shaft is mounted a compressed paper friction, and two pans on this main shaft when pressed against the friction moves the gates of the turbines by suitable gear connection on an intermediate shaft. The friction is controlled by the governor balls, which are separately driven from the main shaft of the installation. The mechanism is capable of very close adjustment, and will not act upon the gate when the speed and load are steady. A compensating mechanism prevents racing. The governor is especially intended for electric light and power installations.

Parties interested in the prevention of smoke and the economical use of cheap or low-grade coal will find information of value in a 36-page pamphlet issued by the Green Engineering Company, of Chicago, Ill., which manufactures the Green traveling link grate. The merits claimed for this grate are that it operates continuously and automatically, keeps clean all air-spaces in the grate surface, insures a uniform high furnace temperature, has a wide range of capacity, will quickly pick or drop a heavy load, or economically bank fires, reduces cost of labor and power, and is of simple and durable construction, each part being accessible and quickly renewable. Illustrations show the construction of the various parts, the methods of installation, and show some large boiler plants where the grate is in use. The pamphlet also contains tables of fuel values of Ohio, Illinois and Pennsylvania coals.

Pebble mills for fine grinding and thorough mixing of such substances as chemicals, feldspar, flint, graphite cement, barytes, talc, mica, ores, etc., are manufactured by the Abbe Engineering Company, of New York City. The company's pebble mills are made in a variety of sizes from a small jar mill for the laboratory use of chemists, druggists or assayers, to the company's Jumbo mill, 6 ft. in diameter, for large plants. The small jar mills may be had in batteries permitting a number of different materials to be ground or mixed at the same operation. One chemical manufacturing firm in the United States is said to use more than 250 of these little mills. In the small mills both pebbles and porcelain balls are used for pulverizing, and in the larger mills the best quality of Greenland flint pebbles. The company manufactures tube mills of various sizes for ore reduction plants or cement works, and the improved Max mill or high-speed pulverizer. It also makes an improved crusher for breaking iron or other ore, railroad ballast, etc.

GENERAL MINING NEWS.

Chesapeake & Ohio Railway Company.—Shipments of coal and coke in August and the two months of the company's fiscal year, were as follows in tons of 2,000 lbs.:

	Coal.	Two months.	
		August 1902	1901
New River	46,108	65,298	686,887
Kanawha	15,387	33,781	185,311
Kentucky	5,820	13,906	16,827
From connections	67,315	112,885	889,025
Total	8,263	12,139	17,181
	75,578	125,024	906,206
	Coke.		
New River	8,681	16,396	53,757
Kanawha	415	1,573	12,216
From connections	9,096	17,969	67,973
Total	1,167	1,474	3,207
	10,293	19,443	71,180
Total coal and coke	85,841	144,467	977,386

Coal shipments show a falling off of 86.2 per cent., and coke, 72.6 per cent. Shipments were principally to the West.

Norfolk & Western Railway Company.—Shipments of coal in September were 541,728 short tons, making a total for the 9 months of 4,951,044 tons. This amount is only 870,755 tons less than was reported for the 12 months of 1901. Coke shipments in September were 117,338 short tons, making a total of 1,082,812 tons for the 9 months. In the whole year 1901 the coke movement amounted to 1,468,171 tons.

ALABAMA.

Coal Miners' Strike.—The strike at the coal mines of the Tennessee Coal, Iron and Railroad Company, involving 4,500 men, ended on October 15. It was caused by the company refusing to withhold a \$1 assessment levied by the United Mine Workers. It was settled on terms not given out, but probably the prospective return to work of the Pennsylvania miners, for whom the assessment was levied, was a cause.

ARIZONA.

GILA COUNTY.

Old Dominion Copper Mining and Smelting Company.—The company, owing to the scarcity of men, has had difficulty in working its mines, and has been obliged to recognize the Miners' Union.

MARICOPA COUNTY.

(From Our Special Correspondent.)

Gold Coin.—A double compartment shaft has been sunk 125 ft. at this mine, near Phoenix. Stringers show good gold values. At the 100-ft. level a cross-cut was run through the porphyry dike, which proved to be 25 ft. wide, and as mineralized as its surface.

Relief.—This gold mine, near Phoenix, will probably be equipped with a complete cyanide plant at an early day. An incline shaft has been sunk 500 ft. on the ore body. Cross-cuts near the bottom are being run mainly as a reservoir for the water. No timbering has been necessary, the rock being a hard diorite. The ore body is 30 ft. wide on the surface, and has been exposed by shafts from 30 to 50 ft. deep. Superintendent Hamlin is to begin on cyanide reduction works as soon as enough ground is opened. The shaft is equipped with a gasoline hoist.

CALIFORNIA.

ALAMEDA COUNTY.

(From Our Special Correspondent.)

Federal Salt Company.—Action has been brought against this company, popularly known as the "Salt Trust," and United States Circuit Judge Morrow has issued a temporary restraining order commanding the company to desist from carrying on its business to appear in court November 3 and show cause why the restraining order should not be made perpetual, and why the agreements and contracts made with salt producers in Alameda and other counties should not be canceled. The United States Marshal has instituted this suit on affidavit by Thomas Turnbull, employed by the Department of Justice to investigate the matter. He deposes that the company has been engaged in business at San Francisco since the latter part of 1900; that by secret contracts with nearly all of the importers, producers and dealers in foreign and domestic salt, the company has gained an almost complete control and monopoly of the salt trade and commerce between the State of California and other States and Territories; that the company has about 70,000 tons of salt stored in warehouses on Mission Rock in San Francisco Bay; that it is accumulating salt at said place for the purpose of creating a scarcity in the market throughout the Pacific Coast with the design of keeping up high prices; that the price of common ordinary salt during the latter part of the year 1900 was about \$3 per ton; and that the price of the same kind has risen to about \$25 per ton.

The largest salt producers are in Alameda County, but the trust also controls outputs of properties in Los Angeles, San Diego and Riverside counties. Mr. Turnbull swore that the following co-defendants admitted that they were under contract to sell all the salt produced by them to the Federal Salt Company alone: American Salt Company, Union Pacific Salt Company, Continental Salt and Chemical Company, Carmen Island Salt Company, New Liverpool Salt Company, and various individuals.

AMADOR COUNTY.

(From Our Special Correspondent.)

Amador Phoenix.—This company has stopped trying to keep the water out of the mine, and closed down. Pumping continued after work stopped, so that the property could be inspected by possible purchasers.

Columbia.—This marble quarry at Columbia, W. D. Bannister manager, is to haul the marble to Oakdale by traction engines and cars. The engine weighs 23 tons and will haul three cars.

Kennedy Mining and Milling Company.—At this mine at Jackson, J. F. Parks, superintendent, grading for 40 stamps of the new mill is finished, and a site for 20 more stamps is being prepared. When the

old 40-stamp mill is removed to the new site the company will have a full 100-stamp mill. The machinery for the new mill is on the ground.

CALAVERAS COUNTY.

(From Our Special Correspondent.)

Benson.—This mine at Angels, it is said, has been levied on by its former owner, H. S. Messer, for non-fulfillment of contract.

Duchess.—This mine at Vallecito, owned by an Indianapolis company, with W. E. Emery as superintendent, has started its mill again, and has 14 men busy.

Ohio.—This mine on Indian Creek near Murphys is looking well. C. W. Knox is in charge. The claim used to be known as the Old Sackett, and is supposed to be an extension of the Del Mazia or Gumboot.

EL DORADO COUNTY.

(From Our Special Correspondent.)

Crystal.—A new 5-stamp mill for this mine near Shingle Springs is nearly completed.

Jasper.—The company which recently bonded this mine at Shingle Springs from Jasper Jurgens is building a dam on Webber Creek and repairing the ditch.

Rustler Mining Company.—This company is clearing out and repairing the El Dorado ditch. It has also bonded the Mammoth quartz mine at Shingle Springs.

Vandalia.—At this mine, near Shingle Springs, owned by John Rosenfeld's Sons, of San Francisco, 60 men are busy.

KERN COUNTY.

(From Our Special Correspondent.)

Goler District.—Charles A. Bland, of Garlock, reports thousands of tons of ore blocked out in this district ready to be milled. The Mammoth Coal Company has temporarily shut down.

Rayo Mining Company.—This company, which owns claims near Keyesville and Vaughn, and has been advertising extensively in Eastern magazines, announcing millions in sight, has been investigated by State Mineralogist Aubury as a result of letters received by him from Eastern men. The existing conditions were found to vary greatly from the statements in the advertisements. The stock is offered for sale through a Chicago investment company.

Standard Oil Pipe Line.—The pipe line from the Kern oil fields to Point Richmond is about half laid. Five hundred men are working on it.

Yellow Aster.—The plant at this mine at Randsburg, John A. Singleton manager, recently shut down for four days because of the breakage of a pump.

LASSEN COUNTY.

(From Our Special Correspondent.)

Land Entries Withheld.—On the report and recommendation of State Mineralogist Aubury, Commissioner Hermann, of the General Land Office, has held up alleged illegal entries of land in the Susanville District until investigations can be made. Many miners who have been working on possessory title for years are being ordered off land by Eastern speculators, who are locating immense tracts of timber land. Large areas in different counties have already been entered in this way.

Lassen Mining Company.—This new company, with A. M. Hunt as president and Ed H. Benjamin as secretary, both of San Francisco, is reopening the old Golden Eagle Mine at Hayden Hill. J. H. Collier is superintendent. A mill, with Krom rolls, is being erected. The mining and milling costs are not expected to exceed \$2 per ton.

MADERA COUNTY.

(From Our Special Correspondent.)

Alpha.—The cyanide tanks and concentrating plant at this mine at Coarse Gold will soon be completed.

Flying Dutchman.—There are 14 claims in this group at Coarse Gold. A stamp mill is being built.

Lingo.—This mine at Coarse Gold is being developed by a Spokane, Wash., company, of which Thomas Clark is superintendent. Twelve men are employed.

Mount Raymond.—Arrangements are being made to run this winter on a large scale. P. Clark, of Spokane, Wash., is manager. An electric light plant will be put in.

Rez.—This mine at Grub Gulch, Charles Ward superintendent, is turning out some very good ore.

Texas Flat.—This mine at Coarse Gold is laying a pipe line for water for the mill.

MONO COUNTY.

(From Our Special Correspondent.)

Castle Peak.—A. D. Cullum, representative of the English owners, writes that it is probable that work will be resumed this fall. The mines were producers last year.

Golden Gate.—This mine in Antelope Valley, near Coleville, has been bonded for a stated price of \$60,

000 by J. L. Wedekind, of Reno, Nev., and J. L. Blackburn, of Bridgeport, Cal. There is a 2-stamp mill.

Goleta.—Experts have been examining this mine near Jordan with a view to putting up reduction works. H. W. Neilson is superintendent.

MONTEREY COUNTY.

(From Our Special Correspondent.)

Mica Deposits.—Charles T. Walther and E. S. Jones, of San Jose, have located claims carrying mica, about 6 miles east of Soledad. No development has been made. Mica is found in many places in California, but is generally of an inferior quality.

Gray Eagle.—At Los Burros the Gillis Company is timbering this tunnel. The Melville Consolidated Company is working about 2 miles above the Gillis claims.

MARIPOSA COUNTY.

(From Our Special Correspondent.)

Columbus Consolidated Mining Company.—This company at Coulterville, T. J. Brown superintendent, owning the Eureka, Lafayette, Alba and White Horse, has made a satisfactory clean-up.

Monitor.—E. J. Gilbert, of Columbia, and H. C. Kennedy, who have bonded this group at Coulterville, expect to begin a tunnel at once. The claims were discovered last June by C. W. Anderson.

New Mill.—The Mariposa Commercial and Mining Company, Charles C. Derby manager, has nearly completed its new 20-stamp mill at Mount Bullion. The old 30-stamp mill will be overhauled and repaired.

NEVADA COUNTY.

(From Our Special Correspondent.)

Blue Lead Channel.—Another attempt is to be made to open the gravel channel connecting Quaker Hill and Canada Hill, the property having been bonded from A. Charronat and I. C. Lindley. About 1,300 acres near Nevada City are included in the bond. In several previous attempts to open the channel bedrock was never reached.

SAN BERNARDINO COUNTY.

(From Our Special Correspondent.)

Bagdad.—These mines at Ludlow, C. R. Grant superintendent, are shipping ore to the Barstow Mills. Grading progresses on the railroad from Ludlow station to the mines. Neither mines nor mill run on Sundays.

SAN DIEGO COUNTY.

(From Our Special Correspondent.)

Western Salt Company.—This company has recently spent about \$150,000 improving the old La Punta works at the head of San Diego Bay. The new refinery cost about \$50,000, and is nearly completed, with a capacity of 70 tons daily. A warehouse to hold 3,000 tons of table salt has been built. There are 70 vats and 6 salt houses. The summer clean-up will be 7,000 tons. Graham E. Babcock, of San Diego, is president, and C. M. Bose foreman. The plant is located for both sea and rail transportation, and the company does not belong to the "salt trust."

SHASTA COUNTY.

(From Our Special Correspondent.)

Bully Hill and Mount Shasta Combine.—By an agreement made in Chicago, a consolidation has been effected of the Bully Hill Copper Company and the Mount Shasta Gold Mines Corporation. Capt. J. R. De La Mar turns in his famous Bully Hill copper property with its mines, smelters, etc., and his Gold Mountain gold mine in San Bernardino County, with a 40-stamp mill; while the Mount Shasta Gold Mines Corporation turns in the Mount Shasta gold mine at Shasta, the McClure and Michigan copper group adjoining the Bully Hill, and the Summit Copper group near the Mountain Copper Company's mines. The consolidation includes 4,000 acres of mineral land, town sites, water rights, mills and smelters. The merged properties will hereafter be known as the Mount Shasta Gold Mines Corporation. F. E. Ware, of Redding, is the present general manager. H. A. Cohen has been manager of the Bully Hill for Capt. De La Mar. The Bully Hill copper properties are, with the exception of the Mountain Copper Company, the largest copper producers in California. The capacity of the 100-ton smelter is to be increased to 500 tons daily.

California Mining and Prospecting Company.—This Napa company is prospecting the Skookum ledge 7 miles from Redding. If the developments warrant a mill will be erected. L. A. Stockley, of Napa, is president of the company. J. O. Royer vice-president and Waldo J. Clark manager.

McCloud River Power Company.—This company is about to build a 100-ft. dam across the McCloud River to obtain fall to generate electric power for Shasta County mines and also run a power line down the Sacramento Valley. James D. Schuyler is engineer of the company and George H. Proctor is president. Part of the machinery has arrived at Redding. The generating plant is intended to be 10,000 h.p.

Reading Gold and Copper Mining Company.—This new company has bought 21 mining claims, including the La Plant and Bedford, north of Keswick; the Stabler group, near Centerville; the Waite group, near Clear Creek, and the Sky Blue Mine at Middle Creek. Thomas Gilbert is president of the company, which has offices in Berkeley. John White is local manager. Work will start at once on the Sky Blue, the La Plant and the Four Mile. The ores will be shipped to the smelters at Keswick, though there is talk of building a custom smelter at the Sky Blue.

SONOMA COUNTY.

(From Our Special Correspondent.)

Socrates Quicksilver Mining Company.—This mining property is reported sold to Hass Brothers, of New York City.

TUOLUMNE COUNTY.

(From Our Special Correspondent.)

Draper.—At this mine, also known as the Whitto, near Soulsbyville, 5 stamps are being added to the mill. Shaft sinking continues. Oil fuel is used for the hoisting engine.

Hazel Dell.—A long tunnel is to be run on this mine at Columbia to tap the shaft.

Keltz.—This mine, of the Atlas Development and Mining Company, at Sonora, is working steadily and employing 10 miners.

Morris Tunnel Mining Company.—This company at Sonora has started work, and will run a 3,000 ft. tunnel. An air compressor has been put in.

Mount Jefferson.—At this mine at Groveland, the mill has started after a shut-down of several months. Ten stamps are running and the other ten will start up soon. A reservoir is being built in the creek bed, which will be about 30 ft. long, 15 ft. wide and 25 ft. deep. This reservoir will give ample water for the 20 stamps. J. M. Meighan is superintendent.

Vine Spring.—This mine, at Columbia, has been bonded by Superintendent Judson, of the Yankee Hill Mining Company.

COLORADO.

BOULDER COUNTY.

Colorado Northern Gold Mining Company.—This company, made up of Pennsylvania stockholders, is opening a group of 32 claims below Wall Street, on the west side of Four Mile Creek. The main tunnel is in 2,100 ft. A second tunnel has been driven 700 ft. The air compressor is operated by a crude oil engine, which also drives an electric generator, to supply power for a Box electric drill put in by the Denver Engineering Works. W. J. Iredale is superintendent.

Magnolia Mill.—This mill at Magnolia uses an electro-chlorination process. William Watsons, of Hartford, Conn., is president of the company owning it, and H. J. Hersey, of Denver, is secretary and treasurer. The ore goes through a crusher, thence to a rotary dryer, and thence to Cornish rolls. After screening by Jeffrey shaking screens the fine product goes to a roasting furnace. The roasted ore is cooled by means of cold water coils, drawn out and conveyed to the leaching vats. The chlorine solution is generated electrolytically, and after having been used for leaching the values in the ore is passed through a series of electrolytic precipitators, where the values are taken out and the solution is then pumped back into storage vats, regenerated and again used.

Nancy Gold Mining Company.—This company has driven a 1,250-ft. tunnel in Wood Mountain, near Wall Street. From the surface a shaft is being sunk to connect with an upraise. Sam Knott is superintendent.

Wood Mountain.—The Zopher vein of this mine, near Wall Street, is under lease to Andregg, Beam, Hendricks & Hubbard, who also operate the Wood Mountain Mill as lessees. The vein is said to be from 4 to 6 ft. wide, yielding a free milling and concentrating ore. Compressed air is used for drills and to run a hoist. The mill has stamps, bar amalgamators and Wilfley tables, the principal saving being by amalgamation.

GILPIN COUNTY.

(From Our Special Correspondent.)

Bate.—A larger hoist and boiler have been installed at this mine in Gregory District by Henry Becker, the lessee, and the shaft building has been enlarged. The work of unwatering the shaft goes on rapidly, and the lessee intends to sink deeper.

Cleveland Mining Company.—Cleveland, O., men, who own the Bon Ton Mine in Eureka District, will install machinery purchased at once. A contract for a new shaft building 24 by 40 ft. has been given. The shaft 150 ft. deep will be sunk as soon as possible. John Brohl, Central City, is superintendent.

Fairfield Gold Mining Company.—Returns from a car-load of ore shipped to the Denver Smelter show increased values of 23 per cent over the former shipment, and carry \$149 per ton. R. Broad, Russell Gulch, is superintendent for Baltimore, Md., men.

Holland.—Idaho Springs and Eastern parties are interested in a lease and bond on this property in

Russell District, and are installing a 25-hp. plant of Fairbanks, Morse & Co.'s make. They will unwater the 200-ft. shaft, and make a careful examination. The ores are pyritic, and will prove profitable when handled at the Golden Smelter. The property is owned by C. Hesselbine, of Denver.

Kansas-Burroughs Consolidated Mining Company.—The September output was 256 cars, or 2,175 tons of milling ore and 100 tons of smelting ore. The property employs between 75 and 100 men, many of whom are on tribute account. Pat McCann, Central City, is manager.

Reward Gold Mining and Reduction Company.—This company has elected these officers: President, Dr. Sweetland, Jamestown, N. Y.; vice-president, Henry P. Shaner, Newcastle, Pa.; treasurer, W. P. Volgamore, Buffalo, N. Y.; secretary and general manager, A. W. Stone, Buffalo, N. Y. The company is interested in a large group of claims in Enterprise District, which are to be cut by a cross-cut tunnel now in 50 ft. on which a contract for 150 ft. has been given.

Straub.—After retimbering the 200-ft. shaft, installing machinery, and overhauling top buildings the Benzie Investment Company, of Denver, is ready to start sinking a 100-ft. lift. W. Ballantyne, Central City, is superintendent.

HINSDALE COUNTY.

Henson Creek Lead Mines Company.—This company has a group of claims on Henson Creek, about 3 miles east of Engineer Mountain. On the main vein 3 to 4 ft. wide, an adit has been driven 1,050 ft. The ore carries galena and chalcopryite, with values in silver and gold. The total values are said to be over \$15 per ton. A 100-ton concentrating plant is nearly completed. It is equipped with Blake crusher, Sturtevant rolls, impact shaking screens, Bartlett and Standard tables. The power is electricity, produced by a General Electric 3-phase generator of 100 k.w. capacity, equal to 136 h.p., driven by a 5-ft. Hug waterwheel, under pressure of 250 ft. head of water, carried by 7,000 ft. of pipe line. The water pressure is equal to 105 lbs. per sq. in., and the power is transmitted from the electric plant to the mine and mill, a distance of 3½ miles. This is a Boston company, of which Henry F. Wells is secretary; Philip T. Newitt, superintendent; T. N. Dall, in charge of the mill work, and I. M. Smith in charge of the power. Alvin Phillips, of Denver, is consulting engineer.

LAKE COUNTY—LEADVILLE.

(From Our Special Correspondent.)

In his old report on the geology of the Leadville District, Prof. S. F. Emmons claimed that the formation of Carbonate, Iron and Fryer hills, known as the Leadville formation, extended into Breece Hill, and now, at some 12,000 ft. in, the Yak tunnel is proving Emmons' theory correct. Breece Hill has always been known a mountain of porphyry, and no one has ever thought it necessary to sink beyond this formation, as the ore was always found in it. The breast of the workings is now proving the existence of other ore bodies, as it has just passed into the parting quartzite at a depth from the surface of 1,300 ft. This fact is of the greatest importance, as it clearly mineralizes the wonderful extent of the Leadville mineralization, and will naturally increase deep mining.

Badger Group.—H. J. Heron is at the head of this new lease on the west end of Little Ellen Hill. A new shaft is going down to catch the extension of the New Monarch ore shoots, and also the Silent Friend ore shoot.

Ballard.—While carrying on prospecting work the company is preparing to handle its immense deposits of low grade siliceous material by cyaniding, and work has started on a new mill capable of treating 60 tons a day. The Ballard has the largest reserves of low grade ore of any property on that part of the belt, and this in addition to a dump of 15,000 tons, which will run ½ oz. gold.

Banker Mining and Milling Company.—Manager Guth has just taken from the second level of the Banker some good oxidized material which promises making a body of pay ore. He is pushing his drifts and announces that within a year a mill will be built to handle the low grade ore.

Continental Chief.—Manager T. Michael has opened a good body of siliceous lead ore, and for the first time in 5 years the mine is again a steady producer.

Crouse.—R. B. Estey is sinking a new shaft on this property, near the new shaft of the Fryer Hill Mining Company. The Crouse is going to mineral, and is down 500 ft.

Gold Basin Mining Company.—After developing a small vein of rich gold ore for some weeks the company has just finished sinking another 80 ft., and has again cut the vein. The control shows 3 to 10 oz. gold and 7 per cent copper.

Louisville.—This old property under the new ownership of Hanifen & Reynolds is prospecting virgin

ground. Meantime, 35 tons daily of fair grade material goes to the smelters.

New Monarch Mining Company.—Two hundred tons daily, mostly oxidized material, is coming from the Little Winnie shaft, but will be increased next month by 200 tons of sulphide ores from the New Monarch shaft.

President.—Henry Gaw and Thomas O'Rourke, 2 of the owners, who have been operating this property for some time, after running a new drift 70 ft., have just uncovered a large body of siliceous ore that samples 4 to 8 oz. gold and 15 oz. silver. Large bodies of material, too low grade to ship, are disclosed in the old workings. The strike will stimulate work on that part of Breece Hill.

Progressive Mining Company.—This company is operating the Olathe placer, and at 300 ft. down is cutting a station. It is after the Fryer Hill shoots.

Rialto.—This Boston property is under lease to Manager Mudd and his Small Hopes Mining Company. Satisfactory indications below the 1,200 ft. warrant immediate sinking to the lower contacts.

St. Louis Tunnel.—Lessees who completed recently a large amount of dead work are now following a good ore body, from which regular shipments are made. This is thought to be an extension of a Fanny Rawlings vein, and nets \$50 to the ton.

MONTROSE COUNTY.

(From Our Special Correspondent.)

La Sal Copper Mining Company.—W. C. Laughlin and R. G. Hall, both men of large experience in copper smelting, have leased the plant of this company at Cashin, about 75 miles West of Placerville, a point on the Rio Grande Southern Railroad, and also the mines of the same company, which contain about 2,000 ft. of development work. They are at present making some alterations, and expect to start up the smelter before long. Developments at the mine continue. When the improvements are completed, the smelter will have a capacity of about 100 tons daily.

SAN JUAN COUNTY.

(From Our Special Correspondent.)

Burro Bridge Concentrator.—Johnson & Lonne have recently erected a 15-ton concentrator. Returns from the first shipment of concentrates were very satisfactory.

Chattanooga Tunnel.—This tunnel, in Deer Park, is in 200 ft., and will be driven by contract. Power drills will be installed in the spring.

Columbus.—George H. Shank, of Shank Brothers, Chicago, has a bond and lease on this Silverton property, and is developing it with a force of 6 men.

Emeralda.—A new shaft and power house, 30 by 70 ft., is being erected, and a 40 h.p. boiler, hoist and 6-drill Rand compressor have arrived. Sinking will start November 1. The production is 12 tons daily.

Last Chance Mining Company.—A new tunnel is now in 225 ft., and nearing the vein. Mr. Cox, of Huntingdon, W. Va., has charge.

Wabuse Mining Company.—Fifteen men have been employed over a year on development preliminary to patenting 15 claims near Silverton. Numerous large ore bodies have been blocked out and a large mill will be erected next season.

Spotted Pup.—This property, near Silverton, is shipping 50 tons daily to the Contention Mill in Dry Gulch.

SAN MIGUEL COUNTY.

Blue Lake.—On this claim in Bridal Veil basin, a strike of ore giving \$300 per ton in gold, silver and lead is reported. The vein is from 12 to 18 in. wide. The claim is owned by Lou White, Mayor Fred Hilgenhaus and J. N. Adams.

Silver Pick.—The 3d level of the mine and all the workings above, together with the stamp and concentrating mill and tram, near Telluride, has been leased for 3 years to Charles Toland. About 12 men are getting out several car-loads of ore before the snows close the trail to pack trains. A force of 100 men will be put to work next summer. The Silver Pick was one of the largest producers near Telluride, and declared big dividends, but owing to a disagreement among the directors about 3 years ago, the mine was closed.

Special Sessions.—E. L. Davis, of Telluride, has sold this group of 7 claims on Mount Wilson to Chicago men. A mill and tram, with necessary machinery, will probably be put in.

Thomas.—Alva Adams and Frank Adams have purchased of T. E. Thomas his interest in this group of 6 claims up Bear Creek, including mill sites, tram and water rights. The consideration named was \$2,000.

IDAHO.

IDAHO COUNTY.

Crackerjack.—This mine, at Hump, has installed its new machinery, including an Atlas engine, a boiler and a Blake crusher.

SHOSHONE COUNTY.

Golden Chest.—It is said that a large cyanide plant is to be installed immediately at this property, two miles from Murray. Harris H. Hayman, of New York City, is president of the company, and Samuel Green, of New York City, is vice-president. They report that the 20-stamp mill has been running full force, and, besides the cyanide plant, another 20-stamp mill may be built. James G. Forester, of Salt Lake, is foreman of the mine. A 2½-mile flume is completed. In the main tunnel the company is sinking a winze on the vein, which is down 65 ft.

Gold Hunter Mining and Smelting Company.—The injunction served at the request of the Yolande Mining Company has been set aside and the former can continue taking ore from the property of the latter company. The Hunter Company has already resumed work on the property near Mullan.

Gold Standard Mining Company.—At the recent annual meeting in Wallace all the officers were re-elected as follows: President, Frank Houle, of Wallace; vice-president, G. W. Ruggles, of Wallace; secretary and treasurer, Fred Phinney, of Wallace. The officers, with Arthur J. Peavey, of Wallace and Willard Kidder and Arthur Dueneweg, of Terre Haute, Ind., form the directors. Manager Houle reported that the long tunnel on the placer grounds on Pony Gulch, a short distance from Delta, had been completed. He was directed to purchase a hydraulic elevator and have it installed as soon as possible.

Mining Developments.—Increased activity in mining is due to the settlement of lead ore prices and the reduction of freight rates on ore. It is thought that a substantial increase in the forces of each of the producing mines will be made soon.

Northwestern Sampling and Milling Company.—This plant, situated a short distance below Wallace, which samples all the ore of the district, is working to its full capacity, sampling about 700 tons per day.

Silver Cliff Gold and Copper Mining Company.—The following officers have been elected: President, James M. Shannon, of Lookout; vice-president, Ira Mullen, of Missoula; treasurer, James D. Young, of Lookout; secretary, Edward C. Young, of Lookout; and manager, James D. Young. The officers, with Thomas Heney, of Wallace, were elected directors. The annual report showed that 160 ft. of tunnel and shaft work has been done since the company was incorporated two years ago. The cost of the work was about \$8 per ft. The wages paid was from \$3.50 to \$4 per day. The treasurer's report showed the assets to be \$1,640.

Standard and Hecla.—It is reported that the projected consolidation of these properties has fallen through. About 180,000 shares of Hecla stock is said to have been voted against the plan, the Hecla stockholders not being satisfied with a ½ interest in the new company. The old board of directors of the Hecla has been re-elected, including President A. B. Campbell, of Spokane, Wash.; vice-president, James Smith; treasurer, John A. Finch, and secretary, H. R. Allen.

MICHIGAN.

HOUGHTON COUNTY.

(From Our Special Correspondent.)

Mining Accidents.—The report of Capt. Josiah Hall, of Calumet, inspector of mines, shows that for the year ending September 30, there were 14,150 men employed, an increase over the previous year of 632. There were 44 fatalities and 14 non-fatal accidents. The casualties by mines were as follows: Arcadian, 1; Atlantic, 4; Baltic, 7; Calumet & Hecla, 11; Centennial, 1; Franklin, 3; Isle Royale, 4; Kearsarge, 1; Osceola, 3; Quincy, 8; Tamarack, 4; Tamarack Junior, 1; Trimountain, 2. Fifteen men were killed by falls of rock, 5 by premature explosion, 13 by falling down shaft, 3 by skips, and 3 by blasts. The nationalities were: English, 13; Finnish, 13; Austrian, 6; Italian, 5; Polish, 3; Swedish, Hungarian, French, German, 1 each.

Arcadian.—Sinking in the Douglass shaft is under way to the No. 10 level. The lower openings show fair grade rock.

Atlantic.—F shaft has been abandoned, the equipment removed and the hoisting will be done through D shaft, 480 ft. north. Work in the cross-cut from the shaft on section 16 continues, but no trace of the Baltic lode has been found. The cross-cut is in 1,450 feet.

Baltic.—This mine is producing considerable mass and barrel copper from No. 4 shaft.

Calumet & Hecla.—This company has discharged 55 men at the Lake Linden smelting works and closed down 2 furnaces and the cupola, owing to a scarcity of anthracite coal. A fire at the 48th level, in a stope 400 ft. south from No. 5 shaft, Calumet branch, was extinguished promptly by trammers. It evidently was of incendiary origin, and started in some timbering in the abandoned stope.

Champion.—The product for September was 332 tons of mineral.

Isle Royale.—The diamond drill has been moved to the northeast corner of section 10 and another boring will be made. The last hole was 625 ft. deep.

Rhode Island.—At this mine No. 2 shaft is down to the 8 level, or 1,000 ft., and sinking has been suspended. As soon as the last stage is timbered work on a crosscut to the east will be begun. It is expected that the Allouex conglomerate lode will be tapped 500 ft. from the shaft. Thirty men are employed.

Winona.—The 3,000-ft. spur track of the Copper Range Railroad has been completed to No. 2 shaft. The 6th level drift south from No. 2 shaft is in 700 ft., and opening excellent ground.

COPPER—KEWEENAW COUNTY.

(From Our Special Correspondent.)

Ahmeek.—Exploratory work is well under way. A small compressor is installed and sinking in one of the oldest pits has started.

COPPER—ONTONAGON COUNTY.

(From Our Special Correspondent.)

Mass.—This company produced 155 tons of mineral in September. Sinking in all 3 shafts is under way and another shaft will be opened.

Michigan.—A 5-ton mass of copper has been taken out of B shaft at the 6th level in the drift on the "branch" vein. Shaft B is 1,500 ft. deep, and drifting to the east is in progress at the 8th and 10th levels.

IRON—GOGEIC RANGE.

Gogebic Shipments.—Shipments from the opening of navigation to October 4 are estimated at 2,836,850 tons. An estimate made last spring was 3,300,000 for the year. Total shipments last season to December 1 were 2,886,252 tons.

Jack Pot.—This mine, employing 100 men, has stopped its pumps and is to be abandoned. The mine is operated by Pickands, Mather & Co., of Cleveland, O.

IRON—MENOMINEE RANGE.

Iron Mining Accidents.—The report of Mining Inspector Trestrail, of Dickinson County, for the year ending September 30, shows that notwithstanding the increased activity in mining and increased forces employed the number of fatal accidents decreased. The total production of ore in the county was 2,908,243 tons; 2,764 men were employed underground and 1,079 on the surface, making a total of 3,843. There were 10 fatalities, of which 5 occurred from falling ground. Three of the men killed were Austrians, 2 were Italians, and 1 each of the following nationalities: American, English, Norwegian, Belgian, Polish. There were no fatalities at these mines during the year: Chapin, Walpole, Traders, Millie Norway, Curry, Verona, Eleanor, Vivian, Northwestern and Forest. None of the explorations, at which there were 173 men employed, had any fatal accidents.

Armenia.—This Crystal Falls mine employs 140 men, and will ship about 40,000 tons of ore this season. The mine has not shipped for several years. It is owned by Corrigan, McKinney & Co.

Bristol.—This Crystal Falls mine is working more men than early in the year. A steam shovel from the Beaufort Mine is loading part of the 30,000-ton stockpile.

MINNESOTA.

(From Our Special Correspondent.)

Iron ore shipments have slackened materially of late, and will be less for October than for any month since April. Boats have been scarce, and stock piles have been practically exhausted at all points, only a few remnants remaining anywhere. The larger concerns are pretty well through with their ore allotments.

The Duluth, Missabe & Northern road has ordered nine consolidation locomotives, to be delivered next spring, from the American Locomotive Works. The road has three under order now, and also 400 50-ton steel cars, all for next spring's delivery.

IRON—MESABI RANGE.

(From Our Special Correspondent.)

Commodore.—This mine will resume shortly, and a coal supply for the winter is being brought in. The mine is still under the old lease from W. C. Yawkey, and according to report will produce at the old royalty. It has been closed some years in an attempt to reduce the royalty.

Jordan.—This mine is shipping more heavily, and sends out 50 cars some days. It is a new property near Hibbing, and was entered only last spring.

Penobscot Mining Company.—Eddy Brothers, prominent Bay City men, recently sold their Mesabi interests, including the Penobscot Mine and the steamers S. J. Murphy and H. L. Shaw, to the Union Steel Company, of Pittsburg, an independent steel making concern. The price is not stated. The mine contains about 10,000,000 tons of good ore, mostly bessemer, running about 62 per cent. iron. The mine is very wet, making from 4,000 to 4,500 gal. of water per minute; a fine cross compound

Corliss condensing Prescott pumping engine handling 5,200 gal. recently installed, has brought the cost of pumping down to about 5c. per ton of ore on the amount they have been able to mine, about 250,000 tons a year. The new owners have taken possession immediately and expect to increase the output. The mine is in the northeast quarter of the southwest quarter of section 1, T. 57, R. 2, and will continue to pump all the water for the Hibbing basin till the new Elizabeth Mine is well down. O. B. Warren, who has been in charge for the Union Steel Company, at its Volunteer property, Marquette Range, has taken charge of the Penobscot. Mr. Warren was assistant superintendent of the Mahoning Ore and Steel Company's mine and explorations till about a year ago.

Pettit.—This mine has closed for the season, on account of water. It is a small property, but contains a good grade of coarse ore.

Roberts.—This mine is being abandoned. The lessees are taking out their machinery and shipping it to the new Morrow Mine at Hibbing. Shipments to this year have been 161,000 tons, and this season's were about 30,000 tons, 27,500 tons being before September 1. It is one forty-acre tract, though the lease covered three forties, adjoining the village of McKinley. It contained a good grade of non-bessemer ore.

Stevenson.—This mine's shipments to date have been more than 1,100,000 tons, fully as much as was expected by most people in the whole season, and it will ship heavily for some time yet. The output is likely to approach that of Fayal and Adams, something unprecedented for a new property. A large amount of work is under way, and next season's output is expected to equal this year's. The pit is being widened on the east side of the property, giving a better chance of working the shovels. There are now three 105-ton shovels employed in mining. Drake-Stratton & Co. have the stripping contract.

MONTANA.

FERGUS COUNTY.

Kendall.—At this mine and mill work goes on smoothly. Over 75 men are on the payroll.

Much work is to be done on the pipe line from Warm Spring Creek to the mill to insure safety from freezing during the winter. Some improvements will be made about the property during October, and everything will be put in shape to keep the mill running to its full capacity all winter. A new electric hoist will be put in of 50 h.p.; 200 ft. is the greatest depth so far attained in the mine, and ore is hoisted from that level to the surface, dumped down the chute to the 150-ft. level, where it is loaded into cars and taken out through the tunnel to the mill. A new No. 5 Gates crusher will be put in on a concrete foundation. A 60-h.p. boiler will be used for heating the mill, and the building will be boarded up with grooved cedar siding.

JEFFERSON COUNTY.

Bertha.—This property, situated at the base of the Alta hill, one mile west of Corbin, has been purchased by the Helena & Livingston Smelting Company for a price said to be \$15,000. The property contains a large body of concentrating ore, which will probably be treated at the Old Alta Mill at Corbin.

Liverpool.—At this property on Lump Gulch, 2 miles from Clancy, the new machinery is in place, the mine is unwatered and sinking is under way from the 400 to the 700-ft. level. Ed Ealy is in charge.

Occidental Mining Company.—This company has 7 miners driving a cross-cut tunnel on its property at the head of Snowdrift. The main office of the company and the bulk of the ownership is in St. Paul, Minn., among the officials of the Northern Pacific Railway.

LEWIS & CLARKE COUNTY.

Big Indian.—This 60-stamp mill, which has been in course of construction for several months, is completed. It gets its ore from a quarry close at hand, which formerly fed the Winscott stamp mill, and is owned by Iowa and Washington parties. Allen C. Mason, of Tacoma, Wash., is president; Colin V. Macintosh, of Helena, is superintendent, and has had charge of the installation of the plant. The ore is low grade, but in large veins. It is carried to the crusher by gravity tram. These cars dump into chutes which feed the crushers. From these the broken ore is carried by belt conveyors to the stamps. The plant is run by electricity, is generated by water power, obtained from the Missouri River. The entire proposition is being operated in the most modern methods and on a large scale. The plant employs 75 men at present.

Missouri River Power Company.—This company has filed a demurrer to the suit brought against it by the American Bridge Company in the United States Court for money alleged to be due for material furnished for the dam at Canyon Ferry.

Montana Marble and Mining Company.—The company proposes to open marble quarries in Nelson

Gulch, 7 miles from Helena. The company is organized under the laws of the State of Washington, with a capital of \$1,250,000. Spokane, Wash., is the principal place of business. The following are trustees: W. Y. Pemberton, of Butte, and A. M. Baldwin, C. E. Russell, W. E. Embry, R. E. Vincent, George W. Belt and Francis Builivant, all of Spokane, Wash.

MADISON COUNTY.

(From Our Special Correspondent.)

Kearsarge.—At this mine, 3 miles from Virginia City, a lockout of miners took place recently because the miners objected to a Chinese cook; demanded his discharge and the employment of a white cook. The management having had considerable trouble with other classes of cooks, gave the twenty-odd miners their time. The Millards, of Omaha, own the property.

Wateka.—A concentrating mill of 125 tons capacity is to be added to the milling equipment of this Rochester gold property. A shoot of base ore at the 500-ft. level will require handling through an ore dressing plant. The property is under the management of C. H. Hand, of Butte. James Naughten, of Butte, is master mechanic.

MISSOULA COUNTY.

(From Our Special Correspondent.)

Western Montana Placer Company.—It is claimed that this company will continue work with its dredge, and a hydraulic system will be installed in place of the boat which is being taken apart to be moved out. The property is on Nine Mile. T. S. Letterman, of Missoula, is superintendent.

PARK COUNTY.

(From Our Special Correspondent.)

St. Julien Gold Mining Company.—The old St. Julien Mining Company has been merged into this company. The capital stock has been raised from \$16,000 to \$500,000, of which \$400,000 has been paid in. The stock is all held by the following persons: P. J. and J. F. Nolan, of Livingston, \$85,000 each; W. A. Bercry, of Detroit, Mich., \$150,000; L. H. Jones, of Detroit, \$62,500; A. F. Peck, of Detroit, \$17,500; \$100,000 are left in the treasury for the construction of a 20-stamp mill. The property is at the head of Emigrant Gulch, 7 miles above Chico. The St. Julien has been a producer for some years. A 20-ton Elpas roller mill has worked quite successfully for two years, and will be used to rework tailings on the completion of the new mill.

POWELL COUNTY.

(From Our Special Correspondent.)

Powell Power Company.—John F. Cowan, J. K. Hasklet and George H. Casey, all of Butte, have organized this company, to put in an electric transmission power line, taking power from the headwaters of Race Track Creek to Butte, a distance of about 30 miles; 3,000 h.p. will be developed with an initial line voltage of 30,000. The capital stock is \$200,000.

Snowshoe Copper Mining Company.—This company operating on Snowshoe Gulch, 10 miles from Elliston, is equipping its property with hoisting machinery and a pump, and intends to sink 500 ft. deep. Martin & Carroll, of Helena, have the management.

SILVER BOW COUNTY.

(From Our Special Correspondent.)

Amalgamated Copper Company.—Among other economies recently introduced in the mines, is the use of electric fans to replace compressed air for ventilating. The fans fulfil the requirements, are much cheaper to operate than air under 100 lbs. pressure, and are easily portable. The wires are carried in iron tubes.

Mayflower.—Work at this mine, near Whitehall, owned by Senator W. A. Clark, has stopped because the rich ore has been exhausted. The plant is being torn apart and the equipment will be sent to Butte. Senator Clark bought it from the locators 7 years ago for \$150,000. It is claimed that the mine has during that brief time yielded \$1,500,000.

Sinbad.—This property has stopped all work, but pumping, for the time being. The Large estate sank a shaft 700 ft., with several hundred feet of drifting. The property is situated east of Meadesville. One difficulty has been the depth to bedrock which was found to be 600 ft.

SWEET GRASS COUNTY.

(From Our Special Correspondent.)

Big Timber & Cooke City Railroad.—The engineers who are surveying the line for the railroad connecting Big Timber and Cooke City have about finished work. The road, will cross the county line near Natural Bridge. About one-half of the distance will be in Park County. Grading will probably not begin before spring.

NORTH CAROLINA.

CABARRUS COUNTY.

(From Our Special Correspondent.)

Furr.—This tract of gold mining ground of some 400 acres, near Georgeville, has been sold to an Eng-

lish company, of which George Lancelot Andrews, of London, Eng., is the attorney, and to whom the deeds are made. The property was opened some years ago to a depth of 40 or 50 ft., showing a large quartz vein carrying gold, with sulphurets of iron, copper and lead. Capt. B. Tamblyn, formerly of Villa Rica Mines, Ga., is in charge.

ROWAN COUNTY.

(From Our Special Correspondent.)

Gold Hill Copper Company.—This company, under the management of George T. Fenton, is working on the 600-ft. level in the Randolph shaft, and producing ore that makes concentrates, running well in gold and copper.

Union Copper Company.—This company has struck an important body of ore on the 600-ft. level that averages 10 per cent. in copper and some gold.

YADKIN COUNTY.

(From Our Special Correspondent.)

Gross.—This mine has been leased to George H. Trimble, mining engineer, of 99 Wisconsin Street, Milwaukee, Wis., who is on the ground and has 20 men at work. The vein is quartz, carrying free gold and sulphurets of iron and copper.

PENNSYLVANIA.

BITUMINOUS COAL.

Somerset Coal Company.—This company, which has extensive operations in the Stonycreek Valley, recently purchased the coal under the farm of Jere B. Keim, near Salisbury, which has both the large vein and a 4-ft. seam, for about \$1,000 an acre, a price only equaled in the State by transactions in the anthracite and Connelville fields. The land lies close to the railroad.

SOUTH DAKOTA.

CUSTER COUNTY.

(From Our Special Correspondent.)

Central Black Hills Copper Company.—Copper ore is being mined on Spring Creek and stored, awaiting the building of the leaching plant.

Grantz Gold Mining Company.—The shaft on the St. Elmo is 113 ft. deep, and a station is being cut. Sinking will continue to the 500 ft. The shaft on the Roosevelt group is 80 ft. deep. The new shaft house, assay office and other buildings have been finished. Otto P. Th. Grantz, of Deadwood, is manager; Jesse Simmons is assayer.

LAWRENCE COUNTY.

Columbus Consolidated Mining Company.—The Portland wet crushing cyanide plant, recently purchased of the Baltimore & Deadwood Company, has been started on ore from the Rossiter and Dalton groups of claims belonging to this company. The old 200-ft. Columbus shaft has been enlarged to 3 compartments, and sinking is resumed.

Deadwood-Standard Mining Company.—A \$7,000 bar of bullion was brought to the United States assay office at Deadwood after 15 days' run at the cyanide plant. The mill has been running steadily 2 months.

Globe Mining Company.—A gasoline hoist and air compressor and Leyner air drills are being installed at the new shaft west of Lead, near the junction of Nevada and Whitetail gulches. F. E. Wade is superintendent.

Hidden Fortune Mining Company.—A ton of very rich siliceous ore is being sacked for shipment on the claims purchased of Otto P. Th. Grantz in North Lead. A new strike of free milling ore is reported on the southern end of the Bingham lode, 1,700 ft. south of the mouth of the Baltic tunnel.

Oro Hondo Gold Mining Company.—The machinery is in place at the shaft in Kirk, and the shaft house, 46 by 40 ft., is being erected. The hoist has a capacity of 2,000 ft. The shaft has been sunk 80 ft. by hand. Sinking is suspended pending the starting of the hoist.

Penobscot Mining Company.—The ore is reported improving in the Realization Mine, and is said to show an average of nearly \$20 a ton. The wet crushing cyanide plant at Garden City will start November 1. T. F. Byrns is superintendent.

Wasp No. 2 Mining Company.—The tramway from the open cut to the mill on Yellow Creek is being shortened from 1,400 to 750 ft. by a tunnel through the hill. The mill is running on quartzite and porphyry from an open pit, and is said to average about \$3.50 a ton. A dryer is being put in the mill to dry shale ores, to prevent clogging the rolls and give better extraction in solution.

PENNINGTON COUNTY.

(From Our Special Correspondent.)

Copper Mountain Mining Company.—Ground has been broken for the 100-ton smelter at Sheridan. S. A. Baxter, of Lima, O., is manager.

Mount Actna Mining Company.—The shaft is 130 ft. deep, following a well-defined ledge of free milling ore.

Tycoon Mining Company.—A steam hoist has been

ordered for the 140-ft. shaft, to replace the whim. The 10-stamp mill is running steadily.

TENNESSEE.

HAMILTON COUNTY.

Cumberland Realty, Coal, Iron and Manufacturing Company.—Kansas City men have formed this company, under the laws of Kansas, with a capital of \$300,000, to acquire lands in the Chattanooga District. George M. Noble, of Topeka, Kan., is president. It is understood that 18,000 acres of land have been acquired, and that development will shortly begin. The land lies mostly along the Tennessee Central Railroad.

TEXAS.

HARDIN COUNTY.

(From Our Special Correspondent.)

Sour Lake Springs Oil Field.—There are 5 wells being drilled, 2 by the J. M. Guffy Petroleum Company and 1 each for the Sour Lake Oil Company, Sour Lake Springs Oil Company and the Byrd Syndicate. Two 25,000-bbl. steel tanks are under construction. No oil has yet been shipped from this field.

JEFFERSON COUNTY.

(From Our Special Correspondent.)

Beaumont Oil Field.—Spindletop recently saw another blaze that threatened to wipe out all the derricks and outfits on the Hogg-Swayne tract. Carelessness caused the fire, and only good luck saved greater damage. It destroyed about 62 derricks, some settling tanks and numerous pumping outfits in Blocks 37 and 38 H. S. The loss will not exceed \$40,000, but the delay and loss to shippers will be exasperating and expensive. The heaviest losers are the Moore Skinner Syndicate and the Star Petroleum Company; other victims are the Gladys, of Galveston; Saratoga Oil and Pipe Line Company, Granite Mountain Oil Company, Forward Producing Company, M. K. T. Oil Company, Guarantee Oil Company, Equitable Land and Oil Company, Beatty Oil Company, Export Oil Company, Fagin Investment Company, Central Power and Equipment Company. R. L. Cox & Co., Shippers keep up well under the diminished production of the last few months.

MATAGORDA COUNTY.

(From Our Special Correspondent.)

Guffy Petroleum Company.—This company has resumed boring on well No. 3, and is down 856 ft., having passed a thin oil sand. Its No. 2 well was lost at 876 ft. by a gas blowout. No. 1, the big gasser, still holds out, and local parties think of piping it for fuel.

NAVARRO COUNTY.

(From Our Special Correspondent.)

Corsicana Oil Field.—The September petroleum report is as follows: Wells completed 2; dry, 2; abandoned, 4; drilling, 1. Total to September 31: Wells completed, 1,104; producing, 580; gas, 22; dry, 243; abandoned, 259. Crude has advanced from 66c. to 71c. bbl.

UTAH.

SUMMIT COUNTY.

Park City Gold and Silver Mining Company.—This company is to work the Success group of 5 claims, in the Snake Creek district, east of the Wolverine and south of the Lucky Bill, at Park City. The company is capitalized at \$300,000, in \$1 shares, and 125,000 shares are set aside for working capital. George Romney is president; Willard D. Thompson, vice president, and C. B. Stewart, secretary and treasurer; these, with Jabez W. West and George Romney, Jr., completing the board. The property was until recently owned by Captain C. A. Springer, Ed. W. Berry, R. J. Evans and others. A shaft was started some time ago and during the winter the new company intends to continue it. Orders for material with which to erect buildings and machinery have been given.

TOOELE COUNTY.

Galena King Mining Company.—This company's property adjoins the Honerine, at Stockton. J. W. Cochrane, of Ashland, Wis., is president; Duncan McVichie, vice-president and general manager; Henry McCornick, treasurer; C. F. Wray, secretary. These and Colonel John H. Knight, of Ashland, are directors.

WEST VIRGINIA.

FAYETTE COUNTY.

Diets Colliery Company.—This company has been organized at Lynchburg, Pa., with Randolph Harrison president, C. M. Guggenheimer vice-president, and John H. Lewis secretary, all of Lynchburg. The company is to develop coal lands on the Gauley River branch of the Chesapeake & Ohio Railroad.

WYOMING.

CARBON COUNTY.

North American Copper Company.—The Southern Wyoming aerial tramway, connecting the Ferris-Haggarty copper mine at Battle Lake with the Boston-Wyoming smelter at Encampment is in use. It is the

longest aerial tramway in the world. Along its line have been built the first double tension stations ever used on an aerial tramway, these being necessitated by the great strain to which the line will be subjected. The tramway was erected by the Mine and Smelter Supply Company, of Denver, Colo., and is of Leschen pattern. Work began last spring. There are 4 divisions of about 4 miles each, the total length of the tram being 15.6 miles. There are 270 towers, 16 tension stations, 4 of which are double; 293,275 ft. of cable, weighing 439,696 pounds; 1,250,000 ft. of lumber were used, and 200 men employed. The work cost \$300,000. The company also owns the smelter, electric light and power plant, and water works at Encampment, the Ferris-Haggarty Mine and other properties.

FOREIGN MINING NEWS.

CANADA.

BRITISH COLUMBIA-BOUNDARY DISTRICT.

Emma.—The daily output of ore from this mine, at Summit, is 160 tons. This ore is quarried from open workings and goes to the Hall Mining and Smelting Company's works at Nelson.

Granby Consolidated.—The new machinery house for the electrically driven compressor plant is about completed. The building is 60 by 120 ft. There will be 2 tandem duplex compound air compressors driven by 2 750-h.p. induction electric motors, giving a 60-drill capacity. The machinery has been shipped from the factory at Sherbrooke, Que., including the necessary rope drives, 7 air receivers, new drills and a 10-ton traveling crane.

A gravity tram from the upper part of the ore quarries to the ore bins and crusher house and a tray to the shipping bins have been in course of erection, and are about ready for the big Farrell crusher, having jaws with an opening 36 by 42 in., which will be driven by a 100-h.p. electric motor. This crusher is the largest of its kind yet made in Canada.

The open workings at the mines now extend north and south about 1,300 ft., and have a width varying from about 50 ft. to about 100 ft. Besides this an area approximately 800 ft. long by 200 ft. wide has been stripped. Work in the main quarries is carried on as usual. Large openings have been made from the Knob Hill main tunnel up to the quarries, giving in all 12 chutes.

EUROPE.

SPAIN.

Rio Tinto Company, Limited.—The following circular to stockholders has been issued from the London office under date of October 9:

"Your directors have the pleasure of presenting, as usual, a brief interim report upon the company's operations during the current year. The deliveries of pyrites on the Continent of Europe promise to be about the same as last year, and will, in the United States of America, probably show a slight increase, but in the United Kingdom there will be some falling off. The deliveries of non-cupreous sulphur ore have not so far been quite up to expectation. Contracts on a larger scale have, however, been entered into for next year. The production of refined copper at Cwmavon will be about equal to that of last year; the demand continues good, and the quality is excellent. The average price of G.M.B. copper for the nine months ended September 30 last, has been £14 1s. 2d. under that of the total of the year 1901. Your directors have now the pleasure to declare, out of the estimated profits of the year, a dividend for the six months' ended June 30 last, of 2s. 6d. per share, less income tax, on the 5 per cent preference shares, and an interim dividend of 2s. 6d. per share, free of income tax, on the ordinary shares, both payable on November 1 next."

MEXICO.

CHIHUAHUA.

(From Our Special Correspondent.)

Mr. G. A. Burr has charge of the work of the Boston & Parral Mining Company, operating La Luz, San Cristobol and San Rafael mines at Parral, Mex., as consulting engineer.

Esmeralda.—This mine, about 800 m. northeast of the Palmilla, has cut 18 in. of ore on the 4th level, assaying 150 oz. silver. It is operated by the Esmeralda Mining Company, of Torreón.

DURANGO.

Velardena.—The negotiations for the sale of these Velardena mines are said to have terminated in their purchase by an American lead syndicate, possibly the Guggenheim Exploration Company. It is said that the mines, which produce a great quantity of lead, will be closed to reduce the supply.

SONORA.

Greene Consolidated Copper Company.—At the annual meeting in New York City recently H. E. Huntington, of the Southern Pacific Company, and Henry Scott, president of the Union Iron Works, of San Francisco, were elected directors in the places of Lewis Seasongood and William L. Greene.

MINING STOCKS.

(Complete quotations will be found on pages 568 and 569.)

New York. Oct. 23.

There is a better undertone in the copper share list, but speculation is still too narrow to interest outsiders. Following the declaration of the Amalgamated and Anaconda dividends comes the first payment to be made on the preferred stock of Heinze's United. The gold list is particularly weak, as dividends are not as satisfactory as they have been, owing principally to costly installations of machinery, etc., at some of the larger properties. On the whole, this is a buyer's market, and with care investors can make some good purchases.

In the copper section sales of Amalgamated have been made at \$65½@67¼, a gain of over 3 points from the lowest last week. Anaconda was sympathetically strong, moving up to 102 per cent (\$25.25), but on Tuesday the stock was off the market.

Greene Consolidated is planning to liquidate its indebtedness. A meeting of stockholders is called for November 5 to vote on an increase of capital stock from 600,000 shares to 720,000, the par value of the additional 120,000 shares to remain at \$10. The right will be given present stockholders to subscribe for this new stock in the proportion of one share new to each 5 shares now held at \$20 per share. The entire proposed issue at \$20 has been underwritten without commission, and any stock not taken by present stockholders will go to the underwriting syndicate, which is composed principally of the directors and important stockholders. Dealings on curb were active, sales being made at \$21½@22, ex-rights, and \$22½@21¾ rights on, while 8,720 rights were sold on Monday at \$100@34 per hundred. A misunderstanding with regard to the purchase of these rights caused considerable confusion among brokers. The trouble arose when the Stock Exchange house which had been purchasing considerable rights at \$1 each, claimed that what they were buying were not rights on 100 shares of old stock entitling them to 20 new shares, but that by 100 rights was meant the right to subscribe to 100 new shares. It is said that this claim is contrary to all the rules governing such transactions, so those who sold the rights at \$1 a share insist upon their being received at that price. There is talk of a contest over this misunderstanding, which, however, does not promise a sensation, as it was the business of both sides to know in what they were dealing.

A surprise was sprung on the stock market when the United Copper Company, Heinze's concern, announced a dividend of 3 per cent. on its \$5,000,000 preferred stock. Only last month one of the principal subsidiary concerns, the Montana Ore Purchasing Company, paid a \$2 dividend, which made \$4 this year, amounting to \$324,000, or 16 per cent on the outstanding capital stock. This is 6 per cent more than has been declared by the Anaconda Copper Company, while the United dividend just announced is 1 per cent better than the annual rate of the Amalgamated Copper Company. No United preferred stock is on the market, as it is held by insiders; but the common stock is offered on curb at \$31¼@30¾ at which sales have been made.

White Knob Copper, of Idaho, is weak, and has been hammered down to \$10, a decline of 6½ points within a week. Later, however, the stock recovered to 13½. Stockholders have become apprehensive, as the company has loaned \$250,000 to complete its plant and put it in active operation. The market was also affected by the report that certain margin accounts in the stock had been closed out.

Tennessee Copper has received more support from insiders, and on fair sales advanced to \$19¼. Later, \$17¼ was bid. British Columbia has also improved, but outside buying is small. Sales of the stock were made at \$7@7¾. Montreal & Boston brought \$3¾@2¾.

The public is asked to subscribe to stock in the Mine La Motte Lead and Smelting Company, which owns the famous Mine La Motte property in Madison and St. Francois counties, Missouri. This old property has changed hands several times in the last 5 years; first selling for \$300,000 in 1897, then for \$850,000 in 1901 to Charles C. Walcott, of New York, a promoter of zinc companies, and now to the Mine La Motte Lead and Smelting Company, which is floating the property on a \$3,000,000 capitalization. This company is headed by New York people, who ask \$7.50 for the \$10 par value shares, promising a quarterly dividend January 15 next, at the rate of 8 per cent per annum on the par value of stock.

Boston. Oct. 21.

(From Our Special Correspondent.)

The firmer market for copper has resulted in a more buoyant tone in the share market, but business is yet much restricted and apparently any attempt to bull prices is quickly squelched. Prices, as a rule, are higher than a week ago, but they are slight at the most.

A fair request for Utah Consolidated Mining has

been noticed, and any stock offered has been quickly taken at advancing prices up to \$22.25. It is now expected that a dividend will be declared sometime this year. The cost of producing copper has been materially reduced of late. New York is reported as buying Utah stock.

United States Mining has been in good request, touching \$22. The company is now tramping ore between the property and the smelter, preparatory to starting the smelter. The company has taken from the Amalgamated and Clark companies four leading men in its forces. Dominion Iron and Steel moved up \$5 to \$60, reacting to \$58.50. The Montreal directory interests are reported to have corralled large blocks of the stock on the late decline. The \$5,000,000 Dominion Coal stock, authorized last spring to take up the present bonds and preferred stock, is expected to be issued next month at \$120 per share. Old Dominion moved up to \$18, settling subsequently to \$17.25. Operations have been resumed at the mine, and labor difficulties adjusted. A new contract has been made with the railroad by which a saving of about \$150,000 per year will be made in the matter of rates.

Copper Range Consolidated has given a good account of itself, touching \$60.25 Monday; it reacted to \$59 from this price. The Baltic, which was consolidated with Copper Range some time ago, is shipping about 35,000 tons of rock per month. The mineral yield is reported as 32 lbs. to the ton, giving 22 lbs. of ingot copper. Centennial has been more or less of a feature touching \$19.25, but the net gain is barely worth mentioning. Victoria Mining was brought up to \$6.75 on the announcement that the dam had been completed. Through its rise the Victoria will operate its mine, and mill, and carry its stock from the mine to the mill.

General buying of United States Coal and Oil advanced the price from \$14.50 to \$16. Without doubt the tightness of money has prevented a fair amount of speculation in this stock, which would have resulted in a higher price. The annual report shows net income from oil sales for the year ended September 30, 1902, of \$322,259, and total income of \$332,245. Expenses were \$143,387, construction \$167,678, leaseholds and rentals \$10,808, resulting in a surplus of \$10,370 for the year. The report states that the company hopes to begin the shipment of coal during the coming year from the lately acquired Island Creek Coal property. The oil production is substantially the same as a year ago, although at times it has fallen off perceptibly during the year. The balance sheet shows \$618,292 cash on hand, while the railroad has \$299,946 cash in its treasury, making a total \$918,238. Although no sales of United Copper have been made for some time, the stock is \$31.50 bid.

Colorado Springs. Oct. 17.

(From Our Special Correspondent.)

The market in itself this week presented little value either from the standpoint of the trader or the speculator. Prices remained upon about the same level as a week ago, and the only improvement noted was in the volume of trading which increased during the last three days of the week. The mines were the main feature, due, in a measure, to a partial return of confidence which has taken place in connection with the fact that nothing is to be done with the Stratton until after November 10. A further reason is found in the payment of dividends by the Portland, United Gold Mines, Gold Coin, Vindicator and Mary McKinney companies this week.

It is announced to-day that the special committee appointed three weeks ago to investigate the Cripple Creek water situation, will report to a general meeting of the mine owners next Monday, recommending the running of a tunnel 10,000 ft. long to drain the mines 500 ft. below the present water level. The proposition will have to receive the financial backing of the big mines before anything of value will be done.

El Paso shares have been banded up and down this week by a series of reports stating that this mine is unable to cope with a new flow of water. Upon investigation, the rumor is found to be without any foundation, but is being used for the purpose of bearing the shares. The stock sold from 71 to 73½c., closing at 72c. to-day. Isabella had a quiet week, selling at 34¼@34½c., the quotation, however, advancing to 35¼@36c., but sagging off to-day to 33¾@36c.

Coriolanus, one of the mines in the Victor section, came to the front this week through the announcement that the property, which has been idle for some time, is to be worked by a strong leasing concern. The shares advanced from 4 to 5c., at which point they closed in good demand. Gould advanced from 6¾ to 7½c., with no satisfactory reason coming to the surface.

Elkton sold from 35 up to 36, and back to 35c. again, with nothing of importance developing. Pharmacist sold from 5¼ to 6, and back to 5½c. to-day.

Salt Lake City. Oct. 18.

(From Our Special Correspondent.)

About the same trading has been done this week as last, and at about the same scale of prices. The losses

in most cases have been fractional as well as the gains. The volume of business has been greater this week, owing to heavier trading in higher priced stocks than last week. The rises and falls of each day have about balanced each other for, if a sudden rise resulted, it reacted in a day or two. The heaviest traders are the Carisa, 21,500 shares, at 20¾@19¼c.; Consolidated Mercur, 24,785 at \$1.92½@1.83; Lower Mammoth, 20,600 at \$1.53½@1.37, which is a rise of 13c. over last week's limits; May Day, 50,400 at 33@27c.; Uncle Sam, 10,300 at 33¼@30½c.; Ben Butler, 20,000 at 12¾@10c.; California, 115,700 at 42@35c. The week closes with sales of 381,894 shares, which cost \$284,384.

San Francisco. Oct. 18.

(From Our Special Correspondent.)

Quotations have been a little higher this week. The low prices reached seem to have stimulated business somewhat, and more trading has been reported.

The sworn reports of the companies, as filed in their offices this week, show cash on hand as follows, with all expenses paid, unless otherwise noted: Alta, \$9, with bills payable of \$2,880; Alpha Consolidated, \$1,011; Andes, \$5, with bills payable of \$2,268; Belcher, \$4,095, with liabilities of \$7,300; Best & Belcher, \$741, with bills payable of \$12,500; Bullion, \$319; Caledonia, \$5,705, with September expenses unpaid; Consolidated California & Virginia, \$206, with a lot of concentrates to be settled for; Chollar, \$777, with bills payable of \$1,500; Confidence, \$3,006, with September expenses unpaid; Challenge Consolidated, \$1,485; Consolidated Imperial, \$552; Crown Point, \$708, with September expenses unpaid; Gould & Curry, \$5,638, with bills receivable of \$12,500 and liabilities of \$14,623; Justice, \$518, with liabilities of \$6,837; Mexican, \$779, with note for \$1,000 unpaid; Ophir, \$815, with bills payable of \$4,000; Overman, \$1,097, with September expenses unpaid; Potosi, \$459, with bills payable of \$1,500; Savage, \$1,064; Silver Hill, \$17,174; Standard Consolidated, \$112,938, with September clean-up and September mine expenses to be accounted for; Sierra Nevada, \$8,420; Syndicate, \$2,140; Union Consolidated, \$1,214; Utah Consolidated, \$369, with \$1,500 due bank.

On the Oil Exchange trading has been moderate, but better than for some weeks past. Prices have been generally firm.

London. Oct. 7.

(From Our Special Correspondent.)

Again it has to be recorded that the chief occupation of the mining market is the circulation of rumors relating to the condition of South Africa. Quite a crop have sprung up this week. A great deal was made of a report that Lord Milner was resigning his position as High Commissioner of South Africa, and no doubt the foundation for the report is that he disagrees with the Government over the question of the suspension of the constitution in Cape Colony. Then there was a report that the South African mining magnates had determined to appoint a London committee, whose business it should be to air their grievances in England. This report has been contradicted by all people likely to be interested, so it may be dismissed for the present. Last week I mentioned at some length the rumor that Rhodesia and the Chartered Company were to be taken over bodily by the Government. Since then a denial has been circulated by a news company whose representative had seen Mr. Beit, but the denial is as vague as the original assertion; so we have not got much further information on the subject. It is not likely that the Government is prepared for the deal just now, for their hands are full with the re-settlement of the Transvaal, but the scheme is within the range of practical politics, and will come before the public at an early date.

Other sections of the market keep very quiet. The West Australian market shows no signs of life at all. The report of the Lake View Consols for the ten months ended June 30 last has just been issued, and shows that under the new directorate and management many economies and retrenchments have been introduced and the finances of the company reorganized. Though £11,000 profit has been earned during the period in question both this and the balance brought in have been applied to the reduction of capital amounts. It is noticeable also that working costs have been much reduced, and next year they will have a considerable effect in increasing profits. It is not probable that there will be any Stock Exchange movements in these shares now that the company has got to a business basis, for the speculator prefers loose management that does not scruple to circulate false reports of the wonderful amounts of ore in sight.

COAL TRADE REVIEW

NEW YORK. Oct. 23.

ANTHRACITE.

With the miners returning to work to-day sales agents are already hearing from anxious consumers.

and for the next month or two are likely to have a taste of what bituminous producers, supplying the seaboard, have had to take all the fall. The market in all anthracite consuming territories is bare, winter is not far off, and the public wants to lay in supplies. It will take time to get the mines in good running order; machinery, mules and men, after a 5 months' idleness, cannot work to best efficiency at first, and judging from the effects of the 1900 strike, many things will contribute to keep down output for some weeks. Still, the miners, though elated over what they consider a victory, are likely to go to work with a will, and if no petty strikes start over the retention of non-union men, nearly all the mines should be making normal outputs, or better, in a month.

The country is short this year to date some 20,000,000 tons or more of its needed supply of anthracite. This is a large amount, and cannot be made up in months. Coal in quantity will probably begin arriving at tide water by Monday, and the railroads will no doubt do their utmost to facilitate shipments, keeping cars on the move. They will naturally supply points on their own lines first, and sales agents will naturally look out for consumers where needs are most pressing. The regular price f. o. b. New York Harbor shipping ports will be \$4.50 for nut, stove and egg sizes, but with demand so pressing it is not likely that retail dealers will be able to get coal on this basis for weeks and retail prices at some points will doubtless be considerably higher than usual all winter.

The settlement of the strike is not likely to bring much relief to points in the Northwest and consumers there who do not care to pay the advanced prices of all-rail shipments will have to burn bituminous this winter. In Chicago territory not much coal can be expected from lake shipments, but as many dealers in that territory depend largely on all-rail coal, anyway, small receipts before navigation closes are of less importance than at Lake Superior points. In the all-rail trade farther east, at Canadian points and particularly along the Atlantic seaboard there is bound to be a grand scramble for coal, with a tolerable certainty of dealers at shoal water ports who are dependent on coastwise shipments not being able to get all their needs supplied before navigation closes. Vessel freights are likely to advance, and this will naturally affect retail prices at many points. Retail prices for prepared sizes at New York are about \$15; at Philadelphia, \$10@12. At New York wholesale prices are: Broken, \$11; egg, stove and nut, \$10; buckwheat, \$4.75; rice, \$2.50. Some Welsh anthracite has been sold at New York for \$10, wholesale, and was mostly taken by the gas companies.

BITUMINOUS.

The Atlantic seaboard bituminous trade is quieter than it was for some months up to last week. The knowledge that the anthracite strike issues were to be arbitrated and that the miners were to return to work has started dealers thinking of hard coal, and taken a lot of pressure off bituminous producers. Prices fell quickly at the end of last week, and the drop brought some buying, though not as much as had been expected. Speculative prices dropped as low as \$4.30 f. o. b. New York Harbor shipping ports for Clearfield grades, and it is said some coal was offered as low as \$4. After the first slump prices rose again, and Clearfield grades are now quoted by speculators at \$4.75@5.25, with comparatively few buyers. Speculators are in a pretty strong position, since, if unable to sell at the speculative price, they can place the coal on contract orders rather than hurt the market, and thus take care of coal as it arrives at tidewater. Still, the amount thus unloaded is probably not very large, since some speculators have no contracts calling for deliveries.

Trade in the Far East is quiet, the fever and hysteria of a few weeks since have gone. Some Welsh anthracite is reported arriving, and causing some curiosity in the trade as to its quality. The situation now is that consumers, so long as they can keep going, are satisfied, and are not in a hurry to buy at high prices. Along Long Island Sound consumers are taking all the coal they can get on contracts; lower prices caused some buying of speculative coal, but the recent advance of 75c. per ton has driven most of these buyers out of the market. At New York Harbor points trade is quiet, consumers apparently getting about what coal they want. All-rail trade is in a bad way. Those concerns having sufficient storage capacity are not suffering much, those buying from hand to mouth have had trouble, and in a considerable number of cases have had to shut down partly or wholly.

Transportation from the mines to tidewater is irregular, coal coming through in bunches, and is also slow. Hardly any coal comes through in less than a week, and the time runs up to 10 days or 2 weeks in some cases. Car supply at the mines is down to about 50 per cent of the demand. In the coastwise vessel market vessels are scarcer and rates firmer. Large vessels are in better supply than small craft. We quote current rates from Philadelphia as follows: Boston, Salem and Portland, 70@75c.; Providence, New Bedford and Long Island Sound, 60c.; Ware-

ham, Portsmouth and Bath, 75@80c.; Lynn and Newburyport, 85c.; Bangor, 85@90c.; Gardener, 90c. and towages. Rates from the further lower ports are 15@20c. above these figures. With the resumption of anthracite shipments, freight rates are bound to rise.

Birmingham. Oct. 20.

(From Our Special Correspondent.)

Alabama's coal production which has been considerably off for the past two weeks on account of a strike on the part of something like 4,000 miners in the employ of the Tennessee Coal, Iron and Railroad Company, is once more in full blast. The production will be the greatest ever known before the end of the week, provided the railroad companies are capable of supplying all the cars needed for the proper handling of the product. The various transportation companies in the South which secure their supply of fuel in this district have had representatives here recently looking after their contracts. Some new contracts were also made for fuel here recently, and the indications point to a steady operation of mines through the entire winter and spring. There is no coal in stock and the needs of the larger consumers are urgent. It was very fortunate that only one company was affected by the strike in this section, or there might have been serious consequences. As it is a number of furnaces were affected and the supply of coke and domestic supply of coal were very short.

The coke production in this State is holding up fairly well, but is still under the demand. Much coke is being brought into the State from the Virginias.

Chicago. Oct. 20.

(From Our Special Correspondent.)

Sales of coal continue to be heavy and are chiefly of Illinois and Indiana grades. Very little Eastern coal is coming in; Hocking is scarce at \$5, Virginia coals are very short, and there is no Pittsburg. Pocahontas smokeless can be had in small lots for \$6; Maryland smokeless sells at \$5.50, and is comparatively free now; Indiana block is in great demand for household purposes at \$3.50@4; Indiana bituminous sells readily at \$3; Southern Illinois brings \$3, and Du Quoin Illinois (Jupiter lump), \$3.25. There is a fair sale of cannel at \$7. Steam coal, of good quality, from Illinois or Indiana mines, can be had for \$2.50@3.

Chicago dealers do not expect relief from the anthracite famine until two or three months after the settlement of the strike. They figure that the output of the mines will be slow in reaching them, as the East will be favored in the distribution, that the car shortage will be especially noticeable as a cause of scarcity, and that there will be the usual delays on the railways, due to cold weather. The navigation season will close in a month, too soon to allow any stocks to be accumulated here. It is probable, therefore, that Chicago must depend on bituminous for both steam and household purposes this winter. There is yet a little anthracite in the hands of the retailers of the city; they are selling it slowly at \$13 to \$18; probably not one of them has more than 150 tons.

Cleveland. Oct. 20.

(From Our Special Correspondent.)

The ending of the coal strike makes it a serious problem what will happen in the market here. It has been said that the freeing of the equipment from the long hauls into the Eastern territory ought to relieve the situation. It is to be remembered, however, that the Eastern roads loaned the roads in this territory equipment which was not in use when the coal strike was on, and this will be withdrawn, thus offsetting any advantage which might accrue from the releasing of certain amounts of equipment from long hauls. The excessive demands in the general merchandise and ore trades will, in all likelihood, shorten the equipment possible for the coal trade, and it is extremely doubtful whether there will be any relief for the lake shippers during the remainder of this season. In the meanwhile, the situation is becoming worse and more perplexing. Heretofore the first of the week has seen vigorous shipments of coal to the lakes, but here lately this activity has been confined to Monday, the remainder of the week being a gradual and disastrous slump toward no coal whatever. The result has been a cutting down of averages for former years, and it seems now as if the increase in the total shipment to October 1 were to be wiped out entirely before the season is over. The coal is so short that it has even slackened the supply for fuel purposes for the boats. In the domestic trade there is considerable uneasiness felt and expressed for the outcome during the winter, but this is being relieved by the prospects of a resumption of work in the anthracite field. Prices have remained stable.

Pittsburg. Oct. 21.

(From Our Special Correspondent.)

Coal.—The scarcity of coal due to a shortage of railroad cars has at last resulted in an advance in prices. A new schedule has been arranged and will go into effect on October 25. The present circular price has been in force for over two years, although

high premiums have been paid during the past few months. The new prices are an advance of 30c. a ton on all grades of coal at the mine, and are as follows: 1¼-in., \$1.75; ¾-in., \$1.65; run-of-mine, \$1.55; nut, \$1.40; nut and slack, \$1.25; and slack, \$1.10. These prices were decided upon at a meeting of representatives of the two combinations, and the most prominent independent concerns held last Saturday but no official announcement has yet been made. It is not likely, however, that any further change will be made when the circular is issued. The freight from the mines to Pittsburg is 30c. a ton. The rate for river coal is about 10c. a ton below that of the railroad coal, and is delivered along the wharves here in flats and barges. There was a better supply of railroad cars yesterday, but to-day the situation is as bad as ever.

Cannelville Coke.—While the production continues heavy there is but little improvement in deliveries. The H. C. Frick Coke Company has not sold a ton of coke since July 1, and is shipping its entire production on contracts. It is not getting all the coke it has bought from independent operators, as some seem to be taking advantage of the high prices offered. As an illustration of the prices being paid, an operator told of supplying a blast furnace with coke at \$8 a ton at the ovens. Several sales were made during the week at \$12 a ton, and it is reported that in one instance as high as \$15 was paid. The Frick Company has practically abandoned its Eastern office, as it has not shipped a ton of coke East for 5 months. It was announced that the United States Steel Corporation has been trying to start one of the Illinois Steel Company's blast furnaces for over a month, but cannot get the coke needed. The *Courier*, in its last issue, gives the production of coke for the previous week at 256,521 tons, a gain of 305 tons. The shipments aggregated 11,562 cars, distributed as follows: To Pittsburg and river tipples, 3,775 cars; to points west of Pittsburg, 5,961 cars; to points east of Cannelville, 1,826 cars.

San Francisco. Oct. 18.

(Special Report of J. W. Harrison.)

Since the steamer *Ventura* sailed there have been the following arrivals of Australian coal at this port: *Dora*, 1,761 tons; *Francisco Guiseppe*, 2,940 tons; *Ditton*, 4,232 tons; total, 8,933 tons. There are, in all, 7 vessels on the engaged list from Newcastle, N. S. W., with about 20,000 tons carrying capacity. Just one year ago there were 37 vessels on the chartered list, with a carrying capacity of fully 100,000 tons. This clearly demonstrates what the Australian coal loading business means to this port. The principal cause of this shrinkage is, as is known to all, the substitution of oil for coal as a steam producing agent. This was looked for over a year ago, but it was not anticipated that its influence would become so apparent in such a limited space of time. Another cogent reason for the small list of vessels to load, is the extremely low rates of freight at present ruling locally for grain cargoes to Europe. The market price here for the Australian product being so low, shippers can only afford to pay a very meager freight rate, hence sailing vessels there must seek some other port for business. The only profitable feature now existing, is fuel for domestic uses. Every possible device is being studied out by oil producers to substitute oil for household purposes, but so far they have been unsuccessful, as they cannot control the smell and the smoke, besides the increased danger in handling.

Prices.—Current prices for Coast coals to dealers are as follows: Wellington and 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: Cumberland, \$12; Welsh anthracite, \$13; Welsh lump, \$11.50; cannel, \$9; Brymbo, \$7.50; Wallsend, \$6.50. Coke is quoted at \$15 per ton in bulk, and \$17 in sacks.

Foreign Coal Trade. Oct. 22.

No exports are now talked of, and will not be until the settlement of the strike permits trade to resume its normal conditions. The coal ordered in Wales and from the North of England is now beginning to arrive. It is understood that options taken on some large lots of Welsh coal will not be completed, as the supplies will not be needed.

Exports of fuel from Great Britain for the nine months ending September 30 are reported as follows, in long tons:

	1901.	1902.	Changes.
Coal	31,445,472	31,337,020	D. 108,452
Coke	594,058	469,085	D. 124,973
Briquettes	840,450	813,591	D. 26,859
Totals	32,879,980	32,619,696	D. 259,984

In addition to these exports there were sent abroad this year 11,312,237 tons of coal for the use of steamers engaged in foreign trade.

Messrs. Hull, Blyth & Co., of London and Cardiff, report under date of October 10, that owing to the

continued demand from America and the strike of the French miners, the Welsh coal market is now extremely firm for all descriptions of coal. Drys are in great request. Quotations are: Best Welsh steam coal, \$4.32@4.44; seconds, \$4.26; thirds, \$4.02; dry coals, \$4.56; best Monmouthshire, \$3.60@3.78; seconds, \$3.54; best small steam coal, \$2.88; seconds, \$2.52; other sorts, \$2.28.

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

The general tone of the freight market is steady and rates show little quotable change. Some rates quoted from Cardiff are: Marseilles, \$1.20; Genoa, \$1.20; Naples, \$1.26; Singapore, \$3.36; Las Palmas, \$1.62; St. Vincent, \$1.80; Rio Janeiro, \$2.64; Santos, \$2.88; Buenos Ayres, \$2.52.

IRON TRADE REVIEW.

New York, Oct. 22.

Production, especially of pig iron, is being seriously reduced by the difficulties of transportation. A short supply of cars and motive power is making deliveries of coke very slow, and many furnaces have been obliged to bank their fires. In the Mahoning and Shenango valleys the rate of production for the present time is estimated at from 40 to 50 per cent below the normal figure. The railroad blockade is also preventing delivery of finished materials, and the situation is not a pleasant one for manufacturers. There is no present prospect of relief, since the opening of the anthracite mines will call off a number of cars which have been temporarily loaned to the railroads in western Pennsylvania and Ohio.

Foreign importations continue to relieve the pressing demand for pig iron and steel billets in the East and quotations for Scotch and Middlesboro iron are now given in markets as far west as Pittsburg. The labor troubles in the Alabama District have been settled, and there is nothing new to check the output in that region.

Finished material continues to be in steady demand, although there is somewhat of a halt in the placing of contracts for delivery for the latter part of next year.

Birmingham. Oct. 20.

(From Our Special Correspondent.)

The pig iron market conditions in Alabama look more favorable now than they have been for several weeks, though several furnaces still have fires banked or are out of blast entirely. The strike of coal miners caused the Tennessee Coal, Iron and Railroad Company to bank the fires at no less than four furnaces, while two others will undergo repairs. It is hoped, however, that before the end of this week the furnaces will be in full blast again. The Sloss-Sheffield Steel and Iron Company last week was compelled to blow out one of its North Birmingham furnaces for repairs, and it will be about November 1 before it will be in condition to resume operation. The Lacey-Buck Company was compelled to shut down its Trussville furnace because of an injury to the blowing engine. Almost all the companies in this district are behind in their orders. The Williamson Iron Company will blow in its little 75-ton-a-day furnace about the last of the week. The Tennessee Company's Oxmoor furnace is only slowly approaching completion.

There is very little iron being sold, except for delivery after March of next year. There is but little spot iron to be secured, and a flat price of \$25 per ton is being asked for it. Regular quotations are strong, and appear to be fixed for at least the first half of next year.

The Southern Iron Committee, which is composed of the various railroads in the Southern territory, held a special meeting in Birmingham during the past week and listened to a request of iron manufacturers, and took off the increase in iron freight rates, stipulated on September 1. The furnace companies made a showing that they were behind in their orders, and that they could not afford the additional rate. The Southern Iron Committee will assist the furnace companies in protecting their shipments to be made this year, and before any advance in rates will be made another meeting will be held.

The following quotations are given: No. 1 foundry, \$20@21; No. 2 foundry, \$20; No. 3 foundry, \$18@19; No. 4 foundry, \$16@18; gray forge, \$16@17; No. 1 soft, \$20@21; No. 2 soft, \$20.

There is still a strong demand for finished iron and steel, and the rolling mills are in steady operation. The Birmingham rolling mills, belonging to the Republic Iron and Steel Company, were damaged quite a little by fire, which destroyed one or two of the buildings. Some of the machinery was injured, but after a week's idleness, the burnt timber was removed and the machinery started up in the open air, the men being willing to go back to work at once. The sheet mill department of this plant, after an idleness of seven weeks, was also put in blast again and

more men are being given employment at these mills than ever before. The product of the rolling mills is in strong demand at good prices. The machine shops and foundries in this district are doing the best they can under circumstances. The strike of the machinists is still on. The new men brought in are not proving a big success. Efforts are now being made to bring about a settlement of the strike which has been on for five months. Cast iron pipe foundries in this State are busy, and the production is good. The Tennessee Coal, Iron and Railroad Company is putting up structural works at Ensley.

Chicago Oct. 20.

(From Our Special Correspondent.)

There is hardly any change in the market conditions of the pig iron industry. Southern furnaces are 90 days behind with their orders, and the prospect is not encouraging for their catching up within six months. Northern iron is scarcely to be had; spot lots, which means any iron deliverable within 60 days, command \$26@27.50 for either No. 1 or No. 2. This commodity fluctuates considerably more than usual, because of the uncertainty about the settlement of the coal strike and the effect of such a settlement on trade, and because of the competition of foreign iron. Not so much foreign iron as was hoped for by foundrymen has been coming West, but it has unquestionably affected the market and prevented prices from going skyward. The settlement of strike troubles in the Birmingham District has made Southern iron a little easier, but has not perceptibly affected prices. Quotations to-day are, for delivery in the second quarter of next year: No. 1 Northern, \$24@24.50; No. 2 Northern, \$23.50@24; No. 3 Northern, \$23@23.50; No. 1 Southern, \$24.50@25; No. 2 Southern, \$24@24.50; No. 3 Southern, \$23.50@24.

Coke still continues to be more than double its normal price. Foundry brings \$12@14, and furnace, \$11@12. The situation is perhaps a little easier as regards coke; there is not so much complaint from foundrymen as from furnace proprietors about the high price; the former seem determined to get coke at any price rather than close their foundries.

The car situation is serious; not only are shipments of coke exasperatingly delayed, but iron is becoming accumulated in great quantities because of lack of cars. Additions to equipment by the roads do not seem to help matters at all, so far as the pig iron industry is concerned.

Cleveland. Oct. 20.

(From Our Special Correspondent.)

Iron Ore.—The first advance in the carrying charges on iron ore during the season came during the week, which has just closed. The United States Steel Corporation came into the market the first part of last week and offered 80c. a ton on ore from the head of the lakes to Ohio ports, which was followed the next day by another charter by a smaller shipper of 3 vessels at 85c. from Duluth to Ohio. At the same time the larger shippers conceded the advance to 60c., which the vessel men had been contending for out of Escanaba for the last month or six weeks. The big shippers, however, did not take very kindly to the second increase in rates, and withdrew their wild cargoes from the market, hoping that the freights might sag without the support of the wild cargoes. The grain trade, however, is keeping the freights up. The rates are now 85c. from Duluth; 65c. from Marquette, and 60c. from Escanaba.

Pig Iron.—The market during the week has been rather dull and business slack. The shipments into this territory have been almost entirely from abroad, at least when it comes to supplying the demand in excess of contracts. The home furnaces, struggling under a scarcity of coke, have welcomed the easier times. The prices do not change, being as follows: No. 1 Scotch, \$25.50; No. 2 Scotch, \$24.50, delivered; No. 2 Nova Scotia, \$23.50, delivered; No. 2 foundry, \$23.50 Valley furnace; bessemer for first half delivery, \$23, and for third quarter delivery, \$21 from non-association furnaces; basic, \$20.50 to \$21, for first half delivery. No sales of bessemer or basic will be made for third quarter delivery until the price of coke has been fixed.

Finished Material.—There has been but little activity in the market during the past week, and it seems somewhat like a lull between seasons of intense activity as there are no evidences that the market is tending toward a permanent decline. Plate inquiries have been moderately good, but the larger mills have been able to take no further contracts and have been forced to turn the consumers over to the smaller mills which are booking future orders at 2@2.10c., whereas the association price of 1.60c. prevailed on the sales from the larger mills. The jobbers are also selling for this year's delivery at 2.50c., and are having no trouble getting it. Shapes have been in better demand with both the jobbers and the small mills, busy on orders for this year, while the larger mills are gobbling up all of the business that exists for next year's delivery. The jobbers are commanding from 2.50c. to 3c., and the smaller mills are getting 2.60 to 3c. The larger mills are selling all they can produce at 1.60c.

Pittsburg, thus maintaining rigidly the conservative attitude. Sheets have been weak again, with the mills by no means satisfied with the orders, although the business is in better shape than it was before the decline. Prices continue to be 3.10@3.25c. out of stock for No. 27 black sheets, one pass cold-rolled as a base. Bar prices do not change much nor do the conditions, the demand being fair but not more than the mills can care for. Bessemer steel bars continue to be 1.60c. Pittsburg; open-hearth steel bars, 1.70c. Pittsburg; and bar iron 1.80c., Youngstown. Billets are in fair demand at \$30 Pittsburg.

Philadelphia. Oct. 22.

(From Our Special Correspondent.)

Pig Iron.—All the factors in the iron situation are working toward a steady level of prices. While coke is dear and scarce, and hard coal not to be had for the present, and soft coal in limited supply, there is very little opportunity to give or place or accept orders, and consequently only a trifling amount of business has been done. Our main dependence continues to be on foreign sources to take care of that class of retail trade which is springing up almost daily. Our people have come to consider that they need not be over anxious, and that they can get what they need from abroad. The importers satisfy themselves on this point. Foreign quotations are about, but not always, \$22.50 for low phosphorus, \$21.50 for Scotch No. 3; and \$23.50 for Scotch No. 1; No. 3 Middlesboro at \$21; American foundry irons are nominally \$24 for No. 1, though sometimes higher prices are paid; \$22.50 for No. 2; \$22 for No. 2 plain; for mill irons the prices range from \$20 to \$21, though the latter is an outside figure.

Billets.—The hitch in negotiations for foreign billets continues. Consequently, very little business has been done, and home producers are holding billets at a figure which side track inquiries for the present. Prices range from \$31 to \$33 for American, although it is said that nothing can be had at \$31.

Bars.—Shortage of fuel has bothered several mill men, and is likely to bother them more. The restriction in output naturally tends to keep quotations at the top notch. Steel bars range all the way from 1.80 to 2.10c., depending on date of delivery and size of order.

Plates.—The oversold condition of the plate mills is keeping prices quoted to new buyers at the highest point. It is correct to say that there is a heavy demand, but during the past week the demands do not appear to have materialized into business. Quotations continue at 2.10@2.40c., according to size of orders; universals, 2.10c.; flange, 2.15@2.20c.

Structural Material.—Material arriving here costs about 2.25c.; home mills, 2.50c. There is business coming in a way below this figure, but the reason for it is not apparent; probably it is due to an old understanding upon the part of manufacturers and buyers.

Old Rails.—Old steel rails are wanted at \$22 and old iron rails at \$26.

Scrap.—The scrap situation has not changed unless it is in the more urgent instructions of certain large buyers to their agents to make arrangements for all the scrap that can be had for the winter. Handlers of scrap deny the statement that there is any weakness. Low phosphorus scrap is quoted at \$27; railroad scrap, \$24; heavy steel, \$21.

Pittsburg. Oct. 21.

(From Our Special Correspondent.)

The production of pig iron in the Valleys during the past few days has not been 50 per cent of the normal capacity of the furnaces, and a prediction was made to-day that within a week the majority of the furnaces will be banked. An official of the H. C. Frick Coke Company declared that shipments have never been so bad as last week in the history of the company, and that indications pointed to a still more discouraging record this week. The determination of furnacemen to keep the furnaces in operation is evidenced in the high prices offered for coke. It was decided 30 days ago to start one of the furnaces of the Illinois Steel Company and the Frick Company has had instructions to forward coke to Chicago at the earliest possible date, but so far has been unable to send a car. All shipments now being made are on contracts placed early in the year, and no new business has been taken since July 1. The settlement of the anthracite coal strike will prove serious to the Pittsburg District, as a large number of railroad cars and locomotives will be withdrawn and put in the Eastern coal trade. The freight congestion is almost as bad as during the switchmen's strike last November. The yards and sidings within a radius of several miles of the city are crowded with loaded cars. Although the mills are filled with orders a number likely will be forced to suspend operations in a short time on account of the inadequate transportation facilities. The railroads are doing all in their power to relieve the situation, but it seems to be beyond their control.

Reports of heavy buying of pig iron for next year are not confirmed. There is no doubt that many in-

quiries are being received, but producers hesitate in taking on any more new business until coke prices are fixed. That there will be an advance is certain, and it may be a stiff one, but officers of the leading interest say the matter has not yet received any consideration. The United States Steel Corporation has not ordered the pig iron it will require for the second and third quarters, and it is reliably reported that the matter will not be taken up before the latter part of next month. Several small lots of bessemer pig iron have been sold during the week at higher prices than have ruled at any time this year. Foundry iron is not particularly active, as the foundries are well covered.

The steel market is stronger this week and the report that bessemer billets sold as low as \$29 was disproved yesterday when a large order was placed here at \$31. There is an improvement in the sheet market, and the demand for tin plate is better. Ten idle mills of the Sharon Tin-Plate Company, at Sharon, Pa., were started yesterday. The demand is for spot plates, and no contracts are being made for future delivery, owing to the uncertainty as to prices. The indications point to a heavy consumption next year.

The special convention of representatives of tin-plate workers' lodges of the Amalgamated Association of Iron, Steel and Tin Workers, called to consider the proposition of the American Tin-Plate Company, opened here yesterday. Nearly 100 delegates are in attendance, and the offer will be carefully considered. As already told, the tin-plate combine will be able to obtain the foreign trade of the Standard Oil Company, and other packing interests, if the workers accept a reduction of 25 per cent in wages. It is hinted that the company may modify its demand to 15 per cent. At the opening there was a strong sentiment against entertaining the proposition, it being reported through a letter from Wales to a Pittsburg trade paper, that the Welsh tin-plate workers will meet the cut in order to retain the American trade. It was explained that this will be impossible, as a 25 per cent reduction in American wages is equal to a reduction of 75 per cent or more of Welsh wages. According to figures presented, 33 1/2 per cent of the labor cost of tin-plate in this country is equal to the entire labor cost in Wales. Representatives of the American Tin-Plate Company appeared before the convention yesterday afternoon and this morning, and addressed the delegates on the proposition. Independent manufacturers also will have an opportunity to speak on the subject before a vote is taken. The latter are strongly opposed to the efforts being put forward to obtain the export trade. The combine will start a number of its idle mills at once if the offer made is accepted by the convention.

Pig Iron.—Several small sales of bessemer pig iron for delivery this year were made during the week at \$23.75, Valley furnaces. For the first quarter, \$22 is quoted and \$21 for the second quarter. Foundry iron is quiet. Small sales of No. 2 have been made at \$24, Pittsburg, for spot shipment, and \$22.50 is quoted for the first half. Gray forge continues at \$21@ \$21.50, Pittsburg, for any delivery.

Steel.—The steel market shows a decided improvement. A contract for 400 tons of bessemer steel billets was closed yesterday at \$31, delivered at Pittsburg. Plates are stronger, and for spot shipment 2c. has been paid. While the pool price remains at \$1.60c. no new business for delivery within 3 months is accepted at less than \$1.85c.

Sheets.—There is a continued good demand for sheets since the cut of \$5 a ton was made by the leading producer. No. 28 gauge is quoted at \$2.75c., and galvanized sheets at 75 and 10 per cent off.

Ferro-manganese.—There is no change in prices, the foreign product still being held at \$51@ \$51.50.

New York. Oct. 23.

Pig Iron.—The resumption of anthracite shipments is going to help Eastern furnaces. Demand is not urgent, and in this market urgent needs are supplied by imports. 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, \$23@ \$23.50; No. 2, \$22@ \$22.50; No. 3, \$21.25@ \$22. Foreign pig is quoted at \$21@ \$25.

Bar Iron and Steel.—Better fuel supply has come to the relief of Eastern mills. Demand is good. We quote for large lots on dock: Refined bars, 2@ 2.05c.; common, 1.90@ 1.95c.; soft steel bars, 2@ 2.10c.

Plates.—The market is firm. Two or three Eastern plants that closed down part of their works on account of the high price of coal are resuming again. 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@ \$35, according to weight. Relaying rails are \$28@ \$30 for heavy sections and \$33@ \$35 for light sections.

Structural Material.—Some large contracts are re-

ported taken at New England points. 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.

CHEMICALS AND MINERALS.

(See also wholesale prices on page 570.)

New York, Oct. 24.

New contracts are still being made at rather low prices, and in one or two instances sellers offer 1904 deliveries at a discount. Apparently importers of heavy chemicals anticipate increased competition with domestic producers. Certainly the American chemical industry is broadening, and the time does not seem far distant when we shall manufacture most of the chemicals that we are now obliged to import. Undoubtedly the development of new electrolytic processes is bringing about this change. Two obstacles confront the foreign manufacturer who seeks business with this country, namely, high transportation rates and the tariff. Besides many European works are operating on antiquated methods which makes production costly, and prevents a cut in selling prices when competition is keen.

On the other hand, it is gratifying to note the improvement that is supporting our chemical export trade, notably in acids and pot, and pearl ashes. Some of this business has been done in markets where British and German manufactures had been consumed exclusively.

Heavy Chemicals.—Conditions are identically the same as last week, excepting perhaps prices have stiffened a little, as most of the large consumers have already placed their contracts for next year. Bleaching powder continues to perplex the trade, as sellers are offering 1904 deliveries at \$1.12 1/2, and it is believed at slightly less. No difference is made in make, Liverpool and American selling on the same basis. Over 1903 a few more contracts have been taken at \$1.15@ \$1.25 for prime brands. The whole situation looks hazy, and judging from the low prices that have been made public, consumers can make contracts at their own figure. On the other hand, it looks as though makers' profits on future business have been severely cut, so that it would not be surprising to hear of the suspension of some old style works.

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 \$1.80@ \$1.87 1/2 for futures; bicarb. soda, ordinary, \$1, and extra, \$3; sal soda, 60@ 65c.; chlorate of potash crystals, \$7.50@ \$7.75 for immediate shipment, and \$7@ \$7.25 for contracts. 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 \$7.00@ \$7.25 for forward; bleaching powder, prompt, prime brands, Liverpool, \$1.75; Continental, \$1.55@ \$1.65; contracts at \$1.12 1/2@ \$1.25, according to seller and time of delivery.

Acids.—Scarcity of fuel is cutting down production of sulphuric and some other acids. No radical change in consumption is noted, as industrial activity has also suffered from lack of sufficient fuel. This situation will soon change, however, as labor difficulties are being adjusted, and the coal supply will be replenished in the near future. Meantime, acid deliveries are moderate, and prices firm. Blue vitriol attracts attention, as jobbers are freer sellers at less than makers' quotations. The exports of blue vitriol from New York in September amounted to 148,076 lbs., making a total of 23,417,168 lbs. for the 9 months. This is 13,827,623 lbs. less than was exported in the corresponding 9 months last year, the decrease being due largely to the smaller consumption in Italian and Austrian vineyards.

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.....	\$4.60@ \$4.75	Oxalic com'l.....	\$6.00@ 6.37 1/2
Muriatic, 18 deg.	1.50	Sulphuric, 50 deg.	.....
Muriatic, 20 deg.	1.62 1/2	" " " " "	13.50@ 15.50
Muriatic, 22 deg.	1.75	Sulphuric, 60 deg.	1.05
Nitric, 36 deg.	4.00	Sulphuric, 66 deg.	1.20
Nitric, 38 deg.	4.25	" " " " "	18.00@ 20.00
Nitric, 40 deg.	4.50	Sulphuric, 66 deg.	1.20
Nitric, 42 deg.	4.87 1/2	" " " " "	21.00@ 23.00

Brimstone.—The firmer ocean freight rates from Sicily have strengthened brimstone prices. Best un-mixed seconds on spot hold at \$23.50@ \$23.75 per ton, and shipments at \$22.75@ \$23. Thirds continue about \$1.75 less than seconds.

Pyrites.—Consumption is moderately active and prices are strong. It is learned that the Virginia-Carolina Chemical Company, the Southern fertilizer combination, is enlarging its holdings of pyrites land in Georgia. The company's Durgy mines, on the line of Carroll and Douglas counties, Georgia, are working steadily. It is noteworthy that this company, since its organization has secured control of considerable land producing the raw materials used in the

manufacture of fertilizers, and now intends to develop its sulphur mine in Mexico, which was optioned two or three years ago.

An arrival of 3,591 tons Spanish iron pyrites is noted at New York.

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 46 to 51 per cent of sulphur; American, from 42 to 44 per cent.

Nitrate of Soda.—Since the conclusion of the coal strike there is more demand, and although arrivals have been heavy, prices are very firm and tend upward. Spot New York is held at \$1.87 1/2 per 100 lbs.; Baltimore and Philadelphia, \$1.90. Arrivals in January, February and March are quoted at \$1.95, while futures—June to December—are offered at \$1.85. The coast and European markets show no prospect of any immediate decline, owing to the scarcity of nitrate as a result of a curtailed production assisted by a shortage in the labor supply.

The statistical position of nitrate of soda in Europe in the 9 months ending September 30 compares with the corresponding period last year, as follows, in tons:

	1901.	1902.	Changes.
Exports to Europe.....	659,839	735,973	I. 76,134
Imports, Europe.....	959,630	834,210	D. 125,420
Deliveries, Europe.....	1,038,080	909,650	D. 128,430
Vis. Sup'y, Oct. 1, Europe.....	105,929	98,407	D. 7,522
Vis. Sup'y, Oct. 1 for Eur.	377,240	415,240	I. 38,000

Notable changes this year were a decrease of 12.3 per cent in deliveries, and an increase of 10 per cent in the visible supply on October 1.

Sulphate of Ammonia.—Gas liquor 24@ 25 per cent, sells on spot at \$2.97 1/2@ \$3 per 100 lbs., while shipments are being booked at \$2.95@ \$2.97 1/2, according to position.

Phosphates.—Consumers hear rumors that competition is sharpening among miners, and that lower prices may be had on future contracts. The reductions already made bring the schedule of prices much below last year, and should this policy continue into 1903 phosphate mining profits will become so small that only very rich deposits can be worked. Another element that has unsettled the industry is the increased purchases of phosphate land by the big fertilizer combinations. Already some of the best properties are controlled by these concerns, and as they are the largest consumers in this country, individual miners must depend on foreign markets.

In Tennessee phosphates business is growing, and much development work is being carried on. Property that was discovered several years ago is now being opened, as the demand for Tennessee rock has broadened both at home and in Europe. Unfortunately the depression in other phosphates has softened prices abroad, but at home the schedule is little altered.

South Carolina phosphates are in moderate demand, and occasionally a lot is sent abroad. In September 6,250 tons were shipped from Beaufort to France, and 5,160 tons to England. Prices are low, and fluctuate with the Algerian grades with which South Carolina phosphates compete.

Phosphates.	Per ton F. o. b.	United Kingdom or European Ports.	
		Unit.	Long ton.
*Fla. hard rock (78@80%)..	\$6.50@ \$7.00	6% @ 6 1/2 d.	\$10.07@ 10.27
*Fla. land pb. (68@73%)..	3.00@ 3.25	4% @ 5 d.	6.65@ 7.00
†Tenn., (78@82%) export..	3.25@ 3.50	5 1/2 @ 6 d.	8.58@ 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.....	3.25	4 1/2 @ 5 d.	5.67@ 6.30
‡So. Car. river rock.....	2.75@ 3.00	.....	.....
Algerian (63@68%).....	.....	5 1/2 @ 6 1/2 d.	7.15@ 8.13
Algerian (58@63%).....	.....	5 @ 5 1/2 d.	6.00@ 6.80
Algerian (53@58%).....	.....	4% @ 5 d.	5.32@ 5.58

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

METAL MARKET.

New York, Oct. 22.

GOLD AND SILVER.

Gold and Silver Exports and Imports.
At all United States Ports in September and Year.

Metal	September.		Year.	
	1901.	1902.	1901.	1902.
Gold:				
Exports.....	\$163,362	\$514,501	\$32,680,569	\$30,980,751
Imports.....	11,905,431	3,012,385	35,400,042	22,937,72
Excess, I. \$11,742,069	E. \$2,497,864	E. \$2,719,473	E. \$8,043,064	
Silver:				
Exports.....	4,934,683	4,635,803	41,487,929	35,580,539
Imports.....	2,185,227	2,397,640	22,491,144	18,702,077
Excess, E. \$2,639,456	E. \$2,238,163	E. \$18,996,785	E. \$16,878,462	

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 October 22, and for years from January 1.

Period.	Gold.		Silver.		Total Excess, Exports or Imports.
	Exports.	Imports.	Exports.	Imports.	
Week ...	\$200,000	\$40,696	\$546,225	\$3,452 E.	\$702,077
1902 ...	24,722,116	3,394,547	20,980,629	942,651 E.	41,445,549
1901 ...	26,108,329	4,055,363	25,524,100	3,146,985 E.	44,430,281
1900 ...	36,631,708	4,839,872	32,440,473	3,930,651 E.	60,301,153

The gold exported went to Cuba, and the silver chiefly to London. Imports were from Central and South America.

Financial Notes of the Week.

General business shows somewhat improved conditions, in view of the closing of the anthracite strike. In New York money continues high, and speculation is correspondingly depressed.

The statement of the New York banks, including the 59 banks represented in the Clearing House, for the week ending October 18, gives the following totals, comparison being made with the corresponding weeks of 1901 and 1900:

	1900.	1901.	1902.
Loans and discounts ..	\$797,849,200	\$874,939,200	\$865,450,800
Deposits ..	846,432,800	945,114,100	863,125,800
Circulation ..	30,431,300	31,376,700	37,856,100
Specie ..	156,654,200	181,941,900	154,112,000
Legal tenders ..	57,901,700	69,802,400	67,277,700
Total reserve ..	\$214,555,900	\$251,744,300	\$221,389,700
Legal requirements ..	211,608,200	236,278,525	215,751,450
Balance, surplus...	\$2,947,700	\$15,465,775	\$5,608,250

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.	\$181,941,900	.....	\$154,112,000	.....
England	185,885,645	.....	170,595,175	.....
France	470,399,825	\$219,054,220	509,331,435	\$221,190,535
Germany	154,920,000	60,250,000	162,555,000	60,125,000
Spain	70,025,000	84,475,000	71,480,000	96,750,000
Neth'lds	28,776,500	28,454,500	23,450,000	32,133,000
Belgium	15,208,335	7,601,665	15,713,335	7,856,665
Italy	79,725,000	9,842,500	80,400,000	10,264,000
Russia	331,910,000	29,580,000	357,525,000	33,890,000

The returns of the Associated Banks of New York are of date October 18 and the others October 16, 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 continues dull, chiefly on account of limited demand for the East.

The United States Assay Office in New York reports receipts of 58,000 oz. silver for the week.

Shipments of silver from London to the East for the year up to October 9 are reported by Messrs. Pixley & Abell's circular as follows:

	1901.	1902.	Changes.
India	£6,172,910	£4,942,630	D. £1,230,280
China	590,212	162,500	D. 427,712
The Straits	296,034	440,070	I. 144,036
Totals	£7,059,156	£5,545,200	D. £1,513,956

Receipts this week were £251,000 from New York, and £5,000 from Australia; total £256,000, all bar silver. Shipments were £143,460 in bar silver to India.

Indian exchange continues steady, and the Council bills offered in London were sold at an average of 15.96d. per rupee. The demand for silver on Indian account remains light. It is not probable that the Indian Government will buy any silver for coinage before the close of the year.

Exports of gold from the port of San Francisco in September were: Hongkong, \$5,480; Japan, \$210,150; total, \$215,630. This gold was all of domestic origin. Exports of silver for the month were:

	DOMESTIC	FOREIGN	TOTALS
Philippine Islands	.....	\$137,000	\$137,000
Hongkong	\$463,300	\$259,858	\$703,258
TOTAL	\$463,300	\$396,858	\$860,258

The foreign silver was chiefly in the form of Mexican dollars.

Prices of Foreign Coins.

	Bid.	Asked
Mexican dollars	\$0.42	\$0.42
Peruvian soles and Chilean pesos	38 3/4	42
Victoria sovereigns	4.88	4.88
Twenty francs	3.85	3.88
Twenty marks	4.74	4.80
Spanish 25 pesetas	4.78	4.82

MISSOURI ZINC ORE MARKET.

Joplin. Oct. 18.

(From Our Special Correspondent.)

The price of zinc ore is again advancing. There has been a general clean up of all of the ore of the district. The highest price paid was \$40 per ton for the output of the Doogin Diggings, an increase of \$1 a ton over the price paid the week before. The Carnegie ore from the adjoining lease brought \$39 per ton. The assay price increased and, although very little ore was sold on an assay basis, there was none sold for less than \$35 per ton for 60 per cent zinc. Lead was quoted all the week at \$49 per ton, but it is known that sales were made at \$50, and a higher figure is anticipated. During the corresponding week of last year the zinc shipments were larger by 1,265,110 lbs., the lead sales were larger by 77,920 lbs., but the value was less by \$23,097. Following are the sales from the various producing camps for the week ending October 18:

Camps.	Zinc, lbs.	Lead, lbs.	Value.
Joplin	2,812,860	466,350	62,163
Galena-Empire	1,267,440	186,250	23,357
Carterville	1,762,170	389,340	39,593
Spurgeon	186,530	21,830	2,151
Aurora	794,890	5,550	12,794
Cave Springs	165,070	.....	2,765
Duenweg	529,900	29,130	10,251
Prosperity	257,960	29,080	5,963
Oronogo	146,390	7,030	2,726
Neck City	227,170	.....	4,203
Zincite	173,050	6,010	3,350
Carl Junction	419,220	.....	7,965
Wentworth	46,130	.....	784
Granby	410,000	37,000	5,595
Gillam	52,000	.....	780
District	9,243,180	1,117,570	\$138,846
Total 42 weeks	435,309,920	52,192,740	\$7,749,827

Zinc value, week, \$155,274; lead, \$28,572. Zinc value, 42 weeks, \$6,569,025; lead, \$1,180,802.

OTHER METALS.

Daily Prices of Metals in New York.

October	Silver			Copper			Spelter		
	Steeling Exchange	N. Y. Cts.	London, Pence.	Lake Cts. per lb.	Electrolytic cts. per lb.	London, £ per ton.	Lead per lb.	N. Y. Cts.	St. L. Cts.
17	4.85 3/4	50 3/4	23 1/2	11 3/4 @ 11 1/2	11 3/4 @ 11 1/2	52 3/4	20 3/4 @ 4.05	5.35 @ 5.40	5.15 @ 5.25
18	4.85 1/2	50 3/4	23 1/2	11 3/4 @ 11 1/2	11 3/4 @ 11 1/2	27	4.05 @ 4.10	5.35 @ 5.40	5.15 @ 5.25
20	4.85 1/2	50 3/4	23 1/2	11 3/4 @ 11 1/2	11 3/4 @ 11 1/2	52 3/4	4.05 @ 4.10	5.35 @ 5.40	5.15 @ 5.25
21	4.86	50 3/4	23 1/2	11 3/4 @ 11 1/2	11 3/4 @ 11 1/2	52 3/4	4.05 @ 4.10	5.35 @ 5.40	5.15 @ 5.25
22	4.86	50 3/4	23 1/2	11 3/4 @ 11 1/2	11 3/4 @ 11 1/2	27	4.05 @ 4.10	5.35 @ 5.40	5.15 @ 5.25
23	4.86	50 3/4	23 1/2	11 3/4 @ 11 1/2	11 3/4 @ 11 1/2	52 3/4	4.05 @ 4.10	5.35 @ 5.40	5.15 @ 5.25

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 firmer tendency reported last week made further progress, but at the close the market settled back into dullness, and it seems as though the buying fever had spent itself for the moment. While production is quite up to the mark, consumption in all lines is also reported as being satisfactory. At the close we quote, for Lake Copper, 11 3/4 @ 11 1/2 c.; for electrolytic in cakes, ingots or wirebars, 11 1/2 @ 11 c., with cathodes 11 1/4 @ 11 c.; casting copper, 11 3/4 @ 11 1/2 c.

The London market for standard copper, which closed last week (Friday) at £52 15s., opened on Monday at £52 12s. 6d., and the closing quotations on Wednesday are cabled as £52 7s. 6d. @ £52 10s. for spot and £52 12s. 6d. @ £52 15s. for three months prompt. Statistics for the first half of October show an increase in the visible supplies of 700 tons.

Refined and manufactured sorts, we quote: English tough, £55 15s. @ £56; best selected, £56 5s. @ £56 10s.; strong sheets, £68 15s.; India sheets, £67 5s.; yellow metal, 6 3/4 @ 6 1/2 d.

Exports of copper from New York in the week ending October 21 were: Great Britain, 252 tons; Germany, 151; Holland, 602; Austria, 310; France, 480; Italy, 55; Sweden, 10; Panama, 23; total, 1,883 tons. Imports were 59 tons copper from Mexico and 20 tons from Japan, also 2,871 tons ore from Tilt Cove, and 138 tons from Great Britain.

Tin has again displayed some strength, and values show a considerable advance over those of last week. The demand has been very good indeed, spot tin having become rather scarce and commanding a premium. At the close, we quote spot 27 @ 27 1/4 c.; October, 26 3/4 @ 27 c.; November, 26 1/2 @ 26 3/4 c.; December, 26 1/4 @ 26 1/2 c.

The foreign market, which closed last Friday at £119 15s., opened on Monday at £121 10s., and on

Tuesday advanced to £121 15s. The closing quotations on Wednesday are cabled at £119 10s. @ £119 12s. 6d. for spot, and £118 @ £118 2s. 6d. for three months prompt.

Exports of tin from the Straits for the 8 months ending August 31 are reported as follows, in long tons of 2,240 lbs.:

	1901	1902	Changes
United States	12,552	13,132	I. 580
Great Britain	16,614	17,032	I. 418
European Continent	3,853	4,964	I. 1,111
India and China	1,856	1,122	D. 734
Totals	34,875	36,250	I. 1,375

The total increase this year was 3.9 per cent. A considerable part of this was in shipments direct to United States ports.

Lead is steady without any special feature. The ruling quotations are 3.97 1/2 @ 4.05c., St. Louis, and 4.05 @ 4.10c., New York.

From Europe a somewhat better inquiry is reported, Spanish lead being quoted £10 13s. 9d. @ £10 15d., and English lead 2s. 6d. higher.

St. Louis Lead Market.—The John Wahl Commission Company telegraphs us as follows: Lead continues uninteresting. Missouri brands are selling in a reasonably free way at 4c. per lb., while desilverized lead is in only light request at 4.05c.

Spelter has been somewhat irregular throughout the week, but there has been a very good consumptive inquiry. It is reported from the West that the works at Cherryvale, Kansas, have been damaged by fire. The closing quotations are 5.15 @ 5.20c. St. Louis, and 5.35 @ 5.40c. New York.

The foreign market is steady, good ordinaries being quoted £19 5s. and specials 5s. higher.

St. Louis Spelter Market.—The John Wahl Commission Company telegraphs us as follows: Spelter is strong and very sensitive. Fire has destroyed four blocks of the Cherryvale Zinc Works at Cherryvale, Kansas, meaning practically 1,000 tons per month less spelter produced during the next three months. This is causing momentarily quite a little stir, and the latest sales are on basis of 5.20c., East St. Louis, with a fair probability of a further advance in the near future.

Antimony is dull and neglected, at 9 @ 9 1/2 c. for Cookson's; 7 1/2 @ 7 3/4 c. for Hallett's; 7 1/4 @ 7 1/2 c. for Hungarian, Japanese 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 1/2 c. 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.

Exports of quicksilver from the port of San Francisco in September are reported as follows: Mexico, 15,885 lbs.; Honduras, 4,590 lbs.; Hongkong, 76,500 lbs.; total, 96,975 lbs., or 1,268 flasks.

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

	Per lb.	Per lb.	
Aluminum	.....	.....
No. 1, 99% ingots	33 @ 37c.	Ferro-Tungsten (37%)	25c.
No. 2, 90% ingots	31 @ 34c.	Magnesium	\$2.75
Rolled Sheets	4c. up	Manganese, pure (N. Y.)	60c.
Alum-bronze	20 @ 23c.	Manganese Cop. (20% Mn)	32c.
Nickel-alum	33 @ 39c.	Manganese Cop. (30% Mn)	35c.
Bismuth	.....	Molybdenum (Best)	\$1.83
Chromium, pure (N. Y.)	80c.	Phosphorus	45c.
Copper, red oxide	50c.	American	70c.
Ferro-Molyb'dum (50%)	\$1.25	Sodium metal	50c.
Ferro-Titanium (10%)	90c.	Tungsten (Best)	62c.
Ferro-Titanium (20 @ 25%)	.....	
N. Y.)	55c.		

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

Average Prices of Metals per lb., New York.

Month.	Tin.		Lead.		Spelter.	
	1902.	1901.	1902.	1901.	1902.	1901.
January	28.54	26.51	4.000	4.350	4.27	4.13
February	24.07	26.68	4.075	4.350	4.15	4.01
March	26.32	26.03	4.075	4.350	4.28	3.91
April	27.77	25.93	4.075	4.350	4.37	3.99
May	29.85	27.12	4.075	4.350	4.47	4.04
June	29.86	28.60	4.075	4.350	4.96	3.99
July	28.38	27.85	4.075	4.350	5.27	3.95
August	28.23	26.78	4.075	4.350	5.44	3.90
September	26.60	25.31	4.075	4.350	5.40	4.08
October	.....	26.62	.....	4.350	.....	4.23
November	.....	26.67	.....	4.350	.....	4.29
December	.....	24.36	.....	4.163	.....	4.31
Year	26.54	.....	4.334	.....	.....	4.08

Average Prices of Copper.

Table with columns for Month, New York Electrolytic (1902, 1901), Lake (1902, 1901), and 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 for Month, London (1902, 1901), N.Y. (1902, 1901), and Y.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 for Name of Company, Date, Per Share, Total, and Total. Lists various companies and their dividend details.

ASSESSMENTS.

Table with columns for Name of Company, Location No., Delinq., Sale, and Amt. Lists companies and their assessment details.

STOCK QUOTATIONS.

NEW YORK.

Table of stock quotations for New York, listing company names, locations, and prices for various dates from Oct. 15 to Oct. 21.

Coal, Iron and Industrial Stocks.

Table of stock quotations for Coal, Iron and Industrial Stocks, listing company names and prices for various dates from Oct. 15 to Oct. 21.

Total sales, 492,573 shares.

BOSTON, MASS.*

Table of stock quotations for Boston, Mass., listing company names, locations, and prices for various dates from Oct. 15 to Oct. 21.

* Total sales, 138,569 shares.

PHILADELPHIA, PA. §

Table of stock quotations for Philadelphia, Pa., listing company names and prices for various dates from Oct. 15 to Oct. 21.

§ Reported by Townsend, Whelen & Co., 309 Walnut St., Philadelphia, Pa. Total sales 23,584 shares.

STOCK QUOTATIONS.

COLORADO SPRINGS, COLO.*

Table of stock quotations for Colorado Springs, Colorado, listing companies like Acacia, Alamo, Am. Cons., Anacosta, Ben Hur, Black Bell, Blue Bell, C. K. & N., C. C. Con., Dante, Dr. Jack Pot, Elkon Con., El Paso, Fanny Rawlings, Findley, Gold Bond, Gold Dollar Con., Golden Cycle, Golden Fleece, Gold Sov'n, Hart, Iron Glad, Isabella, Jack Pot, Last Dollar, Lexington, Little Puck, Mol. Gibson, Moon Anchor, Morning Star, National, Nellie V., New Haven, Pappoose, Pharmacist, Phinacle, Pointer, Portland, Prince Albert, Republic, Rose Maud, Sunset Eclipse, Uncle Sam, Vindicator Con, and Work.

*Colo. Springs Mining Stock Exchange. All mines are in Colorado. Total sales 168,850 shares.

Colorado Springs (By Telegraph.)

Table of stock quotations for Colorado Springs (By Telegraph), listing companies like Acacia, Alamo, Anacosta, Cripple Creek Con., Doctor Jack Pot, Elkon Con., El Paso, Fanny Rawlings, Gold Dollar Con., Golden Fleece, Isabella, Jack Pot, Last Dollar, Mollie Gibson, Moon Anchor, Pharmacist, Portland, and Work.

MEXICO.

Table of stock quotations for Mexico, listing companies like Durango, Guanajuato, Angustias, Pozos, Cinco Senores y An., aviadoras, Luz de Borda, aviadora, San Luis Potosi, Concepcion y An., El Barreno, aviadador, Sta. Maria de la Paz, San Diego y Anexas, Zacatecas, Candelaria y Pinos, San Carlos y Anexas, Sta. Maria de Gaud., Miscellaneous: Bartolome de Medina, Guadalupe Hacienda, La Luz Hac. (Pachuca), La Reina (Chihuahua), Naica (Chihuahua), Natividad (Oaxaca), National (Oaxaca) aviadador, San Francisco Hac., Santa Ana Huantla Morelos, Union Hacienda.

ST. LOUIS, MO.* Oct. 18.

Table of stock quotations for St. Louis, Missouri, listing companies like Am. Nettie, Colo., Catherine Lead, Mo., Central Coal & C., Central C. & C. pf., Central Lead, Mo., Columbia Lead, Mo., Con. Coal, Ill., Doe Run Lead Co., Granite Bimet, Mt., St. Joe Lead, Mo.

TORONTO, ONT. Oct. 21

Table of stock quotations for Toronto, Ontario, listing companies like Center Star, Fairview, Lone Pine, Mt. Lion, North Star, Payne, Rambler-Cariboo, Republic, Van Eagle Con., White Bear, Winnipeg Develop. Co., Can. G. F. S.

*From our Special Correspondent.

Total sales, 7,000 shares.

LONDON.

Oct. 11.

Table of stock quotations for London, listing companies like Anaconda, c. s., Montana, Arizona, pref., ord., Arizona, Cum., pfd., Copiapo, c., Chile, De Lamar, g. s., Idaho, Enterprize, g., British Col., El Oro, g. Mexico, Frontino & Bolivia, g., Colombia, Hall Mg. & Sm., c., British Col., Le Roi, g., British Col., Le Roi No. 2, g., British Col., Montana, g. s., Montana, Stratton's Independence, Colorado, St. John del Rey, g., Brazil, Utah Con., g., (High Boy), Utah, Ymir, g., British Col., European: Linares, l., Spain, Mason & Barry, c., sul., Port g'l., Rio Tinto, c., Spain, Rio Tinto, pref., Spain, Tharsis, c., Spain, Australia and New Zealand: Assoc. Gold Mines, W. Australia, Broken Hill Pr'p. s., N. S. Wales, Great Bo'd'r Pr'p., W. Australia, Hannan's Brownhill, g., W. Australia, Ivanhoe Gold Corp., W. Australia, Kalgurli, g., W. Australia, Lake View Cons., g., W. Australia, Mt. Lyell M. & R. l., c., Tasmania, Mt. Morgan, g., Queensland, Waihi, g., New Zealand, African: Champion Reef, g., Colar Fields, Mysore Gold, Colar Fields, Nundydroog, g., Colar Fields, Ooregum, g., Colar Fields, Ooregum, pref., g., Colar Fields, British S. Africa, chartered S. Africa, Cape Copper, S. Africa, Cape Copper, pref., S. Africa, City and Sub'n (New), g., Transvaal, Crown Reef, g., Transvaal, De Beers Con., d., pref., Cape Colony, De Beers Con., def., Transvaal, Ferraris, g., Transvaal, Geldenhuis Est., g., Transvaal, Henry Nourse, g., Transvaal, Jagersfontein, d., Orange F. S., Jubilee, g., Transvaal, Langlaagte Est., g., Transvaal, Langlaagte, g., Transvaal, Meyer & Charlton, g., Transvaal, Namaqua, c., Cape Colony, Primrose (New), g., Transvaal, Rand Mines, g., S. Africa, Robinson, g., Transvaal.

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

PARIS.

Oct. 2.

Table of stock quotations for Paris, listing companies like Acieries de Creusot, Huta-Bank, la Marine, Anzin, Bolec, Briancas, Champ d'Or, Courrieres, Dombrows, Dynamite Centrale, Escornot-Beyberg, Fraser River, Huanchaca, Laurium, Malfidano, Metaux, Cie. Fran. de, Napthe Baku, Napthe Nobel, Nickel, Penaroya, Rebecca, Salines de France, Salines du Midi, Vieille Montagne.

SALT LAKE CITY.* Oct. 18.

Table of stock quotations for Salt Lake City, listing companies like Ajax, Ben Butler, Bullion, California, Carisa, Century, Con. Mercur, Dalrymple, Eagle & B. Bell, Grand Central, L. Mammoth, Mammoth, May Day, Ontario, San Francisco, Sw. Swansea, Uncle Sam, Victor, West Mt. Glory, Yankee Con.

All mines are in Utah. *By our Special Correspondent. Total sales, 279,857 shares.

SPOKANE, WASH.* Oct. 16

Table of stock quotations for Spokane, Washington, listing companies like American Boy, Ben Hur, Black Trail, Cariboo, McK., Center Star, Gold Ledge, Humming Birds, Giant, Lone Pine, Lucille Dreyfus, Mt. Lion, Morning Glory, Hecla, Quilp, Rambler Cariboo, Republic, San Pol, Snowstorm, Sullivan, Tom Thumb, Trade Dollar.

Total sales 65,000 shares. *Reported by Hunner & Harris.

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	"		.50	Sulphate (Blanc Fixe)	"		.02	Pulverized	"		30.00	Red	"		16.00
Corundum, N. C.	"		.07@.10	BARYTES—				German, com. pulv.	lb.		.01 1/4 @ .01 1/2	Ocher, Am. common	"		9.25@10.00
Chester, Mass.	"		.04 1/2 @ .05	Am. Crude, No. 1	sh. ton		9.00	Best pulverized	"		.01 1/2 @ .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 1/4 @ .03 1/4	Dutch, washed	lb.		.04 1/2
Crushed Steel, f.o.b. Pittsburg	"		.05 1/2	Crude, No. 3	"		7.75	Best pulverized	"		.04 @ .08	French, washed	"		.01 1/2 @ .01 1/4
Emery, Turkish flour in kegs	"		.03 1/2	German, gray	"		14.50	Italian, pulv.	"		.01 1/4	Orange mineral, Am.	"		.07 1/2 @ .08
Grains, in kegs	"		.05 @ .05 1/2	Snow white	"		17.00	GYPSUM—Ground	sh. ton		8.00@8.50	Foreign, as to make	"		.08 1/2 @ .11 1/4
Naxos flour, in kegs	"		.03 1/2	BAUKITE—Ga. or Ala. Mines:				Fertilizer	"		7.00	Paris green, pure, bulk	"		.12
Grains, in kegs	"		.05 @ .05 1/2	First Grade	lg. ton		5.50	Rock	lg. ton		4.00	Red lead, American	"		.05 1/2 @ .06
Chester flour, in kegs	"		.03 1/2	Second grade	"		4.75	English and French	"		14.00@16.00	Foreign	"		.06 1/2 @ .08
Grains, in kegs	"		.05 @ .05 1/2	BISMUTH—Subnitrate	lb.		1.40	INFUSORIAL EARTH—Gr'd.	"		20.00	Turpentine, spirits	gal.		.56 1/2 @ .56 3/4
Peekskill, f.o.b. Easton, Pa., flour, in kegs	"		.01 1/2	Subcarbonate	"		1.65	American best	"		37.50	White lead, Am., dry	lb.		.04 1/2 @ .04 3/4
Grains, in kegs	"		.02 1/2	BITUMEN—"B"	"		.03 1/2	French	"		40.00	American, in oil	"		.05 1/2 @ .05 3/4
Crude, ex-ship N. Y.: Abbott (Turkey)	lg. ton		26.50@30.00	"A"	"		.05	German	"		40.00	Foreign, in oil	"		.06 1/2 @ .09 1/4
Kuluk (Turkey)	"		22.00@24.00	BONE ASH	"		.02 1/4 @ .02 1/2	IODINE—Crude	100 lbs.		2.45	Zinc, white, Am., ex dry	"		.04 1/2 @ .04 3/4
Naxos (Greek) h. gr.	"		26.00	BORAX	"		.07 1/4 @ .07 1/2	IRON—Muriate	lb.		.05	American, red seal	"		.06 1/2
Garnet, as per quality	sh. ton		25.00@35.00	BROMINE	"		.40	Nitrate, com'l	"		.01 1/4	Green seal	"		.07
Pumice Stone, Am. powd.	lb.		.01 1/2 @ .02	CADMIUM—Metallic	"		1.40	True	"		.04	Foreign, red seal, dry	"		.06 1/2 @ .09 1/4
Italian, powdered	"		.01 1/2	Sulphate	100 lbs.		2.00@2.50	Oxide, pure copperas color	"		.05 @ .10	Green seal, dry	"		.06 1/2 @ .09 1/4
Lump, per quality	"		.04 @ .40	CALCIUM—Acetate, gray	"		1.30	Purple-brown	"		.02	POTASH			
Rottenstone, ground	"		.02 1/2 @ .04 1/2	" brown	"		.90	Venetian red	"		.01 @ .01 1/2	Caustic, ordinary	"		.04 1/2 @ .05
Lump, per quality	"		.06 @ .20	Carbide, ton lots f.o.b. Niagara Falls, N. Y., for Jersey City, N. J.	sh. ton		70.00	Scale	"		.01 @ .03	Elect. (90%)	"		.03 1/2
Rouge, per quality	"		.10 @ .30	Carbonate, ppt.	lb.		.05	KAOLIN—(See China Clay.)				POTASSIUM—			
Steel Emery, f.o.b. Pittsburg	"		.07	Chloride	100 lbs.		.70 @ .90	KRYOLITH—(See Cryolite.)				Bicarbonate cryst	"		.08 1/4
ACIDS—				CEMENT—				LEAD—Acetate, white	"		.07 1/4 @ .08	Powdered or gran.	"		.14
Boric, crystals	"		.10 1/2 @ .11	Portland, Am., 400 lbs.	bbl.		1.70@1.90	Brown	"		.08	Bichromate, Am.	"		.08 1/2 @ .08 3/4
Powdered	"		.11 1/4 @ .11 1/2	Foreign	"		1.65@2.25	Nitrate, com'l	"		.06 1/2	Scotch	"		.08 1/2 @ .09
Carbonic, liquid gas	"		.12 1/2	"Rosendale," 300 lbs.	"		.75	" gran.	"		.08 1/4	Carbonate	"		.03 1/2 @ .03 3/4
Chromic, crude	"		.20	Slag cement, imported	"		1.65	LIME—Com., abt. 250 lbs.	bbl.		.80	Chromate	"		.33
Hydrofluoric, 30%	"		.08	CERESINE—				Finishing	"		.90	Cyanide (98@99%)	"		.28
48%	"		.05	Orange and Yellow	lb.		.12	MAGNESITE—Greece.				Kaimit	kg. ton		9.05
60%	"		.11	White	"		.13 1/2	Crude (95%)	lg. ton		6.00@6.50	Manure salt, 20%	100 lbs.		.68
Sulphurous, liquid anhy.	"		.05	CHALK—Lump, bulk	sh. ton		2.50	Calced	sh. ton		17.50@18.00	D'le Manure Salt, 48@53%	"		1.12
ALCOHOL—Grain	gal.		2.47	Ppt. per quality	lb.		.03 1/2 @ .06	Bricks	sh. ton		170.00	Muriate, 80@85%	"		1.83
Refined wood 95@97%	"		.60@.65	CHLORINE—Liquid	"		.30	Am. Bricks, f.o.b. Pittsburg	"		175.00	95%	"		1.88
Purified	"		1.20@1.50	Water	"		.10	MAGNESIUM—				Permanganate	lb.		.09 1/4 @ .10
ALUM—Lump	100 lbs.		1.75	CHROME ORE—				Carbonate, light, fine pd.	lb.		.05	Prussiate, yellow	"		.13 1/2 @ .14
Ground	"		1.80	(50% ch.) ex-ship N. Y.	lg. ton		24.75	Blocks	"		.07 @ .09	Red	"		.36
Powdered	"		3.00	Bricks f.o.b. Pittsburg	M		175.00	Chloride, com'l	"		.01 1/4	Sulphate, 90%	100 lbs.		2.11
Chrome, com'l	"		2.75@3.00	CLAY, CHINA—Am. com., ex-dock, N. Y.	lg. ton		8.00	Fused	"		.20	90%	"		2.14
ALUMINUM—				Am. best, ex-dock, N. Y.	"		9.00	Nitrate	"		.60	Sylvinit	unit		.39 1/2
Nitrate	lb.		1.50	English, common	"		12.00	Sulphate	100 lbs.		.75 @ .95	QUARTZ—(See Silica.)			
Oxide, com'l, common	"		.06 1/2	Best grade	"		17.00	MANGANESE—Powdered,				SALT—N. Y. com. fine	sh. ton		2.00
Best	"		.20	Fire Clay, ordinary	sh. ton		4.25	70@75% binoxide	lb.		.01 1/4 @ .01 1/2	N. Y. agricultural	"		1.50
Pure	"		.80	Best	"		6.00	Crude pow'd.	"		.01 1/4 @ .02 1/4	SALT PETRE—Crude	100 lbs.		3.35 @ 3.87 1/2
Hydrated	100 lbs.		2.60	Slip Clay	"		5.00	75@85% binoxide	"		.01 1/2 @ .02 1/4	Refined	"		4.25 @ 4.62 1/2
Sulphate, pure	"		1.50 @ 2.00	COAL TAR PITCH	gal.		.08	85@90% binoxide	"		.02 1/4 @ .03 1/4	SILICA—Best foreign	lg. ton		10.00@11.00
Com'l	"		1.15 @ 2.00	COBALT—Carbonate	lb.		1.75	90@95% binoxide	"		.03 1/4 @ .05 1/2	Ground quartz, ord.	sh. ton		6.00@8.00
AMMONIA—				Nitrate	"		1.50	Carbonate	"		.16 @ .20	Best	"		12.00@13.00
Aqua, 16°	lb.		.03	Oxide—Black	"		2.26 @ 2.30	Chloride	"		.04	Lump quartz	"		2.50 @ 4.00
18°	"		.03 1/4	Gray	"		2.28 @ 2.40	Ore, 50%, Foreign	unit		.18 @ .19	Glass sand	"		2.75
20°	"		.03 1/2	Smalt, blue ordinary	"		.06	Domestic	"		.30	SILVER—Chloride	oz.		.65
26°	"		.05 1/2	Best	"		.20	MARBLE—Flour	sh. ton		6.00 @ 7.00	Nitrate	"		.85
AMMONIUM—				COPPERAS—in bulk	100 lbs.		.37 1/2	MERCURY—Bichloride	lb.		.77	Oxide	"		.85 @ 1.10
Carbonate, lump	"		.08 1/4	In bbls.	"		.42 1/2	MICA—N. Y. gr'd, coarse	sh. ton		33.00 @ 38.00	SODIUM—			
Powdered	"		.09	COPPER—Carbonate	lb.		.18 @ .19	Fine	lb.		.00 1/2 @ .02	Bichromate	lb.		.06 1/4
Muriatic, grain	"		.05 1/2	Chloride	"		.25	Sheets, N. C., 2x4 in.	"		.30	Chlorate, com'l	"		.07 1/4 @ .08
Lump	"		.08 1/4	Nitrate, crystals	"		.35	3x3 in.	"		.80	Hyposulphite, Am.	100 lbs.		1.60 @ 1.65
Nitrate, white, pure (99%)	"		.12	Oxide, com'l	"		.19	3x4 in.	"		1.50	German	"		1.70 @ 1.90
Phosphate, com'l	"		.09	CRYOLITE	"		.06 1/2	4x4 in.	"		2.00	Peroxide	lb.		.45
Pure	"		.12	EXPLOSIVES—				6x6 in.	"		3.00	Phosphate	"		.02 1/2
ANTIMONY—Glass	"		.30 @ .40	Blasting powder, A.	25 lb. keg		.65	MINERAL WOOL—				Prussiate	"		.11 @ .11 1/2
Needle, lump	"		.05 1/2 @ .06	Blasting powder, B.	"		1.40	Slag, ordinary	sh. ton		19.00	Silicate, conc.	"		.05
Powdered, ordinary	"		.05 1/2 @ .07 1/4	"Rackarock," A.	lb.		.25	Selected	"		25.00	Com'l	"		.01
Oxide, com'l white, 95%	"		.09 1/2	"Rackarock," B.	"		.18	Rock, ordinary	"		32.00	Sulphate, com'l	100 lb.		.75 @ .82 1/2
Com'l white, 95%	"		.12	Judson R.R. powder	"		.10	Selected	"		40.00	Sulphite	lb.		.01 1/4
Com'l gray	"		.07	Dynamite (20% nitro-glycerine)	"		.13	NICKEL Oxide, No. 1	lb.		1.00	Sulphite crystals	"		.02 1/2
Sulphuret, com'l	"		.16	(30% nitro-glycerine)	"		.14	No. 2.	"		.60	SULPHUR—Roll	100 lbs.		1.85
ARSENIC—White	"		.02 1/2 @ .03 1/4	(40% nitro-glycerine)	"		.15	Sulphate	"		.20 @ .21	Flour	"		1.90
Red	"		.06 1/2 @ .07	(50% nitro-glycerine)	"		.16 1/2	OILS—Black, reduced 29 gr.:				Flowers, sublimed	"		2.15
ASPHALTUM—				(60% nitro-glycerine)	"		.18	25@30, cold test.	gal.		.09 1/2 @ .10 1/4	TALC—N. C., 1st grade	sh. ton		13.75
Ventura, Cal.	sh. ton		32.00	(75% nitro-glycerine)	"		.21	15, cold test	"		.10 1/2 @ .11 1/4	N. Y., Fibrous, best.	"		10.20
Cuban	lb.		.01 1/2 @ .03 1/4	Glycerine for vitro, (32-2-10° Be.)	"		.13 @ .13 1/2	Zero	"		.11 1/2 @ .12 1/4	French, best	100 lbs.		1.25
Egyptian, crude	"		.05 1/2 @ .06	FELDSPAR—Ground	sh. ton		8.00 @ 9.00	Summer	"		.09 1/4 @ .09 3/4	Italian, best	"		1.62 1/4
Trinidad, refined	sh. ton		35.00	FLINT PEBBLES—Dan. Best.	lg. ton		14.75	Cylinder, dark steam ref.	"		.08 1/2 @ .10 1/4	TAR—Regular	bbl.		2.30
San Valentino (Italian)	lg. ton		16.00	French, Best	"		11.75	Light, filtered.	"		.14 1/2 @ .17 1/4	Oil barrels	"		2.40
Seyssel (French), mastic	sh. ton		21.00	FLUORSPAR—				Extra cold test	"		.21 1/4 @ .26 3/4	TIN—Crystals	lb.		.22
Gilsonite, Utah, ordinary	lb.		.03	Am. lump, 1st grade	sh. ton		14.40	Gasoline, 86° @ 90°	"		.15 @ .20	Oxide	"		.45
Select	"		.03 1/2	2d grade	"		13.90	Naphtha, crude, 68° @ 72°	bbl.		9.05	URANIUM—Oxide	"		2.25 @ 3.00
BARIUM—				Gravel and crushed, 1st gr	"		13.40	"Stove"	gal.		.12	ZINC—Metallic, ch. pure	"		.07 @ .09 1/2
Carb. Lump, 80@90%	sh. ton		25.00 @ 27.50	2d grade	"		12.40	PAINTS AND COLORS—				Carbonate, ppt.	"</		