

# The Engineering and Mining Journal

WITH WHICH IS CONSOLIDATED "MINING AND METALLURGY."

VOL. LXXIV.

NEW YORK, SATURDAY, DECEMBER 13, 1902.

No. 23.

**THE ENGINEERING AND MINING JOURNAL**  
 ESTABLISHED 1890  
 PUBLISHED EVERY SATURDAY.

261 BROADWAY, NEW YORK.

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

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

**BRANCH OFFICES:**

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

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

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

**ADDRESSES CHANGED WHENEVER DESIRED**

In requesting change of address give OLD as well as new address.

**NOTICE TO DISCONTINUE**

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

**ADVERTISING COPY**

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

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

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

**CONTENTS.**

Editorial Notes .....	775
Lawlessness in Colorado .....	775
Market Conditions .....	776
Sir William Chandler Roberts-Austin .....	777
The Anthracite Coal Strike Commission .....	777
*The Burro Mountain Copper District in New Mexico .....	778
Assay of Lead in Ore .....	779
Committees of the California State Miners' Association .....	779
Hoisting from Great Depths.—III. .... A. M. Robeson	780
Estimation of Phosphoric Acid in Fertilizers .....	781
*Asphalt Deposits of Pike County, Arkansas C. W. Hayes	782
Problems of Labor and Life in Anthracite Mining F. L. Hoffman	783
Gold Stealing in Western Australia .....	784
*"Marauding" in French Guiana .....	785
Ore Dressing in the Slocan District, British Columbia S. S. Fowler	786
Recent Decisions .....	786
Abstracts of Official Reports .....	786
Books Received .....	787
Books Reviewed .....	787
Correspondence .....	788
Questions and Answers .....	788
*The Weber Gasoline Mine Locomotive .....	789
Mechanical Draft Plant for St. Louis Fair .....	789
Some Important Features of Wire Cloth and Screens .....	790
Coal in Siberia .....	790
*Patents .....	790
* Illustrated.	

**DEPARTMENTS**

Assessments .....	804
Chemicals: New York and Foreign .....	802
Coins, Foreign .....	802
Dividends .....	804
Financial Notes .....	801
Industrial Notes .....	794
Markets: Coal, United States and Foreign .....	800
Iron and Steel .....	801
Metals: Gold, Silver, Copper, Tin, Lead, Spelter, Antimony, Platinum, Quicksilver, etc. ....	802, 803
Mining News: United States and Foreign .....	794
Mining Stocks .....	799
Obituaries .....	793
Personals .....	793
Prices—Current .....	806
Schools, Technical .....	793
Societies .....	793
Stock Market Review: United States and London .....	799
Stock Quotations .....	804, 805
Trade Catalogues .....	794

**TO ENGINEERS VISITING NEW YORK.**

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



THE CANADIAN Exchequer Court at Ottawa has decided in the case between the Government and the Dominion Steel Company, that iron conveyed in a molten state from the blast furnace to the converter or open-hearth furnace in the direct process of making steel must be considered as pig iron under the law granting bounties for iron made in Canada. It will be remembered that the Treasury officials withheld the bounty on metal used in the direct process, claiming that it could not be considered pig iron unless actually cast into pigs or similar forms. The court's decision seems to be entirely in accordance with the common sense view of the law and with its real intention.



IN ALL AGES and in all countries where gold is obtained from placer workings it has been found hard to regulate such operations by law so as to prevent the winning of the precious metal by workers who have not a strict regard for the legal rights of owners. The entertaining account given on another page by M. Levat shows that French Guiana is in some sort of paradise for the illicit miner. The "maraudeur" of that country seems to constitute an important element among its workers, and to have a comparatively easy time in conducting his illegal operations. The system of "maraudage" is especially favored by the conditions of a tropical country, a large part of which has been but little explored, and which is very imperfectly mapped out or known. The temptation to a miner to work on his own account is very strong; especially as many of the mining concessions are held by companies which own nominally large areas which they work very imperfectly, or more often not at all, preferring to hold them for a possible future sale. The suggestion that improvement in the mining laws is needed seems to make itself, as the author says, in this case.



THE MINNESOTA iron mines are closing their season, though a few on the Mesabi Range are still shipping, but will be through before this is printed. The total from the State is about 15,500,000 gross tons for the season. Up to December 1 it was 15,273,000 tons, as against 10,776,000 to the same time last year, and December shipments will be greater this year than last, so that

the difference will exceed 5,000,000 gross tons. This is a total whose importance can scarcely be realized, and whose enormous increase over the preceding emphasizes the possibilities of the Mesabi Range in a notable manner. The expectations are for another large gain in 1903. Indeed, if all the new mines carry out their present plans there will be another increase as great as that of this year, but, of course, such a growth is not to be expected nor desired. It must be remembered also that all the increase expected for the coming year is not to be from new mines; several of the old ones will be shipping much larger quantities than they have this year, and from the majority there will be an additional tonnage, if it is desired. Of the total shipments this year about 2,050,000 tons came from the Vermilion and 13,500,000 tons from the Mesabi Range.



CONDITIONS IN LAKE freights have been somewhat different this season from any previous one, owing to the close control of the business in iron ore by the Pittsburg Steamship Company, one of the organizations controlled by the United States Steel Corporation. The season closes with a quiet freight market, so far as ore is concerned, the Pittsburg Company having seen to that. In the matter of other freights the situation has suddenly become strenuous as the season approaches its close. Wheat shippers bid 3 cents a bushel for and can get no boats, for the reason that a very large proportion of the biggest ships will winter in Duluth. Coal shippers into the Northwest have just agreed to pay \$1 a ton for the delivery of 100,000 tons of anthracite at the head of Lake Superior before the close of navigation, the Pittsburg Steamship Company being the contracting party. It is a little singular, and is a tribute to the management of this company, that it has been able to hold down outside vessel-men all the year, when it was buying ore tonnage, and that as soon as it has tonnage to sell it is able to get a price three-fold higher than the outside vessel men have secured. It is able to get this high price for coal, and to take this large late contract at all, only from the fact that it will winter a large part of its fleet at Duluth, other vessel-men not having been in the habit of doing so, and not being ready to make a change in their methods. There is absolutely no reason why ships should not winter at the head of Lake Superior as well as at the foot of Lake Erie; indeed, in the former case, they are in better position to get a paying trip with the opening of navigation than in the latter, where they usually have to make their trip up in ballast.



**LAWLESSNESS IN COLORADO.**

Contempt for the law is the enemy of industrial development and a veritable quicksand under the foundations of that many-storied structure which represents our modern civilization. The marvellous

progress of the English-speaking countries is traceable to that spirit of fair play which in its ultimate application is equally opposed both to the intelligent tyranny of the few and the unintelligent terrorism of the many. Any community which does not safeguard the claims of fair treatment between man and man as embodied in the laws which it has itself enacted will inevitably suffer not only in that moral well being which is indefinable but also in that commercial prosperity which is measured in appreciable units.

Such are the conclusions prompted by the review of the course of events which once more have in an unhappy way drawn attention to the condition of a certain portion of the Colorado mining region. Recent developments have been of better augury for the future. The tragedy of Arthur Collins' assassination appears to have awakened the better element in the population of Colorado to a realization of the ruffianism which has been so long rampant at Telluride. In his effort to maintain order at the mines under his charge and to insist upon the recognition of the law, Arthur Collins had the co-operation of one or two loyal friends among the neighboring mine managers, but he received only a half-hearted support from his fellow citizens in the county of San Miguel and no support whatever from the authorities of the State of Colorado. Nor was there any vindictiveness in his way of doing it; brave to a fault he was and careless of personal safety, but not overbearing—quite otherwise—and even when he lay in the agonies of his terrible wounds, caused by the perforation of all the vital organs by buckshot, he never flinched nor did he once speak of a revenge upon the coward who perpetrated the crime.

By the pathos of this brave man's death the community in which he lived has been stung into action. We are glad to learn that the District Court happened to be in session at the time of the tragedy and that two hundred representative citizens of Telluride petitioned the court to appoint a Grand Jury which should investigate: First, the murderous riots of July, 1901; secondly, the "disappearance" of Barney, a deputy sheriff, and of Smith, the foreman of the Liberty Bell Mine, and thirdly, the assassination of Collins. The Grand Jury has been selected, and it has an excellent membership, which promises to make an honest investigation of all these brutal crimes and atrocities. In the meantime the county of San Miguel has offered a reward of \$10,000 and the State has added another \$2,000. Rewards, for arrest and conviction, are however more pretentious than serviceable; the actual employment of the money in the search for the criminals would be more practical.

The Western Federation of Miners, in session at Denver, passed resolutions deprecating the assassination and then made provision for the support of the members of the union at Telluride in case any of the mines should be shut down, as was evidently anticipated. At the same meeting a resolution was passed appointing a deputation to proceed to Mexico and "organize" the miners in that country. This should prove a matter of concern both to the authorities in our neighbor republic and also to those who are interested in Mexican mines. It is known to us that when the riot took place at the Smuggler Union, in July, 1901, a leading engineer, retained by New York capitalists, had recommended

the purchase of a large property in southwestern Colorado, but, on the receipt of the accounts of the murderous affray at Telluride, these gentlemen withdrew from the business and, upon the advice of their engineer, they diverted a half million dollars to operations in Mexico because there at least no labor troubles—so it was thought—could arise.

There is no doubt but that this feature has helped Mexican mining and has attracted American capital, sorely harrassed as it has been in the Coeur D'Alene, at Leadville, in Telluride, and other localities where the labor union have been permitted to tyrannize. Now, it appears that Mexico is to be educated in Austrian-Italian-Slavonic-cum-Irish ideas of liberty—namely, to strike when you please and make everyone else strike, too!

It is gratifying to all who care for Colorado—and they are many, all over the world—to observe that the recent atrocity has incited the better citizens to denunciation of the lawlessness which paved the way for the assassination of an unoffending man. The stock exchanges, the Colorado Scientific Society and other organizations where thoughtful men gather have expressed the sentiment that this last outrageous outbreak against decency and law should not go unnoticed. So far, so good, but we fear that when the excitement has abated the rush of western life and the absorption of active men will cool their interest into indifference, until the tragic episode is forgotten. Must another horror ruffle the serenity of their industrial activity before they realize that life on the edge of a volcano of anarchy does not tend to the equilibrium of business or the well-being of the Community?

Behind all this sporadic lawlessness there is a condition which must be changed before any cure can be permanent. So long as reputable politicians ally themselves to the enemies of social order the latter will be in a position to prevent the enforcement of the law. In July, 1901, when the strikers had attacked the Smuggler Union mine, killed eight inoffensive workmen and driven the others across the range, the State Senator for San Miguel County telegraphed to the Governor of the State advising him not to send the troops, evidently required for the maintenance of order, because "the mine was in peaceable possession of the miners"! A crowd of cowardly ruffians had broken every law, human and divine, had dispossessed the owners of their property, had killed a number of the workmen and had thus obtained "peaceable possession"! The thing would be humorous if it were not monstrous.

At a recent county election the president of the union responsible for these outrages was actually a candidate for sheriff, but was fortunately defeated by a small margin. At the last election the Populist element in the Telluride district placed itself frankly under a Socialistic label and thus completed one more step in that descent which began with the name of an honorable historic political party, descended to populism, dropped into Socialism and has, in action and in spirit, already plunged into the hell of anarchy.

We have no concern with politics in that broad field of mining and metallurgical science which is our particular domain, but it is shutting one's eyes to facts to disregard the relation between these outrages in the mining camps and the political entanglements of disreputable office-seekers at headquarters. Make it a blister on a man's fair name to

win office through truckling to ruffianism and lawlessness in any guise and you will then save a splendid territory from the reputation which it is surely gaining as a consequence of acts such as these to which we have made unwilling reference.



#### MARKET CONDITIONS.

*Iron and Steel.*—The iron and steel markets show little change, production being still unsettled, owing to short supplies of coke and the difficulties in transportation. The clearing up effected by the railroads last week was of some advantage, but matters have been rapidly falling back again almost to the former position. Instead of gaining on their agreed deliveries, the furnaces are steadily falling behind and steel works are suffering in consequence. In some cases premiums have been paid for deliveries of coke, but this has not availed to secure the desired supplies. The weather has been bad, cold and snow interfering with transportation.

New business is comparatively quiet, but this is not at all unusual, as there is always a slack period toward the end of the year. Moreover, people are not inclined to place orders for finished material when the mills are already behind on their contracts and it is quite uncertain when they will catch up.

While foreign iron and steel continues to come in quite freely on orders placed some time ago, reports from abroad show that there is less inquiry for material. This apparent slacking off of American orders, combined with a heavy bear speculation in Scotch and Middlesboro warrants has depressed the British market considerably. Spot warrants have fallen off heavily, and by the latest reports there was a backwardation of nearly 3 shillings per ton on Scotch pig warrants, and nearly as much on Middlesboro. The bulk of the warrants for both descriptions of iron is understood to be in a few hands which has very much facilitated the present speculation for a fall.

*Copper.*—Very little change can be reported in the copper market, which is again comparatively quiet. The demand for supplies which was manifested last week has apparently been satisfied for the present. Meantime, purchasers are not pressing metal for sale and it is pretty well understood that stocks are not large either in the hands of sellers or consumers. In fact, some sellers are not in a position to make very prompt deliveries, while others have little metal ahead. At the close there are, however, a better demand and stronger prices.

*Other Metals.*—Spot supplies of tin continue fair and prices remain about the same. Business is rather slack towards the end of the year and the condition of foreign markets does not encourage hopes of an immediate rise.

Lead continues steady and unchanged with about the usual demand, and no alteration in quotations.

Spelter still continues rather weak and prices are gradually settling towards a point which must be considered somewhat nearer the normal quotation than has prevailed for some time past. The lower prices have improved the buying somewhat.

Silver continues dull and depressed. Sales in London for the East have been very light, this, however, being partly due to the considerable exports made to India direct from New York. Nothing further has been done towards the settlement of the



Chinese matter and a further fall seems to be in prospect.

**Coal.**—The Western coal markets continue to suffer from transportation difficulties. The effort to rush coal up the Lakes to meet the demand of the Northwest has been brought to a sudden close by the extremely cold spell of this week, which, as we write, has probably closed the Sault Ste. Marie River and is putting a stop to shipments. This cold spell has come so suddenly, following a long period of unusually mild weather, that it is to be feared that a number of vessels have been caught in the ice on Lake Superior. Those which have passed the Sault, however, may be able to work their way to Duluth or Ashland.

The close of lake navigation may give slight relief to the local trade by enabling the railroads to turn some of their cars and locomotives into that trade. The demand for coal, however, will be much increased by the weather and it is doubtful whether any improvement in transportation will make up for this change.

The Seaboard bituminous market shows about the same condition as last week, but the cold weather and snow will doubtless interfere with transportation to some extent. It is possible that some of the shoal water ports in the far East will be closed up with their supplies still short of the usual quantity. The demand for bituminous coal in New York, Boston and other eastern cities still continues, as many concerns which have been using this coal on account of the scarcity of the supply of anthracite are apparently inclined to continue. In fact, complaints are made that the steam sizes of anthracite are in excess of the demand and that some stocks are accumulating at different points. There will doubtless be complaints heard during this and next week owing to slow deliveries of bituminous coal at tidewater points.

The difficulty of supplying anthracite has been emphasized by the sudden cold weather. The companies continue to push supplies as rapidly as possible, but complaints are heard on all sides that the amount brought to the cities is not sufficient. Part of this, however, is due to the rush of buyers who desire to secure supplies for some time ahead. In New York, especially, the newspapers have played persistently into the hands of local dealers by "scare-heads" and exaggerated accounts of the scarcity of coal; but the situation is really much better than some of the journals would have us suppose. The market, however, is still far from resuming its normal condition.



#### THE ANTHRACITE COAL STRIKE COMMISSION.

The sessions of the Anthracite Strike Commission, which were resumed on December 3, have been wholly occupied, up to the present writing, by hearing testimony submitted on behalf of the miners. This has related chiefly to questions of wages, average earnings, rental of company houses, and other similar matters; also to the employment of minors in the breakers and elsewhere. While this testimony has its value, and must be heard by the Commission, it cannot be said that any new points have been brought out, or any information secured that has not been accessible before. Some of this testimony, rather sensational in its character, failed entirely on cross-examination.

Apparently this submission of evidence in support of the miners' case will continue for some time yet. It will probably be followed by a summing up before the hearing of the operators' side begins.

There have been reports of further negotiations for some settlement outside of the Commission, but so far there are no facts accessible to show that these are anything more than mere rumors.

#### SIR WILLIAM CHANDLER ROBERTS-AUSTEN.

Sir William Chandler Roberts-Austen, whose death on November 22 in London we noted briefly in a recent issue, was born in 1843. At the age of 18 he entered the Royal School of Mines in London, intending to become a mining engineer. Upon graduating, however, he was offered a position under the late Prof. Graham, then Master of the British Mint, and his life work was done largely in connection with that institution. In 1869, when Prof. Graham died, Mr. Roberts-Austen was made assayer, and in 1882 he was appointed assay master, all the scientific—as distinguished from the mechanical—operations of the Mint being placed under his charges. In 1880 he succeeded Dr. Percy as professor of metallurgy at the Royal School of Mines, still retaining his connection with the Mint.

Early in his work under Prof. Graham he had begun the study of alloys upon which his reputation was largely to rest. In 1888 he gave in a paper the results of a long series of experiments to determine the influence of impurities on the density and extensibility of gold. This called out a long discussion, one of the results of which was the appointment of the Alloys Research Committee of the Institution of Mechanical Engineers; a body which has done some notable work. This committee has made five reports, and a sixth is ready for publication. The first, submitted in 1891, was chiefly concerned with gold and silver and their impurities, continuing Mr. Roberts-Austen's argument, made in the paper above referred to, that the properties of the elements are a periodic function of their atomic weight; but thus early he evolved the cooling curve system in connection with alloys, which has since been developed so advantageously. In the second report of 1893 there was a consideration of more practical metals. The effects of arsenic, antimony, and bismuth on copper were discussed with a view to alloys of merchantable metal, while the thermal behavior of chromium steel was treated. The development of the next two years brought some definite facts on the significance of the freezing points of metals, with cooling curves for electro-iron, and data on the effects of alloying aluminum with iron, copper and nickel. Brasses, coppers and the diffusion of metals were the main points of the 1897 report, with a further consideration of the relation between the melting points of alloys and the atomic volumes of their constituent metals, and as a development of this the freezing-point effect on copper-tin alloys. The fifth report dealt with carburized iron, at a time when interest was directed to the influence of cementation and chilling for the hardening of armor-plates. In this (1899) report various alloys were discussed, and the treatment of low carbon rail steel was considered from many points of view. There remains the final report of the Committee, already prepared; it deals with the annealing of steel in a comprehensive way, and an appendix on the microscopic alloys of copper and tin has already been presented separately to the Institution. The work of the Committee will now be continued in the National Physical Laboratory, for the establishment of which Roberts-Austen was a vigorous advocate; but there can be no question that the research undertaken, and the light it has thrown on the molecular changes in alloys, has already greatly extended their use.

The work demanded considerable resource; and a typical case may be quoted in the introduction of an automatic recording pyrometer. Le Chatelier had invented an instrument for the purpose; but it lacked the important essential of recording autographically the temperatures; and

Roberts-Austen brought photography to his aid for this purpose. This he described in papers at the Iron and Steel Institute in 1891, 1892 and 1893. To the same Institution he read a paper on the rate of diffusion of carbon in iron in 1896, bearing on the same subject as the alloys research work; and while working under the same auspices on carburization, he contributed to the *Proceedings* of the Iron and Steel Institute and to the Royal Society memoirs on the carburization of iron by a diamond. Alloys formed the topic of his British Association lecture in 1889, dealing with the hardening and tempering of steel, which was the means of beginning that long association with Osmond, the great French metallurgical chemist, that has added so much to our knowledge on the question of the thermal treatment of metals.

For the Iron and Steel Institute he made a notable address on the action of projectiles and of explosives on gun tubes, delivered at the Stockholm meeting, which was illustrated by some very remarkable micro-photographs.

Sir William Roberts-Austen rendered service on several Government committees. In 1893 he was chosen to act as chairman of a committee appointed to inquire into the laboratory arrangements of the Customs and Inland Revenue departments. In the same year he served on a committee, appointed by the Secretary of State for India, to consider the best means of utilizing for metallurgical purposes the water power available on the completion of the Periyar Water Works. In 1896 he was a member of the Board of Trade committee, appointed to consider the cause of the deterioration of steel rails in ordinary use. In connection with the committee, he conducted an elaborate research, and furnished a report of great industrial importance. In 1897 he was directed to serve on a committee appointed to consider the desirability of establishing a National Physical Laboratory; and was chosen as a member of a small committee to report on the most suitable steel for ordnance work for the Government.

Many honors, the highest his profession could pay, fell to his lot. He was president of the Iron and Steel Institute in 1899-1901, was elected an honorary member of the Institution of Mechanical Engineers in 1897, and of the Institution of Civil Engineers in 1901. He was one of the founders of the Physical Society of London, of which he was for some time secretary, and afterwards a vice-president, and was an honorary secretary of the British Association for the Advancement of Science. He was elected a Fellow of the Royal Society as early as 1875, and served on the Council. He was also a vice-president of the Chemical Society and of the Society of Arts. He was made a C. B. in 1890, and a K. C. B. in 1899, a D. C. L. of Durham College in 1897, and a D.Sc. of Victoria University, Manchester. He also served on the Government Commission in connection with various exhibitions, Paris, 1889, and Chicago. He was a Knight of the Legion of Honor, and was elected in 1893 a member of the Athenæum Club, "for distinguished eminence in science."

**MANGANESE ORE IN INDIA.**—*Indian Engineering* says: "At present manganese ore is being very largely railed from Tharsa and Kampti stations on the Bengal-Nagpur Railway in the Central Provinces. In both cases the ore is carted from Ramtek, from 12 to 15 miles north of these stations. Very recently good ore has been found near Balaghat on the southern section of the Satpura Railway, and it has been decided to run a short branch to the miners by the Bengal-Nagpur Railway. As the rails have been already laid from Gondia to several miles beyond Balaghat, it is presumed the new mines will be railing ore from their quarries in another three months at the outside."

progress of the English-speaking countries is traceable to that spirit of fair play which in its ultimate application is equally opposed both to the intelligent tyranny of the few and the unintelligent terrorism of the many. Any community which does not safeguard the claims of fair treatment between man and man as embodied in the laws which it has itself enacted will inevitably suffer not only in that moral well being which is indefinable but also in that commercial prosperity which is measured in appreciable units.

Such are the conclusions prompted by the review of the course of events which once more have in an unhappy way drawn attention to the condition of a certain portion of the Colorado mining region. Recent developments have been of better augury for the future. The tragedy of Arthur Collins' assassination appears to have awakened the better element in the population of Colorado to a realization of the ruffianism which has been so long rampant at Telluride. In his effort to maintain order at the mines under his charge and to insist upon the recognition of the law, Arthur Collins had the co-operation of one or two loyal friends among the neighboring mine managers, but he received only a half-hearted support from his fellow citizens in the county of San Miguel and no support whatever from the authorities of the State of Colorado. Nor was there any vindictiveness in his way of doing it; brave to a fault he was and careless of personal safety, but not overbearing—quite otherwise—and even when he lay in the agonies of his terrible wounds, caused by the perforation of all the vital organs by buckshot, he never flinched nor did he once speak of a revenge upon the coward who perpetrated the crime.

By the pathos of this brave man's death the community in which he lived has been stung into action. We are glad to learn that the District Court happened to be in session at the time of the tragedy and that two hundred representative citizens of Telluride petitioned the court to appoint a Grand Jury which should investigate: First, the murderous riots of July, 1901; secondly, the "disappearance" of Barney, a deputy sheriff, and of Smith, the foreman of the Liberty Bell Mine, and thirdly, the assassination of Collins. The Grand Jury has been selected, and it has an excellent membership, which promises to make an honest investigation of all these brutal crimes and atrocities. In the meantime the county of San Miguel has offered a reward of \$10,000 and the State has added another \$2,000. Rewards, for arrest and conviction, are however more pretentious than serviceable; the actual employment of the money in the search for the criminals would be more practical.

The Western Federation of Miners, in session at Denver, passed resolutions deprecating the assassination and then made provision for the support of the members of the union at Telluride in case any of the mines should be shut down, as was evidently anticipated. At the same meeting a resolution was passed appointing a deputation to proceed to Mexico and "organize" the miners in that country. This should prove a matter of concern both to the authorities in our neighbor republic and also to those who are interested in Mexican mines. It is known to us that when the riot took place at the Smuggler Union, in July, 1901, a leading engineer, retained by New York capitalists, had recommended

the purchase of a large property in southwestern Colorado, but, on the receipt of the accounts of the murderous affray at Telluride, these gentlemen withdrew from the business and, upon the advice of their engineer, they diverted a half million dollars to operations in Mexico because there at least no labor troubles—so it was thought—could arise.

There is no doubt but that this feature has helped Mexican mining and has attracted American capital, sorely harrassed as it has been in the Coeur D'Alene, at Leadville, in Telluride, and other localities where the labor unions have been permitted to tyrannize. Now, it appears that Mexico is to be educated in Austrian-Italian-Slavonic-cum-Irish ideas of liberty—namely, to strike when you please and make everyone else strike, too!

It is gratifying to all who care for Colorado—and they are many, all over the world—to observe that the recent atrocity has incited the better citizens to denunciation of the lawlessness which paved the way for the assassination of an unoffending man. The stock exchanges, the Colorado Scientific Society and other organizations where thoughtful men gather have expressed the sentiment that this last outrageous outbreak against decency and law should not go unnoticed. So far, so good, but we fear that when the excitement has abated the rush of western life and the absorption of active men will cool their interest into indifference, until the tragic episode is forgotten. Must another horror ruffle the serenity of their industrial activity before they realize that life on the edge of a volcano of anarchy does not tend to the equilibrium of business or the well-being of the Community?

Behind all this sporadic lawlessness there is a condition which must be changed before any cure can be permanent. So long as reputable politicians ally themselves to the enemies of social order the latter will be in a position to prevent the enforcement of the law. In July, 1901, when the strikers had attacked the Smuggler Union mine, killed eight inoffensive workmen and driven the others across the range, the State Senator for San Miguel County telegraphed to the Governor of the State advising him not to send the troops, evidently required for the maintenance of order, because "the mine was in peaceable possession of the miners"! A crowd of cowardly ruffians had broken every law, human and divine, had dispossessed the owners of their property, had killed a number of the workmen and had thus obtained "peaceable possession"! The thing would be humorous if it were not monstrous.

At a recent county election the president of the union responsible for these outrages was actually a candidate for sheriff, but was fortunately defeated by a small margin. At the last election the Populist element in the Telluride district placed itself frankly under a Socialistic label and thus completed one more step in that descent which began with the name of an honorable historic political party, descended to populism, dropped into Socialism and has, in action and in spirit, already plunged into the hell of anarchy.

We have no concern with politics in that broad field of mining and metallurgical science which is our particular domain, but it is shutting one's eyes to facts to disregard the relation between these outrages in the mining camps and the political entanglements of disreputable office-seekers at headquarters. Make it a blister on a man's fair name to

win office through truckling to ruffianism and lawlessness in any guise and you will then save a splendid territory from the reputation which it is surely gaining as a consequence of acts such as these to which we have made unwilling reference.



#### MARKET CONDITIONS.

*Iron and Steel.*—The iron and steel markets show little change, production being still unsettled, owing to short supplies of coke and the difficulties in transportation. The clearing up effected by the railroads last week was of some advantage, but matters have been rapidly falling back again almost to the former position. Instead of gaining on their agreed deliveries, the furnaces are steadily falling behind and steel works are suffering in consequence. In some cases premiums have been paid for deliveries of coke, but this has not availed to secure the desired supplies. The weather has been bad, cold and snow interfering with transportation.

New business is comparatively quiet, but this is not at all unusual, as there is always a slack period toward the end of the year. Moreover, people are not inclined to place orders for finished material when the mills are already behind on their contracts and it is quite uncertain when they will catch up.

While foreign iron and steel continues to come in quite freely on orders placed some time ago, reports from abroad show that there is less inquiry for material. This apparent slacking off of American orders, combined with a heavy bear speculation in Scotch and Middlesboro warrants has depressed the British market considerably. Spot warrants have fallen off heavily, and by the latest reports there was a backwardation of nearly 3 shillings per ton on Scotch pig warrants, and nearly as much on Middlesboro. The bulk of the warrants for both descriptions of iron is understood to be in a few hands which has very much facilitated the present speculation for a fall.

*Copper.*—Very little change can be reported in the copper market, which is again comparatively quiet. The demand for supplies which was manifested last week has apparently been satisfied for the present. Meantime, purchasers are not pressing metal for sale and it is pretty well understood that stocks are not large either in the hands of sellers or consumers. In fact, some sellers are not in a position to make very prompt deliveries, while others have little metal ahead. At the close there are, however, a better demand and stronger prices.

*Other Metals.*—Spot supplies of tin continue fair and prices remain about the same. Business is rather slack towards the end of the year and the condition of foreign markets does not encourage hopes of an immediate rise.

Lead continues steady and unchanged with about the usual demand, and no alteration in quotations.

Spelter still continues rather weak and prices are gradually settling towards a point which must be considered somewhat nearer the normal quotation than has prevailed for some time past. The lower prices have improved the buying somewhat.

Silver continues dull and depressed. Sales in London for the East have been very light, this, however, being partly due to the considerable exports made to India direct from New York. Nothing further has been done towards the settlement of the



Chinese matter and a further fall seems to be in prospect.

**Coal.**—The Western coal markets continue to suffer from transportation difficulties. The effort to rush coal up the Lakes to meet the demand of the Northwest has been brought to a sudden close by the extremely cold spell of this week, which, as we write, has probably closed the Sault Ste. Marie River and is putting a stop to shipments. This cold spell has come so suddenly, following a long period of unusually mild weather, that it is to be feared that a number of vessels have been caught in the ice on Lake Superior. Those which have passed the Sault, however, may be able to work their way to Duluth or Ashland.

The close of lake navigation may give slight relief to the local trade by enabling the railroads to turn some of their cars and locomotives into that trade. The demand for coal, however, will be much increased by the weather and it is doubtful whether any improvement in transportation will make up for this change.

The Seaboard bituminous market shows about the same condition as last week, but the cold weather and snow will doubtless interfere with transportation to some extent. It is possible that some of the shoal water ports in the far East will be closed up with their supplies still short of the usual quantity. The demand for bituminous coal in New York, Boston and other eastern cities still continues, as many concerns which have been using this coal on account of the scarcity of the supply of anthracite are apparently inclined to continue. In fact, complaints are made that the steam sizes of anthracite are in excess of the demand and that some stocks are accumulating at different points. There will doubtless be complaints heard during this and next week owing to slow deliveries of bituminous coal at tidewater points.

The difficulty of supplying anthracite has been emphasized by the sudden cold weather. The companies continue to push supplies as rapidly as possible, but complaints are heard on all sides that the amount brought to the cities is not sufficient. Part of this, however, is due to the rush of buyers who desire to secure supplies for some time ahead. In New York, especially, the newspapers have played persistently into the hands of local dealers by "scare-heads" and exaggerated accounts of the scarcity of coal; but the situation is really much better than some of the journals would have us suppose. The market, however, is still far from resuming its normal condition.



#### THE ANTHRACITE COAL STRIKE COMMISSION.

The sessions of the Anthracite Strike Commission, which were resumed on December 3, have been wholly occupied, up to the present writing, by hearing testimony submitted on behalf of the miners. This has related chiefly to questions of wages, average earnings, rental of company houses, and other similar matters; also to the employment of minors in the breakers and elsewhere. While this testimony has its value, and must be heard by the Commission, it cannot be said that any new points have been brought out, or any information secured that has not been accessible before. Some of this testimony, rather sensational in its character, failed entirely on cross-examination.

Apparently this submission of evidence in support of the miners' case will continue for some time yet. It will probably be followed by a summing up before the hearing of the operators' side begins.

There have been reports of further negotiations for some settlement outside of the Commission, but so far there are no facts accessible to show that these are anything more than mere rumors.

#### SIR WILLIAM CHANDLER ROBERTS-AUSTEN.

Sir William Chandler Roberts-Austen, whose death on November 22 in London we noted briefly in a recent issue, was born in 1843. At the age of 18 he entered the Royal School of Mines in London, intending to become a mining engineer. Upon graduating, however, he was offered a position under the late Prof. Graham, then Master of the British Mint, and his life work was done largely in connection with that institution. In 1869, when Prof. Graham died, Mr. Roberts-Austen was made assayer, and in 1882 he was appointed assay master, all the scientific—as distinguished from the mechanical—operations of the Mint being placed under his charges. In 1880 he succeeded Dr. Percy as professor of metallurgy at the Royal School of Mines, still retaining his connection with the Mint.

Early in his work under Prof. Graham he had begun the study of alloys upon which his reputation was largely to rest. In 1888 he gave in a paper the results of a long series of experiments to determine the influence of impurities on the density and extensibility of gold. This called out a long discussion, one of the results of which was the appointment of the Alloys Research Committee of the Institution of Mechanical Engineers; a body which has done some notable work. This committee has made five reports, and a sixth is ready for publication. The first, submitted in 1891, was chiefly concerned with gold and silver and their impurities, continuing Mr. Roberts-Austen's argument, made in the paper above referred to, that the properties of the elements are a periodic function of their atomic weight; but thus early he evolved the cooling curve system in connection with alloys, which has since been developed so advantageously. In the second report of 1893 there was a consideration of more practical metals. The effects of arsenic, antimony, and bismuth on copper were discussed with a view to alloys of merchantable metal, while the thermal behavior of chromium steel was treated. The development of the next two years brought some definite facts on the significance of the freezing points of metals, with cooling curves for electro-iron, and data on the effects of alloying aluminum with iron, copper and nickel. Brasses, coppers and the diffusion of metals were the main points of the 1897 report, with a further consideration of the relation between the melting points of alloys and the atomic volumes of their constituent metals, and as a development of this the freezing-point effect on copper-tin alloys. The fifth report dealt with carburized iron, at a time when interest was directed to the influence of cementation and chilling for the hardening of armor-plates. In this (1899) report various alloys were discussed, and the treatment of low carbon rail steel was considered from many points of view. There remains the final report of the Committee, already prepared; it deals with the annealing of steel in a comprehensive way, and an appendix on the microscopic alloys of copper and tin has already been presented separately to the Institution. The work of the Committee will now be continued in the National Physical Laboratory, for the establishment of which Roberts-Austen was a vigorous advocate; but there can be no question that the research undertaken, and the light it has thrown on the molecular changes in alloys, has already greatly extended their use.

The work demanded considerable resource; and a typical case may be quoted in the introduction of an automatic recording pyrometer. Le Chatelier had invented an instrument for the purpose; but it lacked the important essential of recording autographically the temperatures; and

Roberts-Austen brought photography to his aid for this purpose. This he described in papers at the Iron and Steel Institute in 1891, 1892 and 1893. To the same Institution he read a paper on the rate of diffusion of carbon in iron in 1896, bearing on the same subject as the alloys research work; and while working under the same auspices on carburization, he contributed to the *Proceedings* of the Iron and Steel Institute and to the Royal Society memoirs on the carburization of iron by a diamond. Alloys formed the topic of his British Association lecture in 1889, dealing with the hardening and tempering of steel, which was the means of beginning that long association with Osmond, the great French metallurgical chemist, that has added so much to our knowledge on the question of the thermal treatment of metals.

For the Iron and Steel Institute he made a notable address on the action of projectiles and of explosives on gun tubes, delivered at the Stockholm meeting, which was illustrated by some very remarkable micro-photographs.

Sir William Roberts-Austen rendered service on several Government committees. In 1893 he was chosen to act as chairman of a committee appointed to inquire into the laboratory arrangements of the Customs and Inland Revenue departments. In the same year he served on a committee, appointed by the Secretary of State for India, to consider the best means of utilizing for metallurgical purposes the water power available on the completion of the Periyar Water Works. In 1896 he was a member of the Board of Trade committee, appointed to consider the cause of the deterioration of steel rails in ordinary use. In connection with the committee, he conducted an elaborate research, and furnished a report of great industrial importance. In 1897 he was directed to serve on a committee appointed to consider the desirability of establishing a National Physical Laboratory; and was chosen as a member of a small committee to report on the most suitable steel for ordnance work for the Government.

Many honors, the highest his profession could pay, fell to his lot. He was president of the Iron and Steel Institute in 1899-1901, was elected an honorary member of the Institution of Mechanical Engineers in 1897, and of the Institution of Civil Engineers in 1901. He was one of the founders of the Physical Society of London, of which he was for some time secretary, and afterwards a vice-president, and was an honorary secretary of the British Association for the Advancement of Science. He was elected a Fellow of the Royal Society as early as 1875, and served on the Council. He was also a vice-president of the Chemical Society and of the Society of Arts. He was made a C. B. in 1890, and a K. C. B. in 1899, a D. C. L. of Durham College in 1897, and a D.Sc. of Victoria University, Manchester. He also served on the Government Commission in connection with various exhibitions, Paris, 1889, and Chicago. He was a Knight of the Legion of Honor, and was elected in 1893 a member of the Athenæum Club, "for distinguished eminence in science."

**MANGANESE ORE IN INDIA.**—*Indian Engineering* says: "At present manganese ore is being very largely railed from Tharsa and Kampti stations on the Bengal-Nagpur Railway in the Central Provinces. In both cases the ore is carted from Ramtek, from 12 to 15 miles north of these stations. Very recently good ore has been found near Balaghat on the southern section of the Satpura Railway, and it has been decided to run a short branch to the miners by the Bengal-Nagpur Railway. As the rails have been already laid from Gondia to several miles beyond Balaghat, it is presumed the new mines will be railing ore from their quarries in another three months at the outside."

### THE BURRO MOUNTAIN COPPER DISTRICT, NEW MEXICO.

By GEORGE D. REID.

This district is situated in Grant County, New Mexico, about 15 miles southwest from the county seat at Silver City. The latter town is the terminus of the Deming & Silver City branch of the Santa Fe Railway system, and is a modern Western town with about 3,000 inhabitants.

Desultory prospecting was done in the Burros as early as 1875, but no mining of importance was accomplished until some time after the Apache Indians had been permanently placed on the reservations. About 1885 prospectors began to

made to prospective investors. In most cases these reports have given the geological and mineralogical conditions, but have gone no further. What would be of great use here—as in many other portions of the Rocky Mountain mineral bearing area—is a thorough, complete, and unprejudiced report such as the United States Geological Survey has already given in the cases of some of the larger and more developed districts.

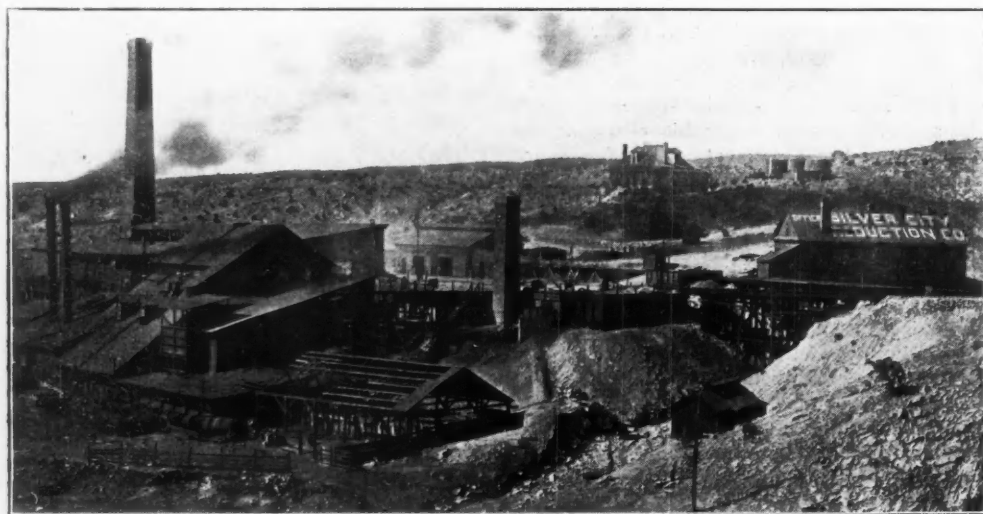
The main copper-bearing area of the Burro Mountains is about 3 miles in length, and 1½ to 2 miles in width. The general strike of the formation is in an easterly and westerly direction. On the east the formation dips under, or

kaolinized, and secondary movements have shattered the whole formation in every conceivable direction. The resulting stockwork seams are mineralized with oxides of iron, manganese, and copper; and in addition, the whole country rock has in places become mineralized or impregnated with malachite and azurite.

The ore-bodies, so far as developed, consist in the main of low-grade carbonates of copper (1 to 10 per cent Cu) occurring as an impregnation of the whole formation throughout comparatively large areas. The stockwork seams are also well mineralized, and, in the case of the larger seams, have been profitably worked all over the district for the high-grade shipping content. The ore in these seams has been mostly cuprite, chalcocite and malachite, the two last mentioned largely predominating.

Formerly little attention was paid to the low-grade carbonate ore bodies. Of late those who have invested capital in the district are beginning to realize that, until deep mining of the underlying sulphides is undertaken, it is on these carbonates that the success of the district depends. At depths of from 75 to 150 feet these surface carbonates change to partially oxidized sulphides of copper and iron. But little development has yet been done in these last mentioned deposits.

Among the principal companies and individual owners in the field at present may be mentioned the Southwestern Copper Company, the Alessandro Copper Mining Company, the American Consolidated Copper Company, Thompson & Copp, Carter & Chapman, Curry & Laughren, J. Emory Stevens, P. T. McGrath, Nichol Brothers and W. S. Laughlin. The deepest workings are on the properties of the two first-named companies. On the St. Louis—one of twelve patented claims owned by the Southwestern Copper Company—an inclined shaft reaches about 450 feet depth, and on the Gettysburg shaft of the Alessandro Copper Mining Company a shaft has recently been sunk to 250 feet depth. These two shafts are the deepest workings in the district, and in



SILVER CITY REDUCTION WORKS, SILVER CITY, N. M.

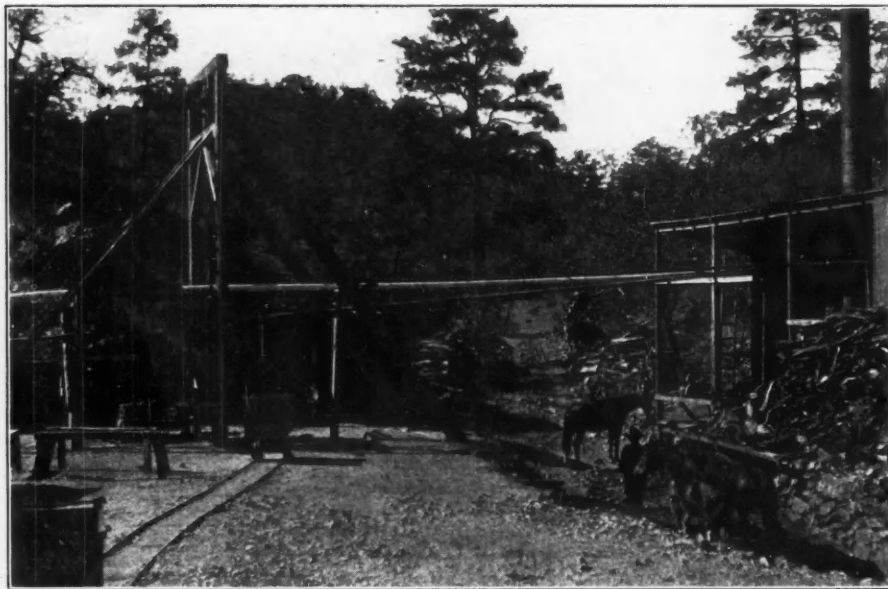
locate in the district, and most of the better ground was soon taken up. Many of the locators being poor men were unable to develop their claims, and the majority merely retained their titles by doing the annual assessment work. After the erection of the Silver City reduction works some small shipments were made with very favorable results.

In the middle eighties an Eastern company secured a number of claims, and the first real development commenced in parts of the district. Two small smelters were built and operated for a time, but eventually the venture proved unsuccessful and the property was shut down. Various reasons have been given for the failure, among them mismanagement, failure of flux supply, lack of water, expense of production, etc. Whatever may have been the true cause, there is no doubt that the failure of this company to successfully treat the ores gave the district a "black eye" for several years, and not much development was done until the last three years, when several companies and individuals entered the field, and have since operated with some success. Little deep mining has so far been accomplished, but what depth has been reached has served already to demonstrate the great probability of a successful future for energetic and economical mining.

As a whole, the district cannot be classed as a probable producer of high-grade ores, but rather as a large low-grade area, with large surface carbonate bodies awaiting treatment. The accessibility, and the cheapness of labor, fuel and supplies are points in its favor. The chief drawback heretofore has been the scarcity of water, not only for possible milling purposes, but for even ordinary camp use. This drawback will undoubtedly be overcome, and, in fact, has been overcome in the case of almost every property which has sunk to a depth of 150 feet or more.

The geology of the district has never been worked nor reported upon by Government geologists, but numerous reports by more or less competent geologists and engineers have been

has been covered by, andesitic conglomerates and breccias which no doubt originate in the volcanic region which lies a few miles towards the north. On the western edge the mineral bearing formation touches the northern slopes of the Big Burro Mountains.



ST. LOUIS MINE, SOUTHWESTERN COPPER COMPANY.

The prevailing rocks are partially metamorphosed porphyries and granites interspersed with small dikes of quartzite, the latter of small width and extent. One mining engineer has classed the metamorphosed granites as aplite. This is probably true in the originally accepted application of the term (see Kemp's *Handbook of Rocks*), but in the writer's opinion will not apply to these metamorphosed rocks throughout the whole district. The originally contained feldspars of the granites and porphyries are to a large extent

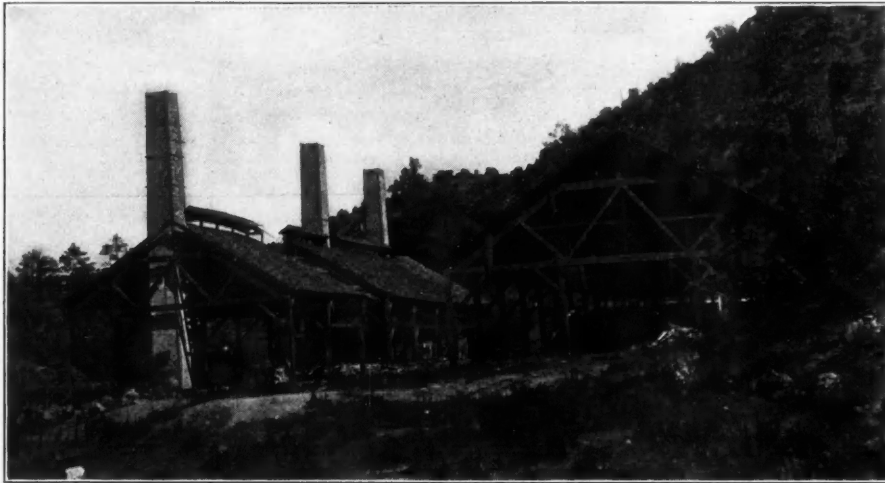
both of them, although at opposite ends of the district, good ore-bodies have been encountered. Only two other shafts, Nichol Brothers on the Sampson, and Carter & Chapman on the Copper Gulf, have as yet penetrated the surface carbonates and reached the sulphide bodies.

In 1900 and 1901 the Burro Mountain District was being rapidly opened up and becoming better known. The fall in the market price of copper, together with the closing of the Silver City plant of the American Smelting and Refining



Company, caused a number of operators to suspend work temporarily. Mining was resumed later all through the district, and the first half of the present year saw more men at work and more money in the camp than ever before, and this in spite of the continued market depression in copper.

The existence of sufficient water for all milling and camp purposes has now been demonstrated and at least two, and possibly three or four, plants for the treatment of the carbonate ores by sulphuric acid lixiviation, are an assured thing for the immediate future. These plants will probably be of comparatively small capacity at first,



PASCHAL SMELTER, BURRO MOUNTAIN DISTRICT, N. M.

for, although the adaptability of the ores to this treatment seems to have been proven, the present development and ore in sight does not warrant extensive plants as yet.

From an economic standpoint the future of the Burro Mountains seems to be assured. Although comparatively old in years, it is only recently that the district has come to be well-known throughout the mining world. The copper area had been scarcely scratched until the last two years. The recent developments, although not extensive, have demonstrated conclusively that it has a successful future in store. Even yet it is little known throughout the East, but every day capital is coming in, and deeper and more extensive mining will be the result. There are probably few copper districts in the Southwest that could give a better showing for an equal amount of development than does the Burro Mountain District at the present time.

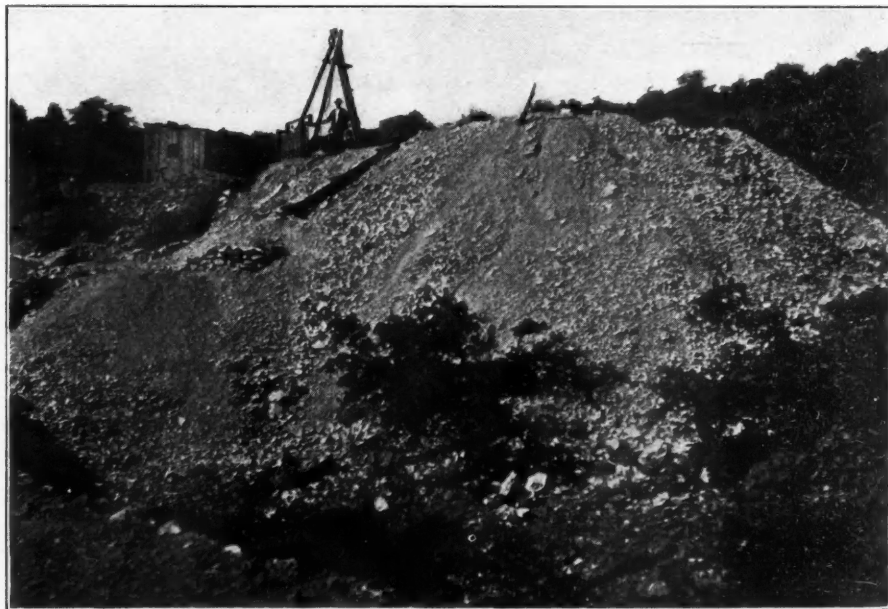
#### ASSAY OF LEAD IN ORE.

Samuel S. Fowler, in the course of a paper on ore-dressing in the Slocan District of British Columbia, read at the Nelson meeting of the Canadian Mining Institute, referred to the frequent ignorance of mill men as to the losses of lead they are suffering in the process, because of the absence of means for weighing and sampling the ore, and the impossibility of arriving at accurate results anyway if reliance be placed on the fire assay for lead, which is still commonly in use. He quotes a test wherein ores assaying 4.7 per cent and 5.2 per cent gave tailings assaying (by wet analysis) 1.36 per cent and 1.42 per cent lead respectively, while no button was got from the tailings by the fire method, which would have indicated no loss in the tailings. It cannot be assumed that if both feed and tailings are assayed by the fire method the relative proportion is preserved in spite of the losses in the method, because the percentage of loss is much greater with low-grade material than with high, and when the tenor of lead is less than 2 per cent the result is generally a farce, as Mr. Fowler points out.

With respect to the volumetric methods for es-

timating lead, Mr. I. C. Bull has recently investigated the accuracy of those which are commonly employed, comparing the results with those obtained by the standard gravimetric method, weighing the lead as sulphate (*Columbia School of Mines Quarterly*, 1902, XXIII, iv, 348 to 365). He tested Alexander's method (molybdate). Koenig's (dissolving lead carbonate in excess of standard nitric acid and titrating the excess of acid with decinormal caustic soda solution), the permanganate method, the bichromate method, and the ferrocyanide method. He found that the ferrocyanide and molybdate methods are the quickest and most accurate, especially in the

presence of impurities, and prefers the ferrocyanide, which is best performed with a 1 per cent solution of potassium ferrocyanide. The solution to be titrated should be about 100 c.c. in volume, should contain 10 c.c. of 50 per cent acetic



GETTYSBURG MINE, ALESSANDRO COPPER MINING COMPANY.

acid, and should be at a temperature of about 60° C. The correction for indicator is about 0.8 c.c.

**OIL FUEL FOR DANISH STEAMERS.**—The East Asiatic Company, of Copenhagen, Denmark, is having oil tanks erected in the free harbor at that port, to provide a stock of liquid fuel not only for its own steamers, but for those of other owners.

**ALLOYS OF CADMIUM AND MAGNESIUM.**—O. Boudouard has studied the properties of the alloys of cadmium and magnesium. They have a more or less brilliant white appear-

ance, are easily filed and are fairly soft. They break when submitted to continuous hammering. The alloy with equal parts of cadmium and magnesium is the most malleable of the series.—*Chemical News*, November 14, 1902, p. 239.

#### COMMITTEES OF THE CALIFORNIA STATE MINERS' ASSOCIATION.

Mr. C. M. Belshaw, the newly elected president of the California Miners' Association, has announced the following executive committee and special committees for the ensuing year:

**Executive Committee at Large**—J. H. Neff, chairman; E. C. Voorheis, W. C. Ralston, Harold T. Power, John F. Davis, A. Caminetti, Terey L. Ford, W. W. Montague, Charles G. Yale, Edward Coleman, Andrew Carrigan, Mark B. Kerr, J. S. McBride, J. J. Crawford, B. N. Shoecraft, C. C. Bush, Dr. C. T. Deane, David McClure, Jr., J. W. C. Maxwell, E. A. Belcher, J. F. Halloran, John McMurry, W. S. Keyes, W. H. McClintock, Dan T. Cole, George H. Wallis, F. F. Thomas, Frank R. Wehe, Julian Sonntag, Fred Bradley, W. P. Hammon, J. O. Harron, John M. Wright.

**County Executive Committeemen**—Alameda, Prof. S. B. Christy, Frank A. Leach; Amador, J. F. Parks, J. R. Tregloan; Butte, A. Ekman, Frank Griffin; Calaveras, A. I. McSorley, F. J. Solinsky; El Dorado, Thomas Clark, H. E. Pickett; Fresno, A. R. Briggs, W. H. McKenzie; Kern, John Treadwell, B. F. Brooks; Mariposa, C. C. Derby, A. H. Ward; Mono, R. T. Pierce, R. H. Turner; Nevada, A. D. Foote, W. F. Englebright; Northern California, Lewis T. Wright, H. W. Turner, W. I. Hupp, Jr.; Placer, William Nichols, Jr., W. S. Graham; Plumas, George Standard, U. S. Webb; Sacramento, J. H. Batcher, A. C. Hinkson; Santa Clara, Ellard W. Carson, Thos. Derby; San Francisco, Louis Glass, Arthur C. Bates; Shasta, Fred Hurst, W. J. Gillispie; Sierra, W. I. Redding, George F. Taylor; Sonoma, C. A. Grimmer, Alfred Abbey; Southern California, H. Z.

Osborne, Theodore B. Comstock, F. W. Braun; Tuolumne, Fred Sutton, A. C. Morrison; Yuba, W. B. Meek, F. R. Lord.

**Committee on Finance**—Andrew Carrigan, chairman; Joseph Sloss, J. O. Harron.

**Committee on Legislation**—John F. Davis, chairman; W. B. Lardner, J. R. Tyrrell, W. C. Ralston, F. S. Moody, A. E. Muentner, R. C. Rust.

**Committee on Mineral Lands and Conservation of Water**—E. C. Voorheis, chairman; Marion DeVries, A. D. Foote, H. E. Pickett, B. S. Rector.

**Committee on Department of Mines and Mining**—W. C. Ralston, R. W. McKens, Terey L. Ford, C. H. Dunton.

## HOISTING FROM GREAT DEPTHS—III.\*

By A. M. ROBESON.

It was because of the results obtained by the Whiting system in sinking the deep Red Jacket shaft, of the Calumet & Hecla Mine, and his belief that its faults were more apparent than real, that the late Major Seymour was led to recommend the adoption of this system at the Kimberley Mine (to replace the flat ropes on the engines there, designed by himself), and to introduce the system on the Witwatersrand.

The design of the alterations to put the Whiting system into effect at Kimberley was entrusted to the writer; and, as it is safe to say, this engine has hauled more foot-tons of ore out of a mine than all others on this system put together, some particulars regarding it will be of value in this discussion.

The reasons for changing the Kimberley engine from flat rope to round were two, viz.:

1. The necessity of providing an engine for the next lift, 1,500 feet, owing to the limit having been reached at 1,200 feet for the engine, as designed for flat ropes.

2. The very high cost per ton for flat ropes as compared with round ones, 1.4 cents per ton, as against 0.132 cent for round ropes from the same depths, 1,200 feet.

It was decided to try the Whiting system, because, with it and the same load, the engine would be suitable for any depth up to the limit of a parallel rope.

As a test of the accuracy of Mr. Behr's method of predicting the outputs of winding engines, it will be interesting to compare the outputs resulting from the time-velocity obtained by Mr. Behr's methods, with those actually obtained by the same engine. The total time for the trip, or, in other words, from "bell to bell," was 66.98 seconds, which figures on a live load of 9,600 pounds, only 254 tons per hour, or 37 per cent less than what was actually obtained, 400 tons per hour, during the first months after the installation of this system, as will be seen by referring to page 6 of the De Beers Consolidated Mines, Ninth Annual Report.

This discrepancy in the theoretical as compared with the actual results only shows the inaccuracy of Mr. Behr's assumption as to dead time at the end of the trip, 27 seconds, which need only be 6 seconds; and his friction allowances, which, as he points out, should be taken high for the instant of starting, but which probably drop to half his figures for engine friction, by the time two revolutions are made, while the shaft friction would not reach its maximum value until full speed was attained. A tail rope is used on this engine for balancing, and although the shaft is not a deep one, the maximum velocity attained is as high as Mr. Behr appears to think desirable; and it can therefore be taken as proved that the tail rope can be used with success under the condition assumed in his paper, provided it does not prejudice the static or dynamic conditions of stress.

The tail rope, of course, has no effect on the strains that occur in the loaded rope at the time of starting from the bottom, as its weight is all at that time on the other skip, but as the load advances on its journey this extra weight is gradually transferred until it reaches its full value at the moment when the skip is emptied of its load. It will be seen then that at the instants when the hauling ropes receive their greatest oscillating strains—at the beginning and end of the trip—which latter, with careless engine drivers, may be very great, they are automatically ready for them—at the beginning of the trip because the tail rope is in the other compartment—

and at the end of the trip because the live load has been dumped. Thus it will be seen that although at first sight the tail rope appears to bring serious stresses to bear on that part of the hoisting rope that most frequently breaks—that portion near the skip—those most serious strains, namely, the oscillating ones, should only occur in their greatest intensity when the rope is best prepared to withstand them. It is perhaps for these reasons that in practice no bad effect has been observed on the capping of hauling ropes, where the tail rope has been used.

It has often been said that the great number of bends made, each trip, in the rope of a Whiting hoist must make its life shorter than that of a rope wound round a drum, under the same conditions of load, etc., etc. This does not appear to be the case if cost per ton is any indication, for the average cost per ton per 100 feet of rope used for four ropes on the Whiting hoist at the Kimberley Mine was 0.0092 cent, while the cost on the same basis for the cylindrical drum hoist at De Beers Mine, where the load, size of rope, tail rope, and size of drum, were the same as at the Kimberley Mine, was 0.0162 cent. The only condition which did not make these absolutely parallel cases, was the fact that in the case of the cylindrical drum hoist, the cost was taken out together for 1,200 feet and 1,400 feet depth, while for the Whiting hoist it was for 1,500 feet only, but as both are figures to a basis of 100 feet length of rope the comparison is a fair one. This, I take it, should settle the question of alleged excessive fatigue, due to the numerous bends in the rope of a Whiting hoist, for, after all, what does it matter if there are differential and bending stresses there, if they don't cost anything?

While on the subject of the differential stresses that actually occur in the different wraps of the Whiting hoist, it will be of interest, and of value, to give the results of certain experiments which the writer caused to be made, in order to throw some light on this obscure question.

The experiments had for their object the answering of two questions: (1) How much, if any, are the successive wraps of the Whiting hoist strained beyond that due to the static load? (2) What is such strain equal to, in terms of stress?

The original data, together with the final results of these experiments, are given in the large table (published in our issue of December 6, page 741).

The method adopted to measure the strain was identical in each case, and consisted in making two reference marks 9 feet 4 inches apart, on the rope while loaded, at a point just in front of the engine, as shown on diagram. A light stiff trammel, having a micrometer adjustment on one end, was then set to these marks accurately by the aid of a magnifying glass, and reading No. 1 was taken. The engine was then turned so that the trammel marks were carried to position 2, where the second reading was taken, and so on to the third and fourth positions. This series of experiments answered the first question completely, as will be seen by examining the tabulated statement, but in order to answer the second question with any degree of accuracy, it was necessary to know the modulus of elasticity of at least one of the ropes experimented on. This was obtained directly for the Geldenhuis Deep experiment by bringing one of the skips to the surface with the same load in it as before, and measuring the strain produced, by adding known weights to the original load. It will be of interest to know that, although this appears to be a crude sort of testing machine, it was possible to measure with it differences of weight of 100 pounds.

After the measurements were completed the skip was removed and a section was cut out of the rope in order to obtain the sectional area of steel. The modulus will be seen to be about 21,500,000, and this is the figure used to obtain the stresses shown in the table. This figure is lower

than solid bars of steel would give, which is to be expected, but as ropes are being considered and not solid bars of steel, it seems that the modulus as obtained should be used.

It will be seen that differential strains do occur in the wraps of the Whiting hoist, that they are greatest in the middle rope, in every example experimented on, and that they are greatest and of considerable magnitude on the hoist having the smallest drums, the 8-foot drums of the Durban Deep engine.

It is the writer's opinion that with the 12-foot drums of the Robinson Whiting hoist, now being erected, these stresses will be greatly reduced, and that with 16-foot drums it might become negligible.

At Kimberley great difficulty was experienced at first in indicating accurately the position of the skip, owing to the movement of the differential rings. This serious fault was overcome in a very complete and simple manner by the late Mr. George Labram, who invented an indicator which is self-correcting at the end of each run. It consists in principle, simply of another frictionally driven winder on a smaller scale than the one for which it is being used as an indicator. The cord, which is attached to the weights which represent the two skips, makes two or three turns around a small slip groove wheel, driven from the engine crank shaft, thereby constituting a frictional drive for the two miniature skips, the scale of movement of the two indicators being regulated by the diameter of the slip-groove wheel. It will be understood that while the conditions are normal, the miniature skips will move coincidentally with the main skips, but on a smaller scale; if a slip, however, should occur, it will always, as is explained later, be such as to place the miniature skip in advance of the main skip. If this action be understood it will be readily seen that the two indicators arrive at their destinations, one at the top and the other at the bottom of their slides, slightly before the engine stops, and, as the bottom indicator can travel no further, its weight is automatically relieved and the slip-grooved wheel has no longer any grip on the cord—and it simply slips within the coils of the cord until the engine stops. At this moment the indicator is correct for the next journey.

It is true that this method is only of service for correcting the constant changes due to differential action, and for keeping the engine driver in touch with his skip so long as normal conditions exist; but if a careless driver exercises no care in starting the load, and delivers an acceleration to the rope masses, greater than the engineer had intended them to receive, the rings slip in proportion to this increased strain, and the indicator will be in error, in proportion to the slip, until the end of the run. This slipping under unwarranted conditions, the writer considers a very important thing in favor of the Whiting system, as it becomes practically impossible for the driver to overstrain the ropes, and compels him to handle his engine skilfully. It must be borne in mind, in this connection, that this false indication, due to abnormal slip, is not dangerous, for when such slip occurs, the indicator is registering upward motion of the skip, it being driven by the engine and not by the rope, while the skip is, let us say, stationary; the result being that the indicator points to the end of the journey before it is actually completed, thereby erring on the side of safety. This easing of the strain of the ropes due to careless starting is an established fact, which, to the writer's mind, is made final by reading the following statement extracted from a letter written by Mr. Gardner F. Williams, general manager of De Beers Consolidated Mines, Limited, to Mr. Hennen Jennings: "We have found that at times when we start the engine (Whiting) too quickly there is a slip in the rings which does no harm and eases the strain on the rope."

Mr. Behr, in speaking of the Corliss valve gear,

\* In discussion of Mr. Hans Behr's paper on "Winding Plants at Great Depths." Abstracted from paper read before the South African Association of Engineers. Parts I and II (by Mr. Hennen Jennings) appeared in the issues of November 29 and December 6.



states that it is not well adapted for use on winding engines, because the compression cannot be varied. If he can remedy this fault without making the cure worse than the disease, from a practical point of view, all engineers will be greatly indebted to him. In this connection it must be remembered that an engine driver now has all he can do to attend to the many operations which are necessary, without adding to them the necessity of changing the compression, and, therefore, this function must be combined with those which he already has to perform, without extra thought or exertion, or it must be done automatically by the engine itself. It is doubtless because of such consideration that the Corliss gear has been used in its simplest form for winding engines.

At Kimberley, on all of the Corliss winding engines at the De Beers Consolidated Mines, hand adjustment is used for varying the cut-off, but, contrary to the general condition on the Witwatersrand, engine drivers can be found at Kimberley with sufficient pride in their art, to use the cut-off to its fullest extent, and the necessity of a governor to do this is not so pressing there, as in the Transvaal.

It may be asked with good reason, by sceptics, why is it if this system of winding is so perfect did not the De Beers Company repeat it in their No. 1 shaft engine, and for the new shaft at the Premier Mine?

The writer can answer the first part of the question, but the second must be left to others, as he knows nothing about it. The reason for not adopting it in No. 1 shaft was one of cost. At one of the abandoned shafts at the Kimberley Mine, there was an engine out of commission, known as the "French" engine, owing to its having been made in France; its general design did not lend itself to the Whiting system, and as it was much cheaper to simply put a cylindrical drum on it, occupying the whole distance between the bearings, instead of the two narrow ones that it had, thus making it serviceable for the work required of it, this plan was adopted.

The writer has heard some questions asked regarding recent practice in the Lake Superior country, and in answer can only give his personal opinion from impressions gained by observation and conversation with engineers there, who have used or seen the system in use.

Broadly speaking, the system has been a failure there, because it was not well executed in its greatest example, at the Red Jacket Shaft. The one thing which appears to the writer to be the only step in advance for the system in this engine, is the diameter of the drums, 18 feet. The engine for driving these drums is a marvel of mechanical complication and beauty of finish, and owing to the fact that a tail rope has never been used in connection with it, and also that it is of the six-cylinder triple-expansion type, it is badly handicapped, as owing to the negative moment, which exists at the end of each trip, the steam remaining in the cylinders and connections, after the throttle valve is closed, is sufficient to supply power enough to run the engine at full speed to the end of the trip. This compels the use of the brakes to a very wasteful degree, even when the air is admitted into the condenser, in order to destroy the vacuum near the end of the trip. If, however, the wood blocks, which were still in use, when, in 1900, the writer last saw this engine, were replaced with Walker rings, and if a tail rope were used in the shaft, very different results would be obtained.

Returning from other parts of the world to our own immediate requirements on the Witwatersrand, the engineer who has a regard for what others have done, has impressed indelibly on his mind three solid facts:

1. Every shaft he has seen goes straight down to the vein without any kinks or off-sets, even when the vein is 5,000 feet from the surface.

2. Parallel ropes are used exclusively at these great depths.

3. Where drums are provided, which hold from 5,000 to 6,000 feet of such rope, they become monstrous affairs.

Mr. Hennen Jennings has shown that it is economically possible to extract the ore, in the richer parts of the Rand, to a vertical depth of from 8,000 to 9,000 feet by means of two vertical shafts, intersecting the vein formation at from 5,000 to 6,000 feet depth, and at that point breaking the journey and continuing it by a run on the incline, until a vertical depth of from 8,000 to 9,000 feet has been reached.

As mining has never been done at much more than half this depth it seems to the writer a waste of valuable time to consider methods of equipment to cut the vein formation at any point greater than 6,000 feet vertically, before it is found, by actual results, that the conditions of mining at that great depth are favorable.

This view of the matter also appears to be that of Mr. Behr, for the greatest depth he considers in his investigations is 6,000 feet. It is true that he mentions the possibility of going 8,000 feet in two lifts, both engines being on the surface, but he places very little emphasis on it, and one must infer that he deems it unnecessary at the present time to consider such depths. This being the case, it is only necessary to see by means of investigations similar to Mr. Behr's whether it is advisable at 6,000 feet depth to cut the lift in two or not.

The reply to this question is best answered by the mining engineer, and he does so completely when he states that the number of compartments his shafts must have, to provide for ventilation, and decides on the traffic which must go through them.

Mr. Jennings has stated that for a property of the maximum economic size lying below the 5,000 to 6,000 feet horizon two seven-compartment shafts are necessary for reason of ventilation, and that six compartments in each shaft would be available for traffic. The maximum traffic through these shafts per day in terms of ore and men will be for 600 stamps, 4,000 tons of ore and 4,620 men; or 2,000 tons of ore and 2,310 men per day for each shaft. To this, of course, must be added the material which must also be sent down.

If two compartments be kept busy exclusively for men, and it be so arranged that 24 men are going up at the same time as 24 are going down, this whole number should be lowered once and raised once during 10 hours of continuous time. This leaves four other compartments in which to hoist ore and to lower material, and as it will be seen by examining column 4, marked "Output," in the table above referred to, that only one pair of compartments are required for this amount of ore, no matter what system is adopted, and as it will be conceded by all that the remaining two compartments will be more than sufficient for material, the problem of selecting the system of winding has resolved itself into the simple one of whether it is necessary to offset the shaft half-way down, in order to get 2,000 tons up through two compartments in 24 hours, or whether it is possible to do it in one straight lift.

It is necessary, where speed of hoisting and maximum safety to men is concerned, to keep the two services separated, never hauling men on the skips which haul ore and vice versa. It also gives the maximum safety with the least rope cost to use the new ropes on the main hoist, and after a certain time transfer them to the ore winder, as is the custom at the Calumet & Hecla Mine. This being granted, the only factor of safety, as regards rope, which is important to life, is that for the new ones for hauling men. The factor of safety to be used for ore need only be governed by economic reasons, and should be sufficiently high if taken at 6.

The conclusion that the writer has arrived at, from his study of Mr. Behr's very valuable paper, is that the output demanded from these very deep shafts does not require that the lift should be made in two stages, because with one stage 2,000 tons per day can be hoisted through two compartments, no matter what kind of engine be employed; and that if a safety factor of 6 be allowed for materials, the cost for plant will be very much less, and the economic efficiency will be greatly increased, because the Whiting hoist, with its light rotating parts and low steam consumption, can then be successfully used.

#### ESTIMATION OF PHOSPHORIC ACID IN FERTILIZERS.

A. G. Woodman, in *Journal American Chemical Society*, describes the following method, which is both rapid and accurate: Weigh 2 grams of the sample into a 200 c.c. beaker, add about 10 c.c. strong hydrochloric acid, mix by shaking, wash down the sides of the beaker with about 10 c.c. of water, cover the beaker with a watch-glass, and boil briskly. With the watch-glass slightly raised, add slowly from 1 to 2 grams of sodium chlorate or enough to decompose the organic matter excepting fat. Boil off the excess of free chlorine. Dilute with water and transfer the contents of the beaker to a 250 c.c. measuring flask. Cool and make up to the mark. In case no fat is present, filtration is unusually unnecessary, as a small amount of insoluble residue will not influence the titration. Transfer an aliquot part of 25 c.c., representing 0.2 gram of the original sample, to a 200 c.c. Erlenmeyer flask, add 15 c.c. ammonia (sp. gr. 0.90) and a small piece of litmus paper. Neutralize the ammonia with strong nitric acid, using a slight excess only. The temperature of the solution is now about 65° C. If more than 2° or 3° above this temperature, add cold water to bring it down to 65° C. Now add from 25 c.c. to 75 c.c. ammonium molybdate solution, depending on the amount of phosphorus pentoxide in the sample, and shake vigorously by hand. The precipitate will settle out clear very quickly. Filter with suction through a 9 cm. filter paper. Wash the precipitate free from acid, making no effort to remove the precipitate from the flask. The washing will take about two minutes. Test the filtrate by adding more ammonium molybdate solution and heating to 65° C. Transfer the precipitate and filter paper to the Erlenmeyer flask, and run in standard alkali until the yellow precipitate is nearly dissolved. Shake to disintegrate the filter paper. Now add 1 c.c. phenolphthalein solution as indicator, and continue adding the alkali cautiously until the pink color remains permanent for about a minute. The end-reaction is very sharp. In case an excess of alkali is added, it can be titrated back with standard acid. Divide the burette reading by two, and the result will be the per cent of P<sub>2</sub>O<sub>5</sub> in the sample.

The solutions are prepared as follows: (a) The molybdic solution is made as directed in Bulletin No. 46, Revised Edition, U. S. Department of Agriculture, Division of Chemistry, except that the solution is heated for five hours in a bath of water at a temperature of 65° to 67° C.

(b) The standard potassium hydroxide solution is prepared by diluting 323.81 c.c. of normal potassium hydroxide, free from carbonates, to 1 liter. One c.c. is equal to 1 milligram phosphorus pentoxide.

(c) The standard sulphuric acid solution is made up to the same strength as that of the standard alkali.

The phenolphthalein solution is prepared by dissolving one gram in 100 c.c. of 50 per cent alcohol.

Under ordinary conditions an analysis can be made in 30 minutes. The method has been tested extensively on samples ranging from 1 to 47 per cent in phosphoric acid and results agree closely with those by the standard gravimetric methods.

## THE ASPHALT DEPOSITS OF PIKE COUNTY, ARKANSAS.

By C. W. HAYES.

At many points in Arkansas, Indian Territory, and Texas the basal members of the Cretaceous contain notable quantities of bituminous matter. This is generally in the form of a heavy semi-fluid residuum or asphalt, although small amounts of petroleum are also reported to occur at this horizon in Texas. This basal petroliferous division, the Trinity group, emerges from beneath the Tertiary beds in central Arkansas, extends westward in a nearly straight line through southern Indian Territory to Ardmore, and thence southwestward nearly across the State of Texas it forms a belt of variable width, but practically continuous exposures. It consists largely of coarse, unconsolidated sands, with some beds of clay and calcareous lenses, and passes upward into highly fossiliferous limestones.

In Arkansas the Trinity rests directly upon folded Paleozoic beds, whose truncated edges formed a somewhat undulating plain prior to the incursion of the sea in which the Trinity sands were deposited.

These Paleozoic rocks in southwestern Arkansas consist chiefly of shales, with numerous heavy beds of sandstone. They have been intensely folded, the prevailing dips being from 50° to 90°. The sandstones are only slightly altered, but the shales have been converted into gnarled slates intersected by innumerable planes on which mo-

ing chiefly of coarse sand, in some places quite calcareous, with beds of clay. The deposit is in the form of a sand stratum, which varies in thickness from 6 to 12 feet, more or less thoroughly saturated with asphaltum. The deposit was discovered by the escape of small quantities of asphaltum to the surface in a spring, and this led to prospecting for its source. A pit was dug about 12 feet in depth, passing through the bed, and the thick, viscous asphalt has slowly oozed out into this pit for the last thirty years.

The asphaltic rocks show considerable variation in character and in the amount of asphaltum which they contain. This variation is shown by the following analyses made for the Arkansas Asphalt Company by G. W. Howard, of New York City.

Specimen No. 1, known at the pit as brown cap sand, contains 5.06 per cent of bitumen, or 1.73 per cent of petroleum and 3.33 per cent of asphaltene. It is essentially a sandstone, since it contains 92.40 per cent silica.

Specimen No. 2 is a black sand rock containing 16.53 per cent bitumen, of which 14.13 per cent is petroleum and 2.40 per cent asphaltene. The percentage of silica in this rock is 81.20.

Specimen No. 3, a grayish rock exhibiting banding, contains 6.68 per cent of bitumen, 69.15 per cent of silica, and 20.35 per cent of carbonate of lime.

Specimen No. 4 is a black, gummy rock carrying 8.86 per cent of bitumen, 79.50 per cent of

The utilization of this deposit is a technical matter which cannot be entered upon here. Its chief value will doubtless be as a paving material. As stated above, some portions of the bed form a natural paving mixture, which hardens on exposure to the sun, and, so far as could be judged, would be fully as durable as the ordinary artificial mixtures made from Trinidad asphalt. Other portions are too rich to be used in a natural state. Tests of these portions in the preparation of a paving mixture have been made by the St. Louis Testing and Sampling Works, with excellent results.

The extent to which the deposit can be used for paving purposes in competition with other asphalts will be determined entirely by the matter of freight rates. It should easily control the market in near-by cities, such as Little Rock, Texarkana, and Fort Smith, and the richer portions of the deposit should compete advantageously with other asphalts in cities as distant as Memphis and St. Louis.

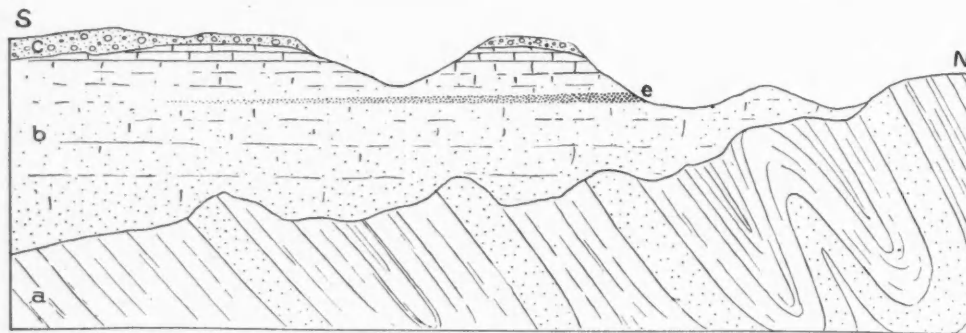
No experiments have yet been made in refining the asphaltic sand for the preparation of pure asphaltum, and this may be found to be more profitable than shipping the crude product.

From the large amount of bituminous matter in these Cretaceous sands in Pike County, it was inferred that petroleum in commercial quantities might be found by deep boring. On the strength of these surface indications, two wells have been drilled for oil. One, to a depth of 460 feet, is located near the center of the asphalt deposit above described. The other, about 2 miles to the southeast, has reached a depth of 1,420 feet. The wells penetrated from 100 to 120 feet of the Trinity formation, consisting chiefly of sands and clays, with a few thin seams of limestone, and then entered the Silurian sandstones and shales. The latter, as shown in the accompanying sketch section, are highly contorted, dipping at angles of 45° to 55°, and are intersected by numerous fractures. No oil in commercial quantities has ever been discovered in rocks of this character, and it will readily be understood that, even if they had originally contained oil, it would, before the deposition of the Trinity, have had abundant opportunity to escape to the surface through the fractures which resulted from the folding of the strata. The expectation of finding oil, therefore, in this region at greater depth than 100 or 200 feet, that is to say, in the underlying Ordovician rocks, has no rational basis. Also, it need not be expected that oil in commercial quantities will be found at shallower depths, since the conditions are not favorable for its retention in these sands.

In view of the foregoing considerations, it is concluded that deep drilling in this region is not justified by even a remote probability of finding oil in commercial quantities. On the other hand, the conditions for the accumulation of asphaltum are most favorable, and it is quite probable that other valuable deposits will be found in this region, similar to that above described and at the same horizon.

The sketch section given herewith shows the relation of three geological formations in the vicinity of Pike County, Arkansas. In this sketch a means Silurian sandstones and shales; b, Cretaceous, Trinity sand and limestone; c, Tertiary, Lafayette gravel; e, asphaltic sand bed.

GERMAN BRIQUETTE MACHINERY FOR THE UNITED STATES.—Berlin advices state that three companies manufacturing machinery for the making of briquettes out of coal waste have been combined into a syndicate for the purpose of exporting this machinery on a large scale to America. The factories interested in the syndicate are located at Ernfeld, near Cologne; at Buckau, near Magdeburg, and at Zeitz, in Saxony. The title of the company will be the Export Briquette Machinery Syndicate. It is reported that orders have been secured from mine owners in the United States.



SKETCH SECTION, PIKE COUNTY ASPHALT DEPOSITS.

tion in the mass has taken place, and by numerous small calcite veins. The surface on which the Trinity sands were deposited was made up of numerous ridges 100 to 200 feet high, formed by the hard sandstone, with intervening valleys upon the less resistant shale. Long after the deposition of the Trinity and other Cretaceous formations, and after they had been subjected to considerable erosion, the region was again depressed and received a widespread though not continuous thin deposit of sand and gravel, probably upon the flood plains of rivers. This is the Lafayette formation, generally regarded as of late Tertiary age. It has suffered much erosion, but the coarse gravels are still sufficiently abundant to greatly obscure the contacts of the Trinity, both with the underlying Paleozoic rocks and with the later Cretaceous formations.

The relations of these three unconformable groups of formations are represented in the accompanying generalized sketch section, which extends nearly north and south, at right angles to the lines of outcrop.

The most extensive deposit of asphaltum thus far discovered in Arkansas occurs in Pike County, about 2½ miles southeast of Pike City, on a branch of Wolf Creek. This has recently been developed by the Arkansas Asphalt Company, of Little Rock. Two hills south of Wolf Creek contain in their upper portions the fossiliferous limestones of the lower Cretaceous, and around their bases and extending under them is the Trinity sand. The asphaltum deposit occurs in a depression between these hills, where only the lower portion of the Trinity formation remains, consist-

ing chiefly of coarse sand, in some places quite calcareous, with beds of clay. The deposit is in the form of a sand stratum, which varies in thickness from 6 to 12 feet, more or less thoroughly saturated with asphaltum. The deposit was discovered by the escape of small quantities of asphaltum to the surface in a spring, and this led to prospecting for its source. A pit was dug about 12 feet in depth, passing through the bed, and the thick, viscous asphalt has slowly oozed out into this pit for the last thirty years.

Specimen No. 5, which is a calcareous sandstone, contains 4.58 per cent bitumen, which equals 3.46 per cent petroleum and 1.12 per cent asphaltene. The carbonate of lime in this specimen amounts to 46 per cent, and the silica to 49.42 per cent. At the pit this rock is known as limestone.

No doubt specimens taken from these classes of rock would vary from place to place in the pit. The analyses, however, probably represent fairly the materials obtainable.

Like similar deposits in other regions, there can be little doubt that this asphaltum is merely the residuum from petroleum, the lighter and more volatile portions of which have escaped by evaporation. It has also doubtless undergone certain chemical changes, chiefly oxidation, during its long exposure to atmospheric conditions.

By means of test borings the asphaltum bed has been proved to extend over a number of acres, under a cover sufficiently thin to permit profitable mining by stripping. At the time the deposit was last visited, in November, 1902, a pit about 100 feet in diameter had been opened and a tramway built to the railroad, about half a mile distant.

It is proposed to use the materials in such proportions as will produce a good paving mixture. The occurrence of the limestone with the sandstone makes this possible without the addition of material from other sources. A practical test will be made at Little Rock, where a contract has been obtained for paving certain streets.



**PROBLEMS OF LABOR AND LIFE IN ANTHRACITE COAL MINING.**

BY FREDERICK L. HOFFMAN.

*Part IV.—Accidents.*

Accidents in coal mining are usually reported as either deaths or injuries. These terms require definition and explanation, especially as to deaths, for it is necessary to know the time element involved, since serious injuries terminating fatally after a period of, say, three or six months or even a longer time are generally not included in the mining mortality data. In England, according to Henry Louis, in Oliver's *Dangerous Trades*, "most inspectors seem to include in their list of fatal accidents all accidents of any kind whatever that terminated fatally within a year and a day from the date of the occurrence." It is further pointed out that "while this may not be law, it is certainly common sense." In Belgium only deaths within 30 days of the accident are reported, and deaths due indirectly to mining accidents are excluded. French statistics include only accidents that resulted fatally within a few days of the occurrence, there being no rule at all on the subject. The practice in the different States of this country varies also considerably. International comparison or interstate comparison of the fatal accident rates must, therefore, be made with caution and due regard for an element of uncertainty, by which the mortality may be understated by as much as ten per cent and possibly more.

Statistics of non-fatal injuries are of very doubtful value, since the nature and extent of the various minor accidents are seldom stated in tabular form. It would be of value to have such a statement along the lines adopted by the German Government and, to a certain extent, by American accident insurance companies. Since many of the detailed reports of district inspectors contain all the necessary facts it would not be difficult to bring together a very valuable body of data which would add materially to our, at present, very limited information regarding the nature and extent of non-fatal accidents in coal mining. Since the methods of reporting non-fatal injuries vary materially with the different States it is not possible to make a useful or accurate comparison of the data.

The relative frequency of accidents in coal mining is measured by various methods, quite generally by a ratio of lives lost in proportion to the amount of coal produced. This method is antiquated and of small value, often leading to wrong conclusions, and it is better to determine the rate of accidents on the basis of the average number of persons employed. Rates as arrived at in this manner are comparable with similar rates for other occupations, and, on the whole, are trustworthy indications of favorable or unfavorable conditions. Largely as the result of the continued use of the ratio method, widely divergent views prevail as to the actual danger of mining operations, and while the rate per thousand is not perfect, it is certainly the most accurate and practically useful measure of accident liability which has yet been devised.

The statement has been made that "the work of a miner and a mine laborer is extremely hazardous, in fact, it is more dangerous than employment in any other important industry in the world." It has further been stated that "in the bituminous coal fields, in the silver and gold mines, in the iron ore and copper mines, the work is less hazardous and freer from liability to disease than labor in the anthracite coal fields." We meet with a similar statement in a paper on *Anthracite Mine Labor*, by G. O. Virtue, published by the Department of Labor in 1897. Mr. Virtue states that "the extremely dangerous nature of anthracite mining even as compared with other mining is very evident." Mr. Roberts, in his book on the *Anthracite Coal Industry* (page 168), states that "deaths from accident are more frequent in the mines than on the railroads in

proportion to the number employed." The Industrial Commission, in its final report, commits itself to the statement that "in most regards iron mines and precious metal mines are less dangerous than coal mines" (page 959). In marked contradiction to this view is the statement of Henry Louis that "mining, and more especially coal mining, is really not the highly dangerous occupation that it is usually thought to be," but this conclusion is derived largely from a consideration of English data. The emphatic assertions that coal mining is much more dangerous than other hazardous occupations are practically unsupported by accurate statistical evidence. The comparisons which are usually made of the crude death rates for all classes of employees are generally misleading and of very small determining value. It is a matter of the utmost necessity that this subject should be thoroughly inquired into and intelligently reported upon. A detailed analysis and digest should be made of all of the reports of the Pennsylvania mine inspectors for the past 30 years, and the elements of the occupation should be fully taken into account. It is impossible here to deal with all of even the most important aspects of the problem, but as far as possible due consideration is given to the most essential points.

Considering first the accident rates as generally published for the anthracite coal-field as a whole, and for the bituminous coal regions of Pennsylvania and other States in this country and abroad, the table which follows will show the average rates per thousand employed during two periods of ten years each, together with the highest and lowest rates prevailing during individual years of the 20-year period.

Accidents per 1,000 Employees.

States.	1880-89	1890-99	Highest	Lowest
Penna. Anthracite ..	3.21	3.18	3.59 (1881)	2.71 (1886)
Penna. Bituminous .	1.74	2.08	3.18 (1891)	1.39 (1881)
Ohio .....	1.53	1.60	2.10 (1886)	1.09 (1882)
Illinois* .....	2.19	2.07	5.60 (1883)	1.40 (1880)
Great Britain .....	2.01	1.48	2.72 (1880)	1.03 (1898)
New South Wales ..	3.46	1.43	11.58 (1887)	0.46 (1881)

It is shown by this table that the average accident rate of all persons employed in anthracite mining has been higher than in bituminous mining in Pennsylvania, Ohio, Illinois, Great Britain and New South Wales. If, however, we consider individual years, it is shown that during 1887 the accident rate in coal mining in New South Wales reached 11.6 per thousand. In Illinois also during 1883 the rate was far in excess of the highest rate ever attained in anthracite coal mining in Pennsylvania during the past 20 years. The lowest rates, however, for anthracite mining are considerably in excess of the lower rates attained in other States, and thus the general opinion that anthracite mining is an exceptionally hazardous occupation as regards all persons employed is supported by the facts. The table further shows that but a trifling decrease in the rate has occurred in anthracite mining, while an increase is recorded for the bituminous coal-field. Very considerable decreases in the rates for Great Britain and New South Wales indicate improved conditions abroad which apparently do not prevail in this country.

A further analysis of the accident statistics, however, is possible by a detailed consideration of the accident rates for individual districts. In the table which follows a comparison is made of the rate of fatal accidents in the eight anthracite and ten bituminous districts during the five years 1896-1900.

This table is of considerable interest, for it is shown that while the accident rates in anthracite mining have been uniformly high in all of the districts, in certain bituminous districts, especially the 1st, 2d, 5th, 7th, and 9th, the rate has been almost as high as the average rate (3.1) for the anthracite coal-field. This table, then, would in-

dicade, with at least approximate accuracy, that in certain sections of the bituminous coal-field the risk to life is equally as great as in anthracite mining, and that in two districts (the 1st and

Fatal Accidents in Anthracite and Bituminous Mining of Pennsylvania by Districts during 1896-1900.

Anthracite		Bituminous	
Dist.	Rate per 1,000	Dist.	Rate per 1,000
1	3.0	1	3.6
2	2.9	2	2.5
3	4.3	3	0.9
4	3.0	4	1.9
5	2.4	5	3.0
6	3.2	6	1.8
7	2.7	7	2.5
8	2.9	8	1.2
		9	2.6
		10	1.8

5th) the average rates are as high as, if not higher than, the average mortality from accidents (3.1) for the anthracite coal-field considered as a whole.

The underlying element of uncertainty in the preceding rates is the fact that a very large number of employees are taken into account who contribute but a small proportion of the number of fatal accidents. It is, therefore, necessary to consider separately the different employments, and this has been done in the following table showing for anthracite mines the fatal accident rate per thousand of persons employed in specified occupations during the period 1892-1900. While the original data are given in the Mine Inspectors' reports the corresponding relative mortality rates have not been worked out, and this table presents for the first time, as far as the writer knows, the actual death rates of anthracite miners in different branches of the industry.

Anthracite Mines in Pennsylvania. Accident Mortality of Employees by Specified Occupation, 1892-1900. Inside of Mines.

	Number of Employees	Number Killed	Accidentrate per 1,000 Employees.
Inside Foremen .....	5,892	25	4.24
Fire Bosses .....	9,232	23	2.49
Miners .....	315,003	1,754	5.57
Mine Laborers .....	219,625	1,000	4.55
Drivers and Runners .....	90,337	334	3.70
Door Boys and Helpers .....	28,222	78	2.76
Others .....	144,142	262	1.82
Total .....	812,453	3,476	4.28

According to this table the rate of fatal accidents per thousand of persons employed was highest for miners, having been 5.6 per thousand during the period under observation. Next in order of importance are mine laborers with a rate of 4.6, inside foremen 4.2, and drivers and runners with a rate of 3.7 per thousand. The average rate for all persons employed inside the mines was 4.3, while for those employed outside the mines the rate was only 1.0 per thousand. These rates will enable us to make accurate comparisons with the more hazardous employments in the bituminous coal mines and specified occupations in other dangerous trades.

This comparison forcibly illustrates the necessity of detailed analysis. The general rates for industries do not indicate with accuracy the mortality in particular branches. There are occupations where the accident factor is quite general, as, for example, in the Gloucester fisheries, while in others the accident factor is quite exceptional, as in the iron and steel industry; in the former nearly all of the men employed are liable to accidents, while in the latter only a small proportion of the men employed are engaged in hazardous occupations. It is shown by this table that Gloucester fishermen, so far as we know, are subject to the highest fatal accident rate in occupations usually classed as dangerous or hazardous. The rate was 13.5 per 1,000 during the period of ten years 1891-1900, and compares with 5.6 per 1,000 for anthracite coal miners. By "coal miners" are meant only actual miners employed inside of anthracite mines in Pennsylvania. The fatality rate of anthracite miners, however, is very much lower than the accident rate of rail-

road brakemen and railroad employees generally in Southern States. It is much lower than the accident rate of bituminous coal mining in the States of Washington and New Mexico, and of diamond mining in South Africa. We do not know the mortality in specified employments in the preceding three indus-

Fatal Accidents in Twenty-five Dangerous Occupations  
Rate per 1,000 Employed.

Occupation	Period	Rate per 1,000 Employed
Gloucester Fishermen	1891-00*	13.5
Railroad Brakemen	1899-00*	12.5
Railroad Trainmen, Southern States	1891-00	9.9
Railroad Flag and Switchmen, Southern States	1891-00	9.8
Bituminous Coal Mining, Washington	1892-01	8.4
Bituminous Coal Mining, New Mexico	1892-01	7.5
Diamond Mining (whites) South Africa	1892-00	6.4
Anthracite Coal Miners, Pa.	1892-00	5.6
Gold Mining (whites) South Africa	1895-98	5.4
Bituminous Coal Mine Laborers, Pa., (Inside)	1892-00	4.9
Coal and Metal Mining, Montana	1893-00	4.7
U. S. Army, Peace—War	1896-00	4.6
Anthracite Mine Laborers, Pa., (Inside)	1892-00	4.6
Bituminous Mine Laborers, Pa., (Inside)	1892-00	4.5
Anthracite Mine Foremen, Pa., (Inside)	1892-00	4.2
Anthracite Mine Drivers and Runners, Pa., (Inside)	1892-00	3.7
Metal Mining in Colorado	1896-00	3.2
Lead and Zinc Mining, Missouri	1891-00	3.1
Copper Mining, Houghton County, Mich.	1891-00	2.8
Anthracite Door-Boys and Helpers, Pa., (Inside)	1892-00	2.8
Bituminous Mine Drivers and Runners, Pa., (Inside)	1892-00	2.7
Paid Firemen in American Cities	1891-00	2.5
Anthracite Mine Fire Bosses, Pa.	1892-00	2.5
Bituminous Mine Foremen, Pa., (Inside)	1892-00	2.4
Bituminous Miners, Pa.	1892-00	2.1
Normal for all Occupations		0.8
* Partly estimated.		

tries, but the accident liability of inside miners would be very much higher than the general average for the industry as a whole. The rates have merely been quoted to show that anthracite coal mining is far from being the most dangerous occupation known either in this country or abroad. It is not necessary to examine further into the details of the table, which is self-explanatory and shows that while, generally speaking, the accident rate of persons employed in the anthracite coal industry is higher than that of persons employed in other dangerous occupations, including the bituminous miners of Pennsylvania, there are important exceptions to this rule. If comparison is made with bituminous miners in Pennsylvania, it is shown that while anthracite miners have a fatality rate of 5.6 per 1,000, bituminous miners experience a rate of only 2.1 per 1,000. The risk to life is very much greater to bituminous mine laborers in Pennsylvania than to bituminous miners. Anthracite inside mine laborers experienced a rate of 4.6 per 1,000, which must be considered very high. The average normal mortality from accidents among occupied males is 0.8 per 1,000, according to English data. Making due allowance for less favorable conditions in this country, the normal mortality from accidents, due either to the occupation or to other causes, may be placed at 1.0 per 1,000, and by just so much as the rates for dangerous occupations exceed this average the employment must be considered exceptionally unfavorable.

There are other factors aside from the specific occupation which materially modify the liability to accident, but regarding which we have practically no trustworthy data. *Age in its relation to accident liability* is a factor which has received practically no consideration. Although the ages of the killed and injured are stated in the individual reports of mining inspectors, the ages are not tabulated nor is there corresponding information as to the ages of the employed. It is of importance that this information should be furnished, and that the mine inspectors' reports should annually contain a statement as to the ages of all persons employed in anthracite mining, with the further distinction as to inside and outside employees. It should not be difficult to obtain this information, and, in fact, an effort in this direction was made some years ago, for we find a table

sylvania mine inspector's report for 1880, page 239, as follows:

Average Mortality in England per 1,000 Employees at Specified Ages.

	15-19	20-24	25-34	35-44	45-54	55-64
All Occupied Males	0.47	0.56	0.66	0.84	1.10	1.41
Coal Miners	1.54	1.53	1.83	2.10	2.91	3.07

*Nationality* is another important factor which no doubt contributes quite considerably to the occurrence of accidents. This point has often been raised, but no satisfactory information has ever been given to the public. While the nationality of the killed and injured is stated, we have very little corresponding information as to the nationality of the employed, and to make the data comparable we should have this information by ages. It, however, is necessary to know whether the information given is the country of birth or the parentage, for it is clear that many of the children employed in the breakers, etc., would be returned as Americans, being native-born of foreign parents. The statement made by Mr. Roberts that "the number of accidents, if computed according to the number of Slavs employed, does not exceed that among English-speaking miners" (*The Anthracite Coal Industry*, page 84), is not supported by the necessary statistical evidence. It is our own opinion that the fatality rate is much higher, for, as Mr. Roberts points out, printed rules as to the care of tools, the handling of powder, the position of the car, the treatment of gases, etc., are "but a dead letter to most of the English-speaking miners, not to say anything of hundreds of Slavs to whom the English tongue is unknown." It is the opinion of most of those who have investigated the subject of coal mining accidents that "the best preventive of colliery accidents is technical education." We understand that in Germany a knowledge of the German language is required for employment in mines, and if there is any virtue at all in education it must certainly show itself in intelligent obedience to rules and regulations framed for the safeguarding of the miner's life. Mr. H. Louis asserts that the decrease in fatal accidents in coal mining in England, where the underground rate has been reduced from 5.1 per 1,000 during 1851-55 to 1.5 during 1896-99, is due to the "scientific training of managers, officials and men alike," and he adds that "it needs a certain amount of technical and scientific training to enable the average coal miner to realize the importance of rules and regulations," and that the "English miner has been brought to realize it as one of the main factors of increased security that the men nowadays enjoy."

(To be continued.)

#### ARSENIC IN INDIA.

An official report, published in the *Agricultural Ledger*, issued by the Indian Government, says that there are three localities within India, or on its immediate frontier, where the sulphides of arsenic are not only known to exist, but are in sufficient abundance to be regularly drawn upon as sources of supply. These are Munsiri in Kumaon, Chitral in the Panjab and various localities in Upper Burma and Unan.

The orpiment from Munsiri is brought for sale by the Bhutias to the Bagesar fair. This is the least important of the Indian supplies. Elphinstone in his *Account of Kabul* discusses the sources of supply from across the Northern Frontier of India. He speaks of it as coming mainly from Bulk. It has long been known that yellow orpiment is regularly brought to Peshawar for sale and it has commonly been spoken of as coming from the Swat country and Kashgar. In Kandahar it is also reported to be sold in fairly large quantities and to come from Herat. Recently, however, a writer in the *Pioneer* furnished a most interesting account of the orpiment mines of Chitral, which, he says, "are situated in a flank of the great giant Tirich-Mir." It would thus appear probable that the Panjab may have derived its orpiment in the past as at the present day, very largely from these Chitral Mines.

From the very earliest times Burma and China have been sources of supply to India, of orpiment, realgar and even white arsenic. Marsden, *History of Sumatra*, for example, speaks of white arsenic as being conveyed from China and Sumatra to India in the 18th century. The white form came no doubt from remote tracts of China and at the present is mainly, if not entirely, imported by sea from these self-same localities, instead of by the old land routes. But the traffic in orpiment and realgar, from Western China through Upper Burma, is a flourishing one even now. The imports, during the past three years, have averaged 638,400 pounds, and last year shows a considerable expansion on the previous year. The foreign imports in 1900-1901 came to 309,792 pounds, valued at 56,390 rupees and were derived mainly from Germany, the United Kingdom, Hongkong, and the Straits Settlements. What proportion of the foreign imports of pigments (if any) represent arsenic, it is impossible to determine, but the consumption of white arsenic, orpiment and realgar in the industries of India must be very extensive.

White arsenic is the medicinal form in most general use. It is also largely employed in preserving the hides and skins that are exported from India and, being more readily soluble and at the same time devoid of color, it is the chief form used nefariously. Orpiment is not only a pigment and a dye, but it is an essential ingredient in the manufacture of shellac; it is the yellow color in nearly all the lac toys that are made; it is the yellow of the Afridi wax cloths; it is the poison used in the production of insect-proof paper; it is the chief ingredient in most scrub destroyers and insecticide powders; it is used throughout India in the preparation of fireworks in order to give a blue flame; and it is an ingredient in nearly all the known depilatory ointments. Lastly, much interest has recently been taken in the subject of orpiment as a poison for locusts. Realgar is chiefly used as a pigment and in pyrotechny, being resorted to, it is said, for the purpose of producing white fires.

It will be seen that in some form or other arsenic is very extensively employed in India, and that it is both brought to the country across the land frontier as well as by sea from foreign countries. Mr. J. E. O'Connor shows in his returns of Medico-Legal Investigations that it is the most prevalently resorted to of all poisons, for criminal purposes. During the year 1899 out of a total of 915 cases actually investigated, where human life had been taken by means of poison, in 382 the poison was found to be arsenic. During the same period out of a total of 593 ascertained cases of cattle poisoning, 430 were by means of arsenic. Curiously enough, poisoning, and more especially arsenical poisoning, is much more frequent in the Panjab than in any of the other provinces of India. It would appear as if the prevalence of arsenical poisoning in the Panjab were a direct expression of greater abundance of and more facilities in procuring the poison than prevail in other provinces. It is at all events worthy of suggestion that more careful inquiry should be instituted than appears to have been the case as to the supplies obtained by the Panjab from Chitral and the trans-frontier sources indicated above.

#### GOLD STEALING IN WESTERN AUSTRALIA.

The *Australian Mining Standard* of recent date says: "A most necessary and long-looked-for amendment is provided in the Police Amendment Bill recently introduced into the Westralian Legislative Assembly in regard to gold stealing. The difficulty at the present time is that if a mine owner brings a charge of gold stealing against a person he is asked to identify the gold itself—an almost impossible thing to do. The advantage of the provision in the present measure is that a person has merely to be proved to be in possession of the gold which is reasonably supposed to have been stolen. The Attorney-General in moving the second reading of the bill said the clauses appeared to be rendered necessary in view of the grave fact that gold stealing was



rampant on the golden belt. Efforts have been made time after time to check the continued growth of those robberies, but without success. The companies have employed detectives, who have brought prosecutions and used their utmost endeavors to enforce the existing law. They have, however, failed, and the evil is of larger proportions to-day than ever before. There is an urgent need for the amendment of the law. It is provided in the new bill that any person charged with having on his person or cart or vehicle or in his possession or on premises of which he is the tenant or occupier, any gold (meaning gold bullion, retorted gold, gold ores, alluvial gold, gold amalgam, gold alloys, zinc precipitates, slag, concentrates, tailings, residues, and unwrought gold in any form), reasonably suspected of being stolen or unlawfully obtained, and who does not prove that he came by it lawfully, will be liable to a fine of not exceeding £50, or a term of imprisonment not exceeding six months. The question of accessories is also dealt with. The amending bill will be highly embarrassing to the receivers of stolen gold, but will not in any way interfere with legitimate dealers. First catch the thief and the remainder is an easy matter for disposal."

#### "MARAUDING" IN FRENCH GUIANA.\*

By DAVID LEVAT.

In French Guiana the profession known locally as that of the "maraudeur"—the gold robber—is not considered at all disgraceful. It indicates simply the prospector or placer miner who practices his industry on any gold-bearing territory which he can find without disturbing himself at all about the legal proprietor. Formerly, before the discovery of the great placers of Awa and Carsewene, the maraudeur was the exception, because at that time the gold mining industry was in a state of stagnation, and there was no considerable rush of workmen; but after the important discoveries in what we know as the contested territory—that is, the territory the ownership of which was in dispute between France and Brazil—the number of gold mines was very largely increased. There sprung up a disposition also among those who had been content to work for the large companies for wages to start out upon their own account.

One of the unfortunate conditions resulting from the growth of this system is that the gold found by this class of men generally escapes payment of royalty or taxes, to the great detriment of the finances of the colony. It is certain that this tax is not collected upon all the gold produced, but probably on an amount varying from one-half to two-thirds of the actual figures. It would be better perhaps if the tax was reduced from the 8 per cent now levied to a somewhat lower figure, say, 5 per cent, which is the law in Dutch Guiana. This is a reform which ought to be seriously considered by the colonial government. There are now in existence at Cayenne, two parties, one of which is opposed to the system of marauding and wishes to suppress it, and another which defends this practice.

It is not denied that it is the better class of workmen who constitute the main part of the maraudeurs, and these are the men who naturally are most looked for by the companies which are exploiting the placers. In general the class of men who work upon the placers have few wants. Their actual needs can be supplied by a moderate amount of work, and they are not inclined to do more than seems to them really necessary nor to work when they can live without it. Saving or accumulation for the future is entirely unknown among them.

The maraudeur who leaves the coast for the interior is generally said to be "en bricole," that is, in harness. One peculiarity of these men when

at work is their sobriety and extraordinary endurance. The same workman who, when he is employed by a company, shows himself extremely exacting as to the quality and quantity of his food—for the wages paid these men always include their food—becomes an anchorite when he starts out to live at his own expense. For instance, "tafia," a liquor which forms an essential part of the rations on the placers, constitutes a continual source of complaint, and the placer workman will not only contest energetically but even quit work if he does not receive his allowance of tafia promptly; and I have even known of instances where strikes have occurred, because in measuring the allowance of 12 centiliters, the thumb of the commissary was inserted in the measure. The maraudeur when he starts out on his own account forgets his tafia altogether. The usual supply of food taken out by a party consists of a bombe (22½ kg.) of flour, with a gun and ammunition to kill game and a few fishing lines to add fish to the daily supply.

With the more luxuriantly furnished expeditions there goes a woman who travels under the euphonious designation of "washerwoman." I need hardly add that she is generally young. At the end of the expedition these young women return from the interior ornamented by a number of gold nuggets, varying according to the generosity of the party and to the success which it may have attained. It is a fact that the jewelers in Cayenne always go to these young ladies to procure the nuggets which they manufacture into gold chains of original form.

The usual method which the maraudeur adopts to put himself nominally in accord with the law is very simple. Before starting out he commences by going to one of the authorized surveyors of Cayenne, who gives him, usually for 10 francs, a map of some supposed new placer territory; presenting this to the Mining Bureau he obtains a permit to exploit a surface of 100 hectares, for which he pays 50 francs. This plan and permit, however, are merely to conform nominally with the law, and the expedition may never set foot upon the ground actually shown, the maraudeur contenting himself by indicating vaguely the district; that is, he would not hold a permit to work on the Maroni when he really intended to go to the Approuague. Supplied with this paper he betakes himself to the district which he has chosen, selecting the best place he can find without disturbing himself at all as to the real owner.

The philosophy of the maraudeur is very simple. Providence has created gold for the benefit of all the world. Any artificial or technical legal restrictions disappear in the luxuriant vegetation of the tropics. He is not at all likely to be disturbed by interference from the police, who are not too anxious to waste their time in distant forests or in ascending rivers difficult of navigation. Should the proprietors be disturbed by possible loss and organize an expedition on their own account, he simply retires for a time, and when the interfering officers depart he returns to the prey like a fly to a plate of honey.

There are reasons for the comparative immunity which the maraudeur generally enjoys. Should he be arrested the courts could not inflict any penalty except where positive proof could be obtained, and that is often very difficult and the expense large. The owner of the placer cannot prosecute unless his territory has been fully surveyed and marked out, and to establish a fence or boundary would be in many cases very expensive. Even should the boundary be exactly marked out, it would be necessary to employ a number of guards, and unless the owner engages in actual working, this would not pay him. There are even some placer territories which have been fully surveyed and marked on which the owners, recognizing the difficulty, have compromised with the enemy. This has made a new class, which may be regarded as authorized maraudeurs. In

these cases, the proprietor permits any one to enter upon and work his placer on payment of a royalty of 10 per cent of all the gold found. Whether he collects this or any approximation to it depends upon the activity and sharpness of the collecting agent who is employed to visit the working parties periodically. Naturally the miners are always unfortunate, and report only an extremely small production, but if the collector understands his business he may succeed in getting somewhere near the proprietor's due. Two or three placer owners have, indeed, replaced this system by charging a fixed rate, say, 25 grams of gold a week for each party, no matter what is the real production.

In what has been said I have named some of the disadvantages of this system. It is only just, however, to say that there is also something to be said on the other side. I have had personal relations with a number of these maraudeurs, which have convinced me that they constitute an important element in the exploitation of the interior placers. The maraudeurs are in fact the best class of miners and prospectors in the colonies. They work hard, expose themselves to all sorts of risks and privations, and to them are due some of the most important discoveries during the last ten years. If it were not for the maraudeurs the placers of Awa and Carsewene and the rich grounds of the Inini would never have been discovered or opened to the world.

The maraudeur is a prospector of great value, and it is not necessary to argue too closely the question whether he works on territory which is open and has not been conceded to any proprietor, or whether he works upon placers which have been conceded and the proprietors of which have not taken the trouble to survey or map them out, or to employ guards. The maraudeur on these conceded tracts prevents, in effect, the monopolizing of great placer areas by speculators who would hold them in the hopes of making money at some future time by their sale. The proprietor who takes up a tract with the idea of holding it for the future and of profiting by its sale without putting himself to any expense to work or exploit it, is of no benefit to the colony. He simply prevents more enterprising parties from working the country and locks up its value. The maraudeur in establishing himself upon the property of such an owner shows what is the value of the ground, and in frequent cases he has forced the owner to invest money in systematic exploitation.

It may be asked in what way the marauding parties succeed in bringing their gold to the coast and selling it without interference by the legal officers. It is true that in principle the stolen gold should not receive any legal sanction from the State, but it is impossible to prevent it altogether. On the Inini, for instance, the maraudeur who has to pass the police posts in returning to the coast will gravely present a sworn statement that the gold he has comes for the most part from beyond the frontier of the colony. On a small portion he will pay the 8 per cent tax, and the whole of the gold is then carried down to Cayenne protected by an official certificate.

This question is a complex and an important one when we consider the considerable number of prospectors who are exploiting in the interior of Guiana. The line between the maraudeur and the honest prospector who really works a placer for which he has obtained a regular concession is very uncertain. These two classes are really one, and I do not hesitate to say that from them proceeds the greater part of the actual production of gold in the colony. If we take the monthly figures reported by all the organized companies which operate placers and which cannot escape the payment of the tax, we find that the output is not more than 90 to 100 kilograms of gold per month. The actual exports from the colony

\* From *La Guyane Française en 1902*. Paris, 1902.

amount to 250 to 280 kilograms monthly, showing that the maraudeurs or small workers are much larger producers than the organized companies.

The one remedy for this system is a very much larger police force and closer watchfulness; and even with this, old residents of the colony say that it would be impossible to put down entirely this irregular exploitation, and, moreover, that the expense would be enormous, and also that the gold production would be largely cut down. It is a fact, however, that in Dutch and British Guiana there are no complaints of irregular operations of this kind. This is due, in my opinion, to the lower rate of tax and also to the more strict rules adopted by the courts.

#### ORE DRESSING IN THE SLOCAN DISTRICT, BRITISH COLUMBIA.\*

By SAMUEL S. FOWLER.

The earlier mills in the Slocan District followed the Coeur d'Alene practice very closely, aiming at rapid running and low cost. Recently the tendency has been toward improved efficiency, without increasing the operating expense, but at the cost of more perfect installation of plant. This is important in the Slocan District, because its galena ore is so much richer in silver than is the case either in the East Kootenay or in the Coeur d'Alene. There are at present 18 mills in the Slocan, which have an aggregate capacity of about 2,100 tons of ore per day, and cost upward of \$500,000. Only five are in operation; of the remaining 13, six were erected without sufficient assurance as to ore supply. These mills are quite similar in general design. The ore delivered into the storage bin, passes thence over a small grizzly to a Blake crusher which reduces it to a maximum size of about 1.5 inch. The coarsely crushed ore is delivered by a belt-driven cam feeder to the roughing rolls, which are belt-driven, and are usually not less than 30 inches in diameter, nor more than 12 inches wide; they are run at about 110 revolutions per minute. These rolls discharge into an elevator, which delivers to the trommels, the latter having apertures from 21 to 2 millimeters. The sizes larger than 2 millimeters go to Harz jigs; those smaller are sorted by hydraulic classifiers, from which the sizes above 1 millimeter go to appropriate Harz jigs and the finer pass through spitzkasten to some form of vanner or other table machine. The middlings from the coarse jigs are recrushed by rolls, usually duplicates of the roughing rolls, while the middlings from the fine jigs and the tables are commonly recrushed in Huntington mills. In the earlier mills the fine slimes were washed on double-deck, revolving round tables, but these have now been displaced generally by other kinds, which have been found to give superior results.

It is difficult to deduce what is the average percentage of values recovered in the district, but in the author's own experience a saving of 74 per cent of the silver and 82 per cent of the lead in the ore has been attained. The cost of milling in the Slocan District is, as everywhere, greatly dependent upon the capacity of the individual mill, but the cheapness of power is an important factor. The conditions of the district permit the installation of small water power plants, working commonly under heads of 300 to 400 feet, at points very close to the mines. With the exception of two mills on Kootenay Lake all the mills in the district are run by water power. Most of the mills are designed with view to economy in labor, and are compactly arranged. The results attained in one of the more prominent are as follows: In 557 days of 22 hours each there were milled 100,824 tons of ore (averaging 7 per cent moisture), or 181 tons per day. In this mill two hours are allowed daily for the common light

repairs, and the practice has proved a good one in preventing many annoying shut-downs. The cost per ton was 34.06 cents, of which 3.64 cents was on account of the crusher-men, 16.13 foremen, jig-men and table-men, 2.23 miscellaneous labor, 2.48 operating supplies, and 9.58 cents labor and material for repairs and renewals of plant. The above figures do not include insurance, allowance for depreciation or cost of sacking the concentrate. The last item amounted to 56 cents per ton of concentrate. (The author computes his average tons milled per day and cost of milling per ton on the basis of wet ore, which, as he states, carries 7 per cent of moisture.)

The milling practice in the Slocan District is doubtless capable of considerable improvement. Among other things it would be advisable to provide a short picking belt above the coarse crusher, and select from it the pieces of rich galena, saving the inevitable loss that it must suffer in being put through the mill. Experiments in one of the works under the supervision of the author indicated the advisability of this. Another noteworthy feature of the Slocan mills is the absence of any general attempt at close sizing before jigging, the common tendency of the Northwest, and more particularly that of the Coeur d'Alene being followed in this respect. The character of the Slocan ore is such, however, that good work cannot be done without close sizing, though it may not be necessary to go to the extreme limit of some German practice. There is also room for improvement in washing the fine material in the Slocan mills. The jig practice of the district, on the other hand, is very efficient. The feed above 3 millimeters in size usually forms nearly 80 per cent of the tonnage, although nearly 30 per cent of the values of the ore reach the five jigs and tables. Indeed, in one instance, the jig tailings were all eventually crushed fine enough to reach a row of seven Wilfley tables, with results that were good; of course, a smaller percentage of product was made on the jigs. The usual run of jig tailings in the district seldom contains more than one-third as much silver as do the tailings from the fine end of the mill and it often happens that the work of the coarsest jigs is practically perfect. This is due in large measure to the inclusion of coarse slate, quartz and calcite in the ore, all of which are generally barren of silver.

#### RECENT DECISIONS AFFECTING THE MINING INDUSTRY.

SPECIALY REPORTED.

WHERE MINING STOCK HAS BEEN LOST COURT MAY COMPEL ISSUANCE ANEW.—In mandamus proceedings to compel the issuance of a certificate of stock in a mining company, in place of one that was lost, where the evidence shows the loss, where more than 10 years have elapsed since the relator became the purchaser of certain shares of stock, and no one has laid claim to the lost certificates, no such claim can thereafter be made; the particulars of the loss need not be shown.—State ex rel. Benedict v. Southern Mineral and Land Company (32 *Southern Reporter*, 174); Supreme Court of Louisiana.

CONTINUITY OF VEIN IN ITS DIP AND EXTRA LATERAL RIGHTS.—In a lode vein having its apex in the surface of a mining claim and a westward dip, after it was followed down several hundred feet, and beyond the side line planes of the claim, through which distance it was a comparatively simple fissure vein, there occurred at some points what were technically termed "complications." The fissure would flatten and pinch out, but before reaching that point there would fall from it a series of small mineralized fissures having an eastward dip, and connecting, at a depth downward of 6 or 8 feet, with another underlapping west dip fissure. This latter pinched out in a short distance on its upward course, but on its

downward course it strengthened, and became again a strong bearing vein. Where these complications occurred, the miners, in the practical working of the mine, dropped to the underlapping fissure, and followed it as the continuation of the main vein in its downward course. The east dip fissures did not appear to cut across either of those having a west dip, but merely connected them. At other points both north and south of the places where these complications occurred the vein was continuous and unbroken down to the lowest level of the workings. It was held that such complications did not break the continuity of the vein, the overlapping and underlapping fissures being portions of the same vein, and that the owner of the claim in which it apexed was entitled to follow it beyond them; on the ground that the evidence established the existence of a vein or lode apexing within the surface boundaries of the claim, and having continuity lengthwise of the claim to the extent and in the direction necessary to carry extralateral rights therein between the extended end line planes of the claim.—*Pennsylvania Consolidated Mining Company v. Grass Valley Exploration Company* (117 *Federal Reporter*, 509) United States Circuit Court, California.

#### ABSTRACTS OF OFFICIAL REPORTS.

*Alaska Gold-Fields Limited.*

The directors' fourth annual report says: "It is with regret that your directors have to intimate that owing to the unfavorable trade conditions in the Yukon District during the past year the result of the operations of the undertakings upon the fortunes of which this company's affairs depend has been unsatisfactory. The amalgamation of the company's trading and transportation interests with those of the Alaska Commercial Company, as indicated in the last statement was of vital importance in order to meet the increasingly keen competition, and although the anticipated benefits have not been realized, it is certain that without this amalgamation the position would have been a most serious one.

"Your chairman, who has been from the inception of the company its largest shareholder, has given your business his best attention, and recently has again, at considerable inconvenience and entirely at his own expense, been out to San Francisco and undertaken a personal investigation into the company's business. His report contains a statement of the position and prospects of the company, and it may be added that since his visit tidings from the district as to the state of trade are rather more favorable, and the outlook for the coming year somewhat better. Much of the trouble has been caused by the financing of small traders by the banks upon an already well-supplied and declining market, and this policy having been unprofitable to the banks we understand will not be continued. Negotiations have been initiated, of which particulars cannot, as will be understood, be given, which should enable your company's transport business, and that of its present principal competitor in that line, to be conducted in future upon a profitable and improving basis instead of as during the past year upon terms which have probably been quite as unsatisfactory to its competitors as to the company in which you are interested. According to advices from Dawson City the construction of the Klondike Mines Railway has been commenced, and this undertaking is of great importance to the immediate future of the district. As regards the coal properties owned by the company, development has been suspended because of transportation difficulties, but the position may improve if the quartz discoveries in the neighborhood are to be worked upon a large scale, in which case there should be a good local demand for the coal, and the question of successful dealing with this valuable property would be nearer a practical solution."

\* Abstract of a paper read at the Nelson meeting of the Canadian Mining Institute.



## 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.

*Rhodesia Chamber of Mines, Seventh Annual Report.* H. E. O. Green, Secretary. Bulawayo, Rhodesia; published for the Chamber. Pages, 144; with tables.

*Statistics of the Six States of Australia and of New Zealand, 1861-1901.* Compiled by T. A. Coghlan. Sydney, N. S. W.; Government Printer. Pages, 84.

*Report of the Proceedings of the Fourth Session of the International Mining Congress, 1901.* Irwin Mahon, Secretary. Butte, Montana; published for the Congress. Pages, 234.

*Notes on the Estimation of Copper by Potassium Permanganate.* By H. A. Guess. Reprinted from the *Journal of the American Chemical Society*. Pamphlet, 4 pages.

*Jahrbuch der Elektrochemie.* 1901. Eighth Yearly Volume. Edited by Dr. Heinrich Danneel. Halle, Germany, 1902; Wilhelm Knapp. Pages, 728; illustrated. Price (in New York), \$8.50.

*New South Wales. Annual Report of the Department of Mines for the Year 1901.* D. C. McLachlan, Under-Secretary for Mines. Sydney, N. S. W.; Government Printer. Pages, 196; illustrated.

*Comparative Statistics of Lead, Copper, Spelter, Tin, Silver, Nickel, Aluminum and Quicksilver.* 1892-1901. Frankfort-am-Main, Germany; compiled and issued by the Metallgesellschaft and the Metallurgische Gesellschaft A-G. Pages, 64.

*Locomotives: Simple, Compound and Electric.* Fourth Edition, 1902. By H. C. Reagan. New York; John Wiley & Sons. London; Chapman & Hall, Limited. Pages, 618; with 309 illustrations. Price, \$2.50.

## BOOKS REVIEWED.

*Jahrbuch für das Berg- und Huttenwesen im Königreiche Sachsen.* Edited by C. Menzel. Published by Craz & Gerlach (Joh. Stettner), Freiberg. Pages, 510. Illustrated by numerous engravings in the text and 23 large plates. Price (in New York), \$3.50.

This is the well-known Freiberg year-book for 1902, covering the statistics and developments in 1901. The first part of the volume comprises the following technical papers: Ueber die Thon- und Kaolingruben industrie westlich und sudwestlich von Meissen, by Bergmeister Seemann. Ein Massengrab von Saurien im Unter-Rothliegenden des Dohlenen Kohlenbeckens im Plauenschen Grunde bei Dresden, by R. Hausse. Ueber die Erzlager der Umgebung von Schwarzenberg im Erzgebirge, by Prof. Dr. R. Beck. Die in den Jahren 1891-1901 beim sachsichen Bergbau vorgekommenen Brüche an Schachtförder einrichtungen, by Geh. Bergrath Menzel. Stammbaum der Freiburger Huttenprozesse im Jahre 1902, by H. Kochinke. Weitere Beiträge zur Aufsuchung magnetischer Erzlagerstätten, by Prof. Dr. Uhlich. Beitrag zur Geschichte der Kaolingruben der Königlichen Porzellan-Manufaktur zu Meissen, by Max Winkler. Versuche mit einem Guibal- und einem Capellventilator, by O. Huppner. Neue Vorrichtungen gegen zu hartes Aufsetzen des niedergehenden Fordergestelles bei der Seiffahrung beim Königlichen Steinkohlenwerke Zaucheroße, by H. Hartung.

The second part of the volume, which is the largest, comprising 310 pages, is devoted to official reports upon the mining and smelting industries in Saxony in 1901. The third part refers to the new laws and regulations of the year.

*Les Gazogenes.* By Jules Deschamps. Published by Vve. Ch. Dunod, Paris, 1902. Pages, 432. Illustrated.

The scope of this work is well indicated by its table of contents, the list of chapters comprising:

I. Definition, Utility and Variety of Gas Producers. II. Combustion. III. Combustibles. IV. Gasification of Combustibles. V. Calorific Power. VI. Apparatus for Distillation. VII. Water-gas Producers. VIII. Siemens' Producers. IX. The Producers of the Dowson Type. X. Producers Operating by Reversed Combustion. XI. Producers with Two Shafts. XII. Special Producers. XIII. Auxiliary Apparatus. XIV. Recuperators and Regenerators. XV. Application of Gas Producers to the Production of Motive Power.

The early chapters of a general nature are brief, the first five including only 60 pages, and they are rather little essays on their respective subjects than analytical considerations of the physical principles involved. The chief part of the book is descriptive, especially of the various types of producers, and in this respect it is more comprehensive than any other on the subject that we know of, although not entirely satisfactory. The author has in mind the utilization of producer gas for the operation of gas engines rather than for metallurgical purposes and other large uses, and writes from that standpoint.

On the whole, the book is disappointing. It fails to treat with the necessary fulness many branches of the subject which it ought to have done, and fails to go sufficiently into many important details. There are scarcely any references to authorities, and like so many French treatises it is destitute of an index. The engravings, which are numerous, are variable in character, some being very good and others quite inferior.

*Metallurgical Laboratory Notes.* Prof. Henry M. Howe. Boston, Mass.; the Boston Testing Laboratories. Pages, 140; illustrated. Price, \$2.50.

In this book Prof. Howe presents the directions of a series of experiments which he employs in teaching metallurgy at Columbia University. The idea is quite new, and leads to a discussion of the relative merits of instruction by various methods in such a subject. Prof. Howe gives his own views in the highly interesting preface to his book, some passages from which we quote:

"Metallurgical laboratory instruction of the established type reproduces the industrial metallurgical processes, each as a whole, and with such fidelity to actual industrial practice as is attainable. This, which we may call 'Applied Metallurgy,' seems to me to have inherent and very grave faults. In its place I have tried to work out a system of what we may call 'Theoretical,' or, better, 'Analytical Metallurgy,' with the aim of teaching, not individual processes each as a whole, but the individual underlying principles, each by itself. This I have tried to do by means of a series of distinct experiments, each testing directly one or more of these principles.

"If the aim of our metallurgical laboratory study is to anticipate industrial practice, we should follow the applied metallurgy plan; if its aim is to teach principles rather than practice, we should follow the analytical plan. It seems clear on general grounds that instruction in general should so far as possible deal with principles rather than with the details of practice. But additional reasons, if any are needed, exist in case of metallurgical laboratory instruction. For the details of practice are learned inevitably, spontaneously, accurately, and with the greatest ease in practice itself, but with very great difficulty and distortion in the laboratory. Principles, on the other hand, are what the laboratory teaches most readily and perfectly, and practice least readily and most imperfectly. The path of the least resistance then is to study principles in the laboratory and the details of practice in practice itself."

This is a far reaching question, which requires and deserves very careful consideration. We are disposed to agree with Prof. Howe in the general statement. We think many educators will agree with him; and what is perhaps more important the thoughtful employers who are expected to make use of the more or less unfinished products which are turned out by the schools. However, we do not conceive that the exponents of the method of applied metallurgy consider generally that they are by any means in their laboratories duplicating industrial practice. Their work is apt to be analytical to a more or less extent. The question, it seems to us, concerns the way which will accomplish the best net result.

We have great faith in the value of experimental work properly done on a small scale. In practice such experiments are the guides to the development of new processes and the improvement of old ones; in many cases the conditions of practice can be closely duplicated, save in the domain of pyrometallurgy. In the latter, convenient methods of heating must be resorted to, which are not what would be employed in practice, but neither is the firing of a miniature, special furnace what it would be in practice, and we are of the opinion that Prof. Howe is correct in aiming to relieve his student of the drudgery attendant upon the management of such apparatus and divert his attention rather to the task of thinking over the principles which the experiments illustrate. On the other hand, there is obvious advantage in carrying out some processes in their entirety, causing the student to locate and determine the losses and thus fixing his attention upon one of the most important features in practice, even though his results may be quite different from those which are actually experienced in practice. Work of that nature is surely analytical and valuable. In operating on a very small scale it is not always feasible to carry through a process from beginning to end; its undertaking must necessarily be fragmentary. Moreover, we think that the student is likely to be led into valuable channels of thought in devising some of the apparatus which may be required to carry through his experiment in a manner that is analogous to those of practice. As in very many things, the best method of teaching metallurgy may be something between the two extremes.

We have no thought of underrating in any way the importance of Prof. Howe's views, of which we have a keen appreciation. He is teaching his students to use instruments of precision, just as the surveyor is taught to use the transit and level, and with their guide he is showed how to learn the important principles of metallurgy. The pyrometer, calorimeter and microscope, especially the first, are prominent in the work, and with their aid conditions and results are determined. It is such analytical investigation that is most needed in the art and science of metallurgy at the present time.

The experiments which are described in Prof. Howe's book are 91 in number. They cover the subjects of pyrometry and calorimetry, the melting points of silicates, the properties of refractory materials, iron and steel, copper and gold and silver. These experiments, so far as they go, appear to be very well considered. They are described in a highly lucid manner, and are explicit in smoothing away obstacles so as to enable the student to obtain the maximum advantage with a given expenditure of energy. The lack of balance in the series of experiments and their restriction to certain branches of metallurgy would be subjects for criticism had not Prof. Howe disarmed it in his preface. As he explains, the system was required quickly, and it was impossible to await the completion of a well-rounded work, which we have no doubt will follow later.

## 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.

## Standardization of Methods.

Sir: Of this matter considerable has been said lately in the various technical journals. Probably such is more or less desirable, according to circumstances; but, we wish to suggest that if the various methods of preparing "standard" solutions and chemicals in the laboratory were brought to a more uniform and truthful basis, there would probably be less variation among individuals and between the methods. The various chemical associations of the world have been in the past, as now, trying to get uniform (ultimate) results of analysis, as in fertilizer analysis, revising the old and devising new methods. The investigations of the association of Official Agricultural Chemists in regard to the methods of fertilizer analysis, and the great variation in their individual results are well known. And they have apparently quit—why? Well, we will suggest that they have hold of the wrong end of the poker. Nowhere in their literature do we find any investigation in regard to the methods of making standard solutions, or the purity of chemicals used. To begin with, a truthful standard (yardstick) should be established. This has been frequently brought to our minds in technical analysis, and lately in the variations of local chemists in the test of lye. We had our standard acid (sulphuric) and potassium tetroxalate tested by different chemists, with the result that there was a maximum difference of 5.40 per cent, and an average difference of 2.70 per cent in one case; a maximum of 3.20 and an average of 1.60 per cent in the other.

It is very apparent that in the alkalimetric determination of a high-grade phosphate or other substance there would be considerable difference in the results based on these ratios. And, is it a wonder that the official chemists, or others, do not agree.

Early this year the chemist of a Chicago steel company had a sample of "standard manganese" ore tested by 26 different chemists distributed all over the United States. Their results ranged from 29.43 to 31.66 per cent manganese, using different methods. A difference maximum of 2.23, or 7.43 per cent on a basis of 30 per cent manganese. The same method varied considerably in the hands of different chemists. No doubt if the question of a correct standard of permanganate, etc., had been first settled, much of the variation in results would have been eliminated, and the errors properly placed upon the standard instead of the method.

It is with the object of bringing up this question of correct standards for investigation and solution that we write this.

E. M. & M. L. WADE.

Los Angeles, Cal., Nov. 28, 1902.

## The Unconsidered Heroes.

Sir: In your issue of October 25 you published a letter under this heading, signed by Mr. Arthur L. Collins. But a few weeks have elapsed, and the writer of that letter has himself earned the unfading crown which awaits the fallen hero—not, I trust, unconsidered or forgotten.

The particulars of the cowardly crime which terminated this noble life will doubtless have already appeared in your columns; it may, however, be well to remind your readers that Mr. Collins was the living embodiment of fairness, that he had no dealings with the workers of the district excepting in his official capacity, and then almost exclusively through members of his staff.

Any suggestion of personal vengeance as a motive for the deed is, in fact, out of the question.

My brother died simply as a martyr to duty. Very early in his connection with the Smuggler-Union he became convinced that the future of that and other mining enterprises largely depended on the cost of labor—not as fixed by the wages paid or the hours worked, but in relation to the general failure to secure a fair day's work for a liberal day's wage. That the work done throughout the San Juan is generally unsatisfactory, and that this feature is increasing to a degree which may well justify alarm for the future of the district, is admitted by almost all who are best qualified to judge. The remedy which, under the special conditions of the Smuggler-Union Mine, appeared to him most practical, was the introduction of the contract system of payment. Under this system the average wages paid were more, not less, than the standard of the district, while the general reduction in working hours which took place about the same time was by him readily accepted and loyally observed. Any change, however, which accentuates the difference between the honest worker who means to work, and the worthless idler who means to loaf, or which tends to uplift the general standard of work performed, directly challenges the suicidal and socialistic policy which has been adopted by the Western Federation of Miners; and the full power of that organization was brought to bear on its author. The unsuccessful strike which followed, culminating in the capture of the mine buildings by a desperate armed force, which the State Executive refused to dislodge, will be fresh in the memory of many. The final outcome was a truce, under which, thanks to the calm persistence and force of character displayed by my brother, the contract system remained practically unaltered.

Since that time, however, his life has been continually threatened. Held up to obloquy as "Anti-Labor Collins" by the Union organs, he had finally come to be regarded by the small but desperate section which dominates the Telluride Union as the one great obstacle to their ambition; the backbone of all the forces which made for law and industry. No one knew better than himself the dangers which threatened him; but he neither could nor would flinch from the path which he considered to be that of duty and honor. And I will say for some of us that we would sooner have him dead than lose our ideal of a supremely fearless and high-minded man.

As a matter of fact, my brother was by no means opposed to labor organizations. I have known him to urge on the better class of men the duty of joining the union, attending its meetings, and expending more effort in the direction of securing proper influence in its councils for the more responsible and conservative elements. His one mistake, if it can be called a mistake, lay in expecting from others too much of the unflinching courage and resolution which characterized himself. As to his sympathy for labor, no man ever went further out of his way to support and reward the man who showed any disposition to deal fairly with his employers, and by many of these he was beloved almost as much as he was respected. I venture to assert that the cause of honest labor had no better friend in this State than "Anti-Labor Collins."

I do not lay this crime at the door of the union miners as individuals. I believe that nine-tenths of the members of the Telluride Miners' Union know nothing of the crimes which have recently disgraced that district. I am convinced that a large majority would, if they dared, deplore and denounce them. But so long as that Union remains under the domination of a small circle of anarchists, so long as it palliates, or but half-heartedly condemns, the methods of the midnight assassin, so long must it endure the condemnation of every honest and law-abiding citizen.

Those of us who stand outside the unions can judge them only by their fruits. While we see boycotting, disorder and crime flourish where the unions flourish, and see harmony and industry prevail where the unions are weak or non-existent, so long must unionism stand condemned. Must we conclude, to paraphrase Mr. Gladstone in his happier days, that "the sanction of Unionism is crime"?

GEORGE E. COLLINS.

Silverton, Colo., Nov. 28, 1902.

BIG LAKE CARGOES.—The Cleveland *Marine Record* says that the record for big iron ore cargoes for this season is held by the tow barge *John Smeaton*, which carried 8,570 net tons from Two Harbors to South Chicago. This was closely approached by the steamer *Isaac L. Elwood*, with 8,559 net tons, Two Harbors to Conneaut, and by the steamer *J. J. Hill*, with 8,541 net tons. Two Harbors to Conneaut.

## 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.

*Separating Gold and Silver from Copper Matte.*—In the case of a high-grade copper matte carrying 2,500 ounces gold and silver and 45 per cent copper, is it possible by a careful blowing of the molten matte to reduce practically all of the gold and silver and leave a low-grade copper matte behind?—G. C.

*Answer.*—Yes, it is possible; but whether or not it would be practicable under your conditions is another question. In bessemerizing copper matte the metal which is first precipitated carries nearly all of the gold and most of the silver; also most of the impurities such as arsenic and antimony. M. Paul David has invented a special form of converter, known as the "selecteur," in which this is done. It has a pocket on one side, in which the first copper is collected and thence tapped off. This form of converter is used at Aiguilles, France. The cost of converting matte assaying 35 per cent Cu is claimed to be \$4.34 per 1,000 kilograms, the men being paid wages of 70 cents to \$1 per day. You can also smelt in reverberatory furnaces for copper bottoms, which will collect most of the gold and a large part of the silver. Copper bottoms are produced by smelting rich cupriferous material in a reverberatory furnace without sufficient sulphur to satisfy the copper. Metallic copper is set free by certain reactions, and it having a greater affinity for gold and silver, besides various impurities, than the matte has, those substances are concentrated in the copper bottom, while the main portion of the copper is obtained in a matte freed from them.

*Smelting Lead Copper Ores.*—Can an ore containing 10 per cent lead, 2 to 5 per cent copper and high in sulphur be smelted in a lead blast furnace with an Arents syphon tap? Hofman states that copper causes bottom crusts, which close the syphon tap. Would the sulphur in the above ore form a copper matte so that the copper would not enter the lead bullion? Can lead bullion containing several per cent copper be successfully refined in a cupelling furnace?—An Interested Subscriber.

*Answer.*—Assuming that the ore had only 2 per cent copper, with a properly designed furnace and a properly made up charge, there would probably be no trouble. With 5 per cent copper in the ore the lead-well would be likely to give trouble before long. A good deal depends upon the size of the furnace and the degree to which the



copper is concentrated in the matte. There must be enough sulphur in the charge to combine with the copper and make a proper matte, but some of the copper will go any way into the lead. Colorado smelters plan a matte fall of about 15 per cent, the matte containing ordinarily about 15 per cent copper. The lead-well was formerly put in the center of the projecting side of the crucible, but nowadays it is placed near the front. The channel which used to be made circular, 2 or 3 inches in diameter, is now sometimes made as large as a foot square. Dr. Iles recommends a width of 6 to 8 inches. He says: "On account of the frequent clogging of the lead well on small furnaces much trouble, delay and expense was occasioned. These difficulties were always intensified by the presence of copper in the matte, in excess of 10 per cent. Since the lead channel has been so materially enlarged and the quantity of lead entering the crucible has been so largely increased by fast driving these troubles have almost entirely disappeared. The metallurgist can run a furnace for a year producing matte containing from 15 to 25 per cent copper without the slightest difficulty and very frequently mattes

#### THE WEBER GASOLINE MINE LOCOMOTIVE.

The accompanying illustration shows a locomotive for mine and industrial purposes recently designed and built by the Weber Gas and Gasoline Engine Company, of Kansas City, Mo. The cut shows clearly the general construction of the engine. For outside work it is provided usually with a cab. For mine work no cab is needed, of course, but a scrubber is supplied for neutralizing the products of combustion. The engine shown has the scrubber carried on the rear end of the frame. On the front end are the gasoline tank and a seat for the driver. The engine is in the center, directly over the four wheels which carry the locomotive. The flywheels for the engine are heavy disks, one on each end of the shaft. The frame is of steel, and is so designed as to give great strength, and to enable the machine to stand rough usage and shocks from uneven tracks. All holes are drilled and reamed, and the parts are held together by turned drift-bolts.

The axle-boxes are provided with vertical space to allow the introduction of spring cush-

to get out of order. It needs very little attention, a few minutes' work each day being sufficient to keep it in working condition.

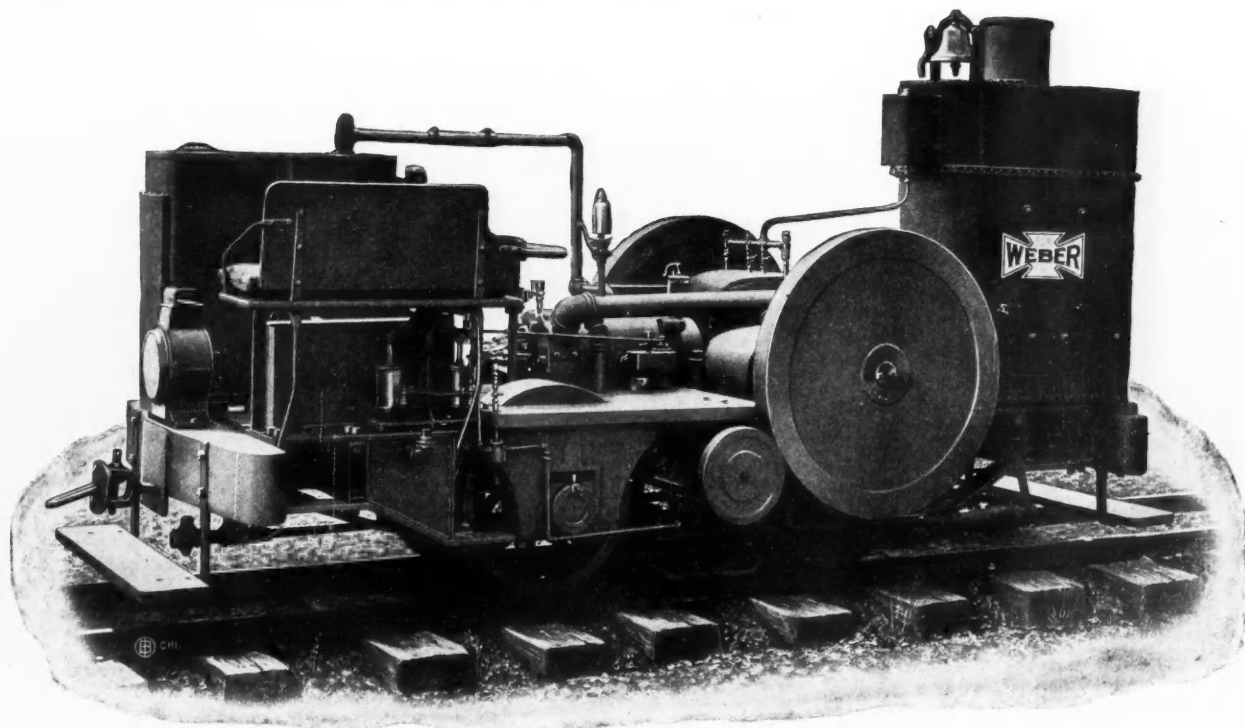
In designing the locomotive great care has been taken to house properly the working parts—the gearing and clutches—and to protect them from grit and dust. This is necessary to save lubricating oil, decrease the power required and prevent cutting of bearings, etc.

The makers claim for this type of engine low first cost as compared with steam or electric motors; small cost of operation; small quantity of water required; simplicity and ease of operation; low cost of repairs; safety from fire and electric sparks; handiness and quickness in handling loads.

The locomotive can be built of different dimensions to suit conditions as to gauge of track, grades, curves, load to be hauled; and for mine work, as to height and width of gangway.

#### MECH NICA' DRAFT PLANT FOR ST. LOUIS FAIR.

The mechanical draft feature of the Union



THE WEBER GASOLINE MINE LOCOMOTIVE.

running from 40 to 50 per cent copper for a period of two to four weeks have been produced; but at this high point the copper alloy should constantly be removed from the top and sides of the lead-well." (*Lead Smelting*, page 56.) The percentage of matte-fall depends chiefly upon the quantity of sulphur left in the roasted ore and the degree to which it is further burned in the furnace. Even when there is only a little copper in the ore, and ample sulphur to combine with it is left, a certain amount will enter the lead. Copper lead can be successfully cupelled. Kerl states that in cupelling 30 tons of silver-lead containing from 0.75 to 1 per cent copper, the operation lasted 24 hours less than when copper was absent and the losses of lead and silver were less. Lead can be freed from copper to a large extent by a simple liquation, the copper forming with a part of the lead an alloy which is less fusible than the remaining lead, from which it can be separated as a dross. This is done at the works of the St. Joseph Lead Company at Herculaneum, Mo., by melting down the impure lead in a small furnace which has a sloping hearth of cast iron. In the silver-lead refineries, however, the chief part of the copper is removed in connection with the softening process.

ions to prevent jar. The driving wheels are pressed on the axle and keyed; they have steel tires shrunk on.

The engines are of the double opposed cylinder type, which handles the load with the least possible vibration. Power is transmitted from the engine shaft to the driving axle by steel cut gearing. The different motions—forward, backward and stops—are controlled by steel clutches operated by levers. All levers and valves for controlling the engine are within easy reach of the engineers' seat. By a special improvement he can cut out either cylinder from work. This is an advantage, reducing the consumption of gasoline when the engine is running light, switching or coupling cars. The seat is so placed that the view of the engine-driver ahead on the track is not obstructed. The locomotive is provided with a powerful brake, and in case of an emergency both the brake and the reverse clutch can be used.

The system of supplying gasoline to the cylinders is simple and positive, and is almost automatic in its action, requiring very little attention. The scrubber has proved in practice very effective, in neutralizing the products of combustion. It has also proved durable and not liable

Electric Light and Power Company's plant, which will be used for lighting the World's Fair grounds at St. Louis, will be an installation of unusual interest to engineers. The plant is to be equipped with both forced and induced draft apparatus, which is unusual. A mechanical draft plant usually is either of the forced or induced draft type, but in this case both will be used. There will be 26 boilers of 700 horse-power each, with automatic stokers. Fans will be used for the forced draft, and the boilers will also be operated under induced draft. The forced draft fans will be four in number, of the full housing type, size 160 inches. They will be driven by 10 by 10 vertical engines direct attached. The induced draft fans will be two in number, of a size quite in keeping with the basis upon which the Exposition is being built, the wheel diameters being so large as to be seldom met with in mechanical draft engineering. Each of these induced draft fans will be of the full housing type, size 230 inches, and will be driven by 9 by 10 double cylinder, double acting upright engines, this type being selected to secure the maximum power in limited space. The Buffalo Forge Company is building all the fans and engines for the above equipment, in its shops at Buffalo, N. Y.

### SOME IMPORTANT FEATURES OF WIRE CLOTH AND SCREENS.

The subject of wire screens is a most important one in concentrating plants, stamp batteries, and many other milling operations, for the reason that the efficiency of the apparatus depends to a considerable extent upon the care exercised in the selection of screens. It is a safe venture to state that there are many points in the construction of these screens, which if generally known, would be of valuable aid in securing what would best be adapted to the peculiar nature of the ore that is being treated and resulting in the desired fineness of the crushed product, as well as reasonable service in the wear of the screen.

In the first place, the size to be used on any ore should be determined by actual experimental runs with different mesh screens, and this can be most intelligently accomplished by consulting a list wherein the sizes of the openings in the wire screen are given.

To illustrate this point, suppose that a screen is required, presumably 24-mesh, which means that the cloth must have 24 openings to the lineal inch, or 576 openings to the square inch, and the question arises, What size of wire should be used? Now, 24-mesh can be made from 12 different sizes of wire, varying from 0.020 diameter to 0.009 inch; therefore the size of opening would vary, according to the size of wire used. The number of the mesh really means nothing, so far as results are concerned, but it is the size of the opening or hole in the wire cloth, which produces the degree of fineness of the pulp.

To farther illustrate this point, a page from an up-to-date catalogue is given below, by permission of the W. S. Tyler Company, of Cleveland, Ohio.

Iron or Steel Wire Cloth.				
No. Meshes per in.	No. of Wire	Decimal Size of Wire	Size of Opening	Price per sq. ft.
24	25	.020	.021	.77
24	26	.018	.023	.65
24	27	.017	.024	.55
24	28	.016	.025	.46
24	29	.015	.026	.38
24	30	.014	.027	.30
24	31	.0135	.0275	.26
24	32	.013	.028	.22
24	33	.011	.030	.19
24	34	.010	.031	.17
24	35	.0095	.0315	.15
24	36	.009	.032	.13
26	26	.018	.0205	.77
26	27	.017	.0215	.65
26	28	.016	.0225	.55
26	29	.015	.0235	.46
26	30	.014	.0245	.38
26	31	.0135	.025	.30
26	32	.013	.0255	.26
26	33	.011	.0275	.23
26	34	.010	.0285	.19
26	35	.0095	.029	.17
26	36	.009	.0295	.15

With a complete list of all meshes, as above described, it is possible to compare the size of the openings in the various meshes, and the fact will develop that the same size of hole can be obtained in different meshes by varying the size of the wire, for instance:

Steel Wire Cloth.			
No. Meshes per inch	No. of Wire	Decimal Size of Wire	Size of Opening
18	22	.028	.0275
20	24	.023	.027
20	26	.018	.027
24	30	.014	.027
26	33	.011	.0275

From the above it will be seen that practically the same sized hole prevails throughout the five different meshes, therefore the size of the opening, and not the mesh, is the important factor to be considered in selecting screens, because the maximum size of the crushed product is regulated thereby. With this feature in mind, intelligent changes can be made from one size to another, if a coarser or finer product is desired.

Another consideration is the lasting quality or life of the wire screen, which often does not meet the expectations of the user; sometimes the manufacturer is held responsible for the trouble, whereas a careful investigation may reveal that fault can be attributed to the careless manner in which the mesh or size is chosen. Natur-

ally the heaviest wire will wear the longest, so that if the size of opening is known which will produce the proper fineness of the pulp, then the screen can be ordered with a view of obtaining the heaviest wire consistent with the mesh in which it is woven. Prevailing conditions may call for medium sizes of wire rather than something heavy, but in any event, the size of the opening must be considered.

The most modern process of weaving makes it possible to corrugate the wires thoroughly both ways in the screen, and this will be found quite an advantage, as the wires are so firmly locked that they cannot become displaced, therefore the mesh remains original until the screen is worn out. It is also very important to secure cloth that is even and accurate of mesh, as otherwise calculations would be generally upset.

### COAL IN SIBERIA.

According to Russian official reports, summarized by the London *Engineer*, the question of securing an adequate supply of coal suitable to be used as fuel by the Siberian Railway is being solved in a most satisfactory manner. In 1900 the coal produced in Siberia amounted to 320,000 tons, of which 288,000 tons were used by the Siberian Railway. The output of coal has increased very rapidly, and this industry will be of immense importance at no distant date. As the coal-fields situated in the neighborhood of the great Siberian main line of railway are turning out to be very rich and extensive, the following official details are of interest:

In the Government of Tomsk, the coal-field of Kusnezsk, along the river Tom, is worthy of notice; it is 270 miles long and 70 miles wide, and contains coal seams of great thickness. The coal taken from the pits near the station at Sudshenka is especially good in quality, and in 1900 about 80,000 tons were produced. In the Government of Yenisseisk, in Central Southern Siberia, there are five coal deposits of practical importance; these are near the village of Antropovo, in the Achinsk District, near the town of Krasnoyarsk, on the rivers Katcha and Kemchuga, on the river Abakan, and along the Lower Tunguska. Further eastward and in the Government of Irkutsk, the Balagan District has a good coal-field near the village of Cheremchovo, and in 1900 the coal worked there amounted to 80,000 tons. Other coal-fields exist near the stations of Kutulik and Golovinskaya, and in the neighborhood of Nizhni-Udinsk; these mines have been exploited in part, and further concessions to work this coal are being made constantly. A supply of coal will be no less needed by Russia for the Orenburg & Tashkend Railway across a portion of the Steppes. In the Government of Akmolinsk, which is in the Kirghese Steppes of Russian Central Asia, there are good coal-fields near Karakandin. In Semipalatinsk, in Russian Turkestan, coal is to be met with in the districts of Semipalatinsk, Pavlodar, Karkatin and Saissansk. Of especial importance are the coal-fields at Ekibas-Tus; this place is connected already with the river Irtysh by a broad-gauge railway 73 miles in length, and the coal is being worked by the Vosskressensk Company.

Of all the coal-fields referred to the most important are those of Sudshenka, in the Government of Tomsk, in Western Siberia. The Sudshenka coal is not only of extreme utility in the case of the Siberian Railway, but it could become also of very great service to the mining industry of the Ural region, if only the cost of production and of transport could be reduced somewhat.

**THE WELSH TIN-PLATE TRADE.**—The London *Engineer* of November 28 says: "The price of tin-plates remains below cost of production, and with a view of preventing a wholesale closing of works, a meeting of the Tin-plate Mak-

ers' Association was held at Swansea on Tuesday to devise means for bringing about an improvement. The association decided that the output be regulated to the demand, and that the manufacturers outside the Association be approached with a view of securing united action. Thus a complete stoppage of all Welsh tin-plate works is to be arranged for a week in December and January, respectively."

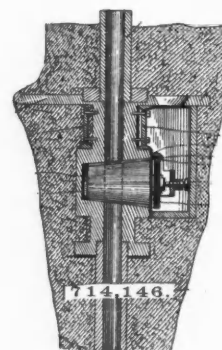
### PATENTS RELATING TO MINING AND METALLURGY.

#### UNITED STATES.

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

Week Ending November 25, 1902.

- 714,139. HIGH-TUNGSTEN STEEL.—George B. Brown, Reading, Pa., assignor to Carpenter Steel Company. A high-tungsten steel containing from 1 to 3 per cent. of chromium and from 15 to 30 per cent. of tungsten.
- 714,145. METHOD OF RECOVERING FREE AND COMBINED ACIDS OF NITER CAKE.—Lewis Cheeseman, Sr., Alexandria, Va., assignor of three-fourths to Park Agnew, A. H. Agnew, and M. B. Harlow, Alexandria, Va. A process of recovering both the free and combined acids of niter cake in useful forms, which consists in dissolving the niter cake in water, precipitating the free sulphuric acid as land-plaster by the addition of oxide of calcium, precipitating the iron by a further addition of oxide of calcium, filtering, precipitating the combined sulphuric acid as sulphite of barium by the addition of barium-sulphhydrate solution and recovering it as a pure white paint material.
- 714,146. DEVICE FOR PREVENTING GAS OR OIL WELLS FROM GUSHING, ETC.—George R. Cheesman, Auburn, N. Y. A device comprising in combination with the piping or casing of the well, a valve-chamber secured to



the upper end of said casing, and positioned in an excavation in the ground, struts resting on said chamber, planking resting on said struts, and a filling over said planking, a pipe screwed to the upper end of said chamber, a turning valve in said chamber, and means for rotating said valve.

714,160. PROCESS OF EXTRACTING BROMINE FROM BRINE.—Herbert H. Dow, Midland, Mich., assignor to the Dow Chemical Company, Midland, Mich. The steps in the process of manufacturing bromine from bromide-containing brines, which consist in bringing unoxidized bromides containing brine into contact with air and subsequently into contact with air containing a free halogen.

714,174. FILTER-PRESS.—Frederick S. Guy, Peoria, Ill. A filter-press comprising a receptacle for slop to be separated, means for moving the slop away from the inlet toward the compression-chamber and a right and a left hand screw located at the rear end of the machine, such screws adapted to fit tightly and revolve together and toward each other and also adapted to carry away the solid particles while preventing the passage of fluid therethrough.

714,175. FEEDING DEVICE FOR WIRE-WORKING MACHINES.—Thomas S. Haley, New Haven, Conn. In combination, a hopper having a suitable discharge-orifice, a recessed transfer-plate adapted for reciprocating movement under said orifice, and a reciprocating plunger adapted for movement at an angle to the direction of movement of the transfer-plate and crosswise thereof.

714,195. WALL CONSTRUCTION FOR COKE-OVENS, ETC.—Heinrich Koppers, Carnap, near Essen, Germany. An improved stone for the building of coke-oven walls with vertical flues, comprising a smooth outer surface, two slanting sides parallel to each other, the one of which is of nearly double the length of the other and a cavity on the inner side.

714,204. TUNNEL CONSTRUCTION.—Gustav Lindenthal, New York, N. Y. A tunnel comprising an inclosing casing and means for directly supporting the load or roadway, said means comprising piles passing into the material beneath the said inclosing casing.



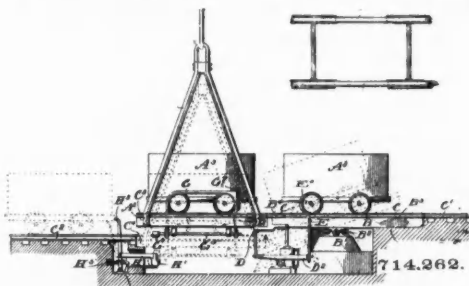
714,205. METHOD OF LAYING TUNNELS.—Gustav Lindenthal, New York, N. Y. An improvement in the art of tunnel construction which consists in first producing above the path of the tunnel and prior to any boring operation thereunder an air-resisting zone, and in then driving the tunnel.

714,224. HOISTING AND CONVEYING APPARATUS.—William McIntosh, Clinton, Mass. The combination of an overhead track or cable, a carriage mounted to run thereon, a horn on said carriage having a smooth unobstructed holding-surface, and a hump or detent arranged so that said horn and said hump or detent assume different relative positions, whereby said horn can engage and pick up a fall-ropes carrier without substantial obstruction from said hump or detent, and whereby said hump or detent holds said carrier after it is picked up by said horn.

714,256. PROCESS OF MAGNETICALLY AND STATICALLY TREATING ORES.—Henry M. Sutton, Walter L. Steele and Edwin G. Steele, Dallas, Tex. A process of separating ore consisting in first subjecting the same to a statically-affected magnetic action and subsequently subjecting the non-magnetic and diamagnetic material to the direct action of static electricity.

714,257. DRY ORE-CONCENTRATOR.—Henry M. Sutton, Walter L. Steele, and Edwin G. Steele, Dallas, Tex. In a dry ore-concentrator, a framework, a working-table thereon, an inclined pervious belt movably mounted on said table to discharge by gravity at its lower end, an air-chamber beneath the belt having an inclined bottom thereto, a receptacle within said chamber at the lower end thereof to collect and retain by gravity metal falling in said chamber, means for producing an intermittent blast and suction action upon a face of said belt, and means for moving said belt during the suction action.

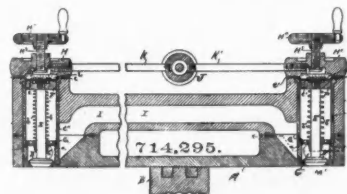
714,262. CAGE FOR MINING-CARS.—William Towers, Murphysboro, Ill. An elevator, caging means for securing a car thereon, a platform at one side of said elevator, a



retaining means for a car upon said platform, connections to be engaged by said elevator for automatically releasing said retaining means and caging means; and means actuated by the car leaving the platform to reengage the caging means with a following car.

714,278 and 714,279. CONVEYER.—Mason Bradfield, Los Angeles, Cal. The combination with a conveyer having a main bail and means for supporting and transporting said conveyer, of a rigid auxiliary bail removably connected with said conveyer and movably attached to said means, said rigid auxiliary bail being constructed to disengage said means from said main bail when the means is relaxed and to prevent reengagement when said means is again contracted.

714,295. RELIEF VALVE FOR AIR-COMPRESSORS.—Arthur Giesler, Dayton, Ohio, assignor to the Stilwell-Bierce & Smith-Vaile Company, Dayton, Ohio. In an air-compressor, two cylindrical valve-casings connected by an air-channel and located one at each end of the compressor-cylinder, ports leading from the lower ends of the casings to the corresponding ends of the cylinder, valves in the casings, commanding the ports and opening outwardly,



Springs for opening said valves, pistons upon the valve-stems, diaphragms secured to the pistons and to the cylindrical casings, a chamber in the upper ends of said casings above the diaphragms, a valve-casing located at the side of the compressor, and containing two oppositely-facing valve-seats, passages through said seats connecting the ends of the casing with the space between the seats, valves for the passages so arranged that one is seated as the other is unseated, an air-vent in one end of the casing, means for holding the valve commanding the vent normally seated, and the other one open, a pipe connecting the compressor-reservoir with the closed end of the casing, and pipes connecting the space between the valves with the chambers above the diaphragms.

714,339. METHOD OF MAKING BASIC SLAG.—Jacob Reese, Philadelphia, Pa. A method of producing basic slag,

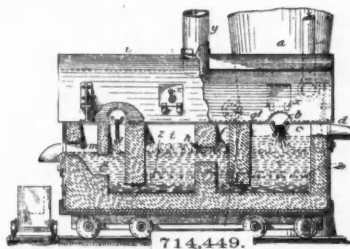
which consists in fusing mineral calcareous phosphate with oxide of manganese, and oxide of iron.

714,331. PHOSPHATE AND METHOD OF MAKING SAME.—Jacob Reese, Philadelphia, Pa. A method of making a compound of calcic phosphates, which consists in intimately mixing basic open-hearth slag and fused mineral calcic phosphate both low in silica.

714,357. CONVEYER SYSTEM.—Hiram W. Blaisdell, Yuma, Ariz. A conveying system provided with a main conveyer and a cross auxiliary conveyer in a plane above said main conveyer and movable means for effecting the discharge of the material from said main conveyer upon said superimposed auxiliary conveyer.

714,400. ELECTROLYTIC CELL.—Maurice C. Rypinski, Schenectady, N. Y., assignor to the General Electric Company. An electrolytic cell provided with electrodes one at least of which is of aluminum, and an electrolyte consisting of a solution of a salt of an organic acid.

714,449. CONVERTER.—George C. Carson, Redding, Cal., assignor of two-thirds to Albert Miller, Redding, Cal., and Fred Hurst, Washington, D. C. In combination with a converter, tuyeres for supplying air to the contents thereof, a

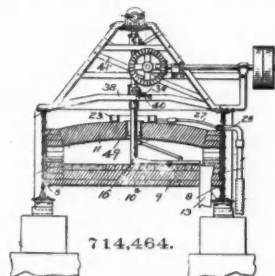


substantially dome-shaped roof above the same, said roof comprising inner and outer concentric walls, longitudinal I-beams separating and supporting said walls and having air-passages, an air-supply to the space between said walls, and a connection between said space and the tuyeres.

714,450. PROCESS OF TREATING METAL.—George C. Carson, Redding, Cal., assignor of two-thirds to Fred Hurst, Redding, Cal., and Albert Miller, Washington, D. C. A process of treating molten metal which consists in feeding the molten metal continuously into a suitable vessel, subjecting the same to the action of a continuous blast of air delivered near the bottom, and causing the purified metal to be forced out from a point below the blast-line and up through a substantially vertical channel whereby a sufficient body of metal is maintained in the vessel.

714,451. CONTINUOUS CONVERTER.—George C. Carson, Redding, Cal., assignor of two-thirds to Albert Miller, Washington, D. C., and Fred Hurst, Redding, Cal. In a converter, a primary compartment having a slag-outlet, means for feeding molten metal into said primary compartment, a secondary compartment, an intermediate partition between the two having a port at the bottom level of both compartments, a tertiary compartment communicating with said secondary compartment by a passage above the bottom, and air-pipes entering said tertiary compartment.

714,464. FURNACE FOR ROASTING ORES.—Thomas Edwards, Sebastopol, Ballarat, Victoria, Australia. In combination in an ore-roasting furnace, a rabble having a



hollow stem and foot, said stem being formed in sections, a water-conducting pipe held in place within the lower section by being clamped between the two sections, a discharge-pipe leading from the lower section and an inlet-pipe leading to the upper section.

714,473. MUFFLE FURNACE.—Emile Geille, Brussels, Belgium. A multimuffle-furnace comprising a central fire-place; an annular colonnade of pillars forming a muffle-chamber with radial spaces between said pillars; a reverberatory arch supported by said pillars above the muffle-chamber; muffles of suitable form in the chamber; a concentric series of passages beneath the muffles; discharge-flues in the pillars connected with the passages; and a chimney-crown beneath which the flues discharge.

714,502. PROCESS OF EXTRACTING ZINC FROM ZINC-SKIMMINGS.—Herman C. Meister, St. Louis, Mo. A process of converting zinc compounds of zinc skimmings into oxide of zinc, which consists in treating the zinc-skimmings with the oxide of an alkali or the oxide of an alkaline earth in the presence of moisture.

714,503. PROCESS OF EXTRACTING ZINC FROM ZINC-SKIMMINGS.—Herman C. Meister, St. Louis, Mo.

A process of converting zinc compounds of zinc-skimmings into carbonate of zinc, which consists in treating the zinc-skimmings with the carbonate of an alkali in the presence of moisture.

714,508. HEAD FOR OIL-WELLS.—Fred J. Moser, Kane, Pa. The combination of a casing-head having means for permitting the passage of the tube therethrough and also having oppositely-disposed nipples adapted for connection with the gas-line, a cross-head engaged with the tube, and eyebolts, the eyes of which are connected with the nipples, said bolts extending up to the cross-head.

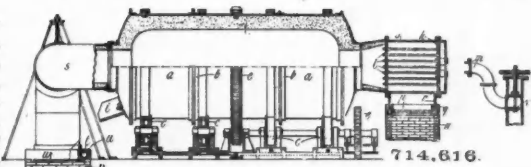
714,565. FURNACE-BOTTOM AND PROCESS OF MAKING AND REPAIRING SAME.—John Danforth, Johnstown, Pa. A process of cleaning and repairing furnace-bottoms, which consists in the ejection of slag or metal from cavities therein, by the action of fluid under pressure, then depositing refractory material in said cavities and baking or sintering the same.

714,578. PROCESS OF PRODUCING PEAT BRIQUETTES.—Gustav Hartmann, Munich, Germany. A process for the production of peat briquettes, which consists in gradually heating comminuted peat in a loose condition to a temperature of 220°, while permitting the free access of air to said material.

714,598. APPARATUS FOR SEPARATING METALS FROM SOLUTIONS CONTAINING SAME.—Sidney T. Muffy, Bowdre, Ga., assignor of one-half to Runyon Pyatt, New York, N. Y. In an apparatus of the class described, a mattress-cathode composed of a cellular porous plate and cellular porous carbon casings containing a filiform packing of lead and zinc composition within said casings and inclosing said carbon plate together with a plate-anode of iron, or other suitable substance, forming electrodes, connecting with a battery or other source of electricity.

714,599. PROCESS OF PRECIPITATING METALS FROM SOLUTIONS CONTAINING SAME.—Sidney T. Muffy, Bowdre, Ga., assignor of one-half to Runyon Pyatt, New York, N. Y. An electrochemical process for precipitating gold or other metals from solutions, consisting in obtaining secondary or increased electrochemical action by passing a solution of requisite temperature combined with warm air to supply oxygen into and through a filiform and partly-soluble composition of lead and zinc inclosed in a porous cellular casing of carbon, together with a suitable plate-anode and comprising electrodes having connection with a source of electricity.

714,616. APPARATUS FOR THE MANUFACTURE OF IRON AND STEEL.—George J. Snelus, Frizington, England. In apparatus for the refining of pig-iron by iron oxide or metallic oxide with or without "Saniter" mixture



for the production of malleable iron casings or steel, the combination of a rotary furnace, a basic lining in said furnace, means for rotating said furnace, a blowpipe communicating with said furnace and provided with a hot-air inlet and a blast-furnace gas-inlet, means for controlling said blowpipe-inlets, a diaphragm in the blowpipe and porcelain tubes carried by the diaphragm.

714,618. METALLURGICAL PRODUCT OR ALLOY.—John Stevenson, Jr., Sharon, Pa. A metallurgical product or alloy containing the elements manganese, phosphorus and carbon in relatively large proportions.

714,647. CEMENT FOR CASTINGS.—Walter Perry, Ansonia, Conn. A composition of matter consisting of iron, plaster-of-paris and an adhesive constituent.

714,649. ORE-CONVEYING SURFACE FOR ELECTRICAL SEPARATORS.—Henry M. Sutton, Walter L. Steele and Edwin G. Steele, Dallas, Tex. An ore-conveying surface comprising an insulated body having a conducting face upon one surface thereof; and means for electrically charging said conducting-faces.

GREAT BRITAIN.

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

Week Ending November 6, 1902.

23790 of 1901. BALL MILL AND AMALGAMATOR.—A. Lamberton, Coatbridge. An improved form of ball mill and amalgamator combined.

24,524 of 1901. SILICON BRASS.—Billington & Newton, Stoke. A brass capable of being hot rolled and squirted, containing a small percentage of silicon.

24,824 of 1901. COAL WASHER.—Bell Brothers and M. R. Kirby, Middlesbrough. A coal washer in which the supply of material and water, or the emptying of the refuse are controlled automatically.

5796 of 1902. STEEL MAKING.—W. White, Pittsburg, Pa., U. S. A. Improvements in the process of bessemerizing silicon out of steel and then finishing the refining in the open-hearth furnace.

## PERSONAL

Mr. Ben. B. Laurence is still in Denver, Colo.

Mr. John B. Farish has left New York City and is now on his way to California.

Mr. J. W. Mercer sailed from New York City on December 10 for Guayaquil, Ecuador.

Mr. Walter Beam, of Denver and Telluride, Colo., has been in New York City during the week.

Mr. James H. Currier, of Boston, Mass., is in Gilpin County, Colo., looking after mining interests.

Mr. R. H. Toll, superintendent of James Doyle's mines at Mancos, Colo., is in Denver on business.

Mr. A. Chester Beatty was called to New York City last week in connection with important business.

Mr. Charles H. Kearns, of Central City, Colo., is looking at mining property in Gunnison County, Colo.

Mr. D. McDonald has resigned as superintendent of the New Era Mining Company at Searchlight, Nev.

Mr. Richard Pearce has returned from London on the *Oceanic*, which arrived at New York on December 10.

Mr. George A. Bardwell will assume charge of the Philadelphia office of the Chicago Pneumatic Tool Company.

Mr. Leonard D. Sivyver, mining engineer of Spokane, Wash., is in San Francisco, Cal., on professional business.

Mr. S. Kubale has resigned his position as engineer of the Redjang Lejong Mining Company in Sumatra, on account of ill health.

Mr. Edgar Collins, of the Smuggler property at Telluride, Colo., was a visitor to Central City, Gilpin County, Colo., last week.

Mr. Percy L. Fearn has been appointed consulting engineer to the White Knob Copper Company, and is now at the mine, in Idaho.

Prof. Henry M. Howe, of New York City, has been elected an honorary member of the British Institution of Mining and Metallurgy.

Mr. W. N. Winchester, representing the Ingersoll-Sergeant Company, has been visiting gold mines about Sumpter and Baker City, Ore.

Dr. William H. Walker has been appointed associate professor of industrial chemistry at the Massachusetts Institute of Technology.

Mr. J. H. Collins, the father of the late A. L. Collins, passed through New York City on his way from England to Telluride, Colo.

Mr. J. P. Coppeau, general manager of the Lanyon Company's zinc smelter at Iola, Kans., was in Utah recently interviewing zinc producers.

Mr. James Hutchinson has, it is reported, resigned as general manager of the Trade Dollar Consolidated Mining Company, Silver City, Idaho.

Mr. A. W. Burchard, vice-president of the Greene Consolidated Copper Mining Company, of Cananea, Mex., was in Los Angeles, Cal., recently.

Mr. J. D. MacArthur, of the MacArthur-Forrest cyanide process, is consulting engineer to the Queensland Copper Company, Brisbane, Australia.

Mr. J. J. Thomas, of Los Angeles, Cal., represented Southern California at the meeting of the California Miners' Association at San Francisco.

Mr. J. W. Duntley, president of the Chicago Pneumatic Tool Company, arrived in New York City from Europe on the *Kronprinz Wilhelm* on December 11.

Mr. George A. Packard, mining engineer, of Boston, Mass., passed through Denver, Colo., recently, on his way to Baker City, Ore., on a professional trip.

Mr. J. B. Hammond, of Portland, Ore., was recently in Los Angeles, Cal., en route for Arizona, to examine some properties near Globe, for Seattle people.

Mr. G. W. Tibbetts, mining engineer, of Denver, Colo., was recently in Los Angeles, Cal., returning from Arizona, where he has been examining properties.

Col. Willis P. Harlow and Mr. George E. Greene, of New York, have been visiting the properties of the Yaqui Copper Company, near Campo Santo Nino, Sonora, Mex.

Mr. J. T. Henley, who resigned as superintendent of the Elkton Mine, at Cripple Creek, Colo., on October 1, severed his connection with the company on December 1.

Mr. John T. Jones, of Iron Mountain, Mich., is again looking over the iron ore deposits of Iron County, Utah. Mr. W. A. Barrows, Jr., of Sharpsville, Pa., accompanies him.

Mr. John T. Hodson, general manager of the Lincoln Company's gold property in the Neal District, Idaho, left for camp recently, after spending Thanksgiving at Salt Lake.

Mr. F. C. Roberts and Mr. W. G. Greene sailed from New York on the *Campania* on December 6, on their way back to Rhodesia, South Africa, after a trip to British Columbia.

Mr. H. Hayman Claudet, of London, Eng., the technical representative of the Canadian Oil Concentration Company, which controls the Canadian rights to the Elmore process, is at Rosslund, B. C.

Mr. M. D. Thomas, former foreman of the Trinity Copper Company, of California, is now foreman of the Bully Hill mines, where Mr. G. B. Keating has succeeded Mr. W. Oxnam as general manager.

Mr. Charles R. Wores, of Tucson, Ariz., has come to San Francisco on professional business. He has recently managed the sale of the Oceanic group of mines, 65 miles southwest of Tucson, Ariz.

Mr. Francis E. Burrows, of New York City, brother of the late Judge Burrows, for whom Burrows Park, Colo., was named, is in Denver, expecting to locate in Colorado. He is interested in mines in Summit and San Juan counties.

Mr. William R. Todd has been chosen president of the Quincy Mining Company, to succeed the late Thomas H. Mason. Mr. Todd was secretary and treasurer of the company, in which position Mr. W. A. O. Paul succeeds him.

Mr. W. M. Brewer, who is now connected with the Northwestern Smelting and Refining Company, which owns the smelter at Crofton, B. C., was recently in the White Horse District looking over quartz prospects, with a view of obtaining ore for his company.

Mr. E. V. Douglas, who has been president of the Consolidated Lake Superior Company from the beginning of the enterprise, has resigned, owing to the condition of his health, but will still remain a director. Mr. F. S. Lewis, vice-president, has been elected president.

Mr. F. K. Borrow has resigned as superintendent of the Contention Mine, near Telluride, Colo., and goes to Buluwayo, Rhodesia, South Africa, to take a position with a mining company, of which Mr. D. B. Huntley, formerly manager of the Tomboy Mine, is now manager.

Mr. J. A. Middleton, second vice-president of the Erie Railroad, has been appointed assistant to President E. B. Thomas, of the Lehigh Valley. He will have immediate charge of the general direction of both the Lehigh Valley Railroad and the Lehigh Valley Coal Company.

Mr. W. H. Dailey, manager of the Copper King Mining Company, and of the smelter at Bulls Head Point on San Francisco Bay, has left San Francisco, Cal., for England, and Mr. Hatley has been appointed in his place. The mine is in Fresno County, and belongs to an English company.

Mr. George R. Wood has opened offices as a consulting electrical mining engineer in the Westinghouse Building, Pittsburg. Mr. Wood has occupied the position of electrical engineer for the Pittsburg Coal Company since the formation of the company, and has had an extremely varied experience.

Mr. S. J. Truscott, of London, has been appointed engineer of the Redjang Lejong Mining Company in Sumatra, succeeding Mr. S. Kubale. Mr. Truscott has had much experience in the East and South Africa, and has written several books and a number of articles on gold mining. A recent article by him on "Gold Mining in the Dutch East Indies" was published in our columns.

Mr. R. A. Hadfield, of Sheffield, England, has received from the Institution of Civil Engineers of Great Britain the Howard quinquennial prize, which is awarded for distinguished success in metallurgical work. Mr. Hadfield receives the honor "for his scientific work in investigating the methods of treatment of alloys of steel, and on account of the importance in industry of some of the new products introduced by him." The prize was instituted in 1877, and is awarded at intervals of five years. The previous recipients of the honor have been: 1877, Sir Henry Bessemer; 1882, Sir William Siemens; 1887, Dr. John Percy; 1892, Sir I. Lowthian Bell; 1897, Hilary Bauerman.

Mr. E. B. Thomas, chairman of the board of directors of the Erie Railroad, has been elected president of the Lehigh Valley Railroad Company, succeeding Mr. Alfred Walter, who recently resigned. Mr. Thomas is also president of the Lehigh Valley Coal Company. Mr. Thomas is about 60 years old. Previous to 1885 he was for several years general manager of the Cleveland, Columbus, Cincinnati & Indianapolis Railway. From 1885 to 1888 he was second vice-president and general manager of the Richmond & Danville and the Georgia Pacific roads. From 1888 to 1890 he was second vice-president of the New York, Lake Erie & Western, being then promoted to the first vice-presidency of the same road, and of the Chicago & Erie. In 1894 he was elected president of the former road, and when it went into the hands of receivers he was appointed a receiver. After the reorganization he became president of its successor, the Erie Railroad. He resigned this place a little over a year ago, and was elected chairman of its board of directors.

## OBITUARY.

John Hanley, well known as a mining man in the Coeur d'Alene region, Idaho, died in Sonora, Mex., recently.

W. C. Reynolds dropped dead while riding on a street car in San Francisco on November 27. He was one of the mining experts employed by the Pullman Car Company and Marshall Field to examine properties for them in Mexico.

## SOCIETIES AND TECHNICAL SCHOOLS.

AMERICAN MINING CONGRESS.—President J. H. Richards, of Boise, Idaho, has issued a call for a meeting of the executive committee for December 17, to be held in Deadwood, S. Dak. The Black Hills Mining Men's Association has extended a special invitation to each officer of the American Mining Congress to attend the regular monthly meeting of the local association to be held on December 18.

AMERICAN CHEMICAL SOCIETY—NEW YORK SECTION.—On December 5 the society held its meeting at the Chemists' Club, Dr. T. J. Parker occupying the chair. A report was made by Chairman M. Toch, of the committee on the Nichols Research Medal, who exhibited the medal. A resolution was passed to appoint a committee to confer with the committee of the American Society of Mechanical Engineers and others, to urge the adoption of the metric system in this country and to assist in presenting the matter for favorable action by Congress. The committee as appointed are: Dr. Leo Baekland, P. T. Austen and Clifford Richardson.

Dr. H. Schweitzer, the well-known patent expert, read a very interesting resume of the evolution of photographic developers, beginning with hydroquinone, which was the first to succeed pyrogallol acid, on account of its greater cleanliness, rapidity and convenience, and described the properties, chemical constitution and peculiarities of eikonogen, rodinal, metol, amidol, glycin, diogen and edinol, which latter is the latest addition to this class of compounds. He stated that slow developers were, as a rule, acid, while the rapid developers are more basic. Acetone sulphite was then described, and its properties elucidated. In a second paper, on "Theocin," he described its successful synthetic preparation, and characterized it as the first alkaloid to be synthetically produced in a large way.

A paper was read by H. Riederer, on "The Determination of Bismuth as Molybdate, and Its Separation from Copper." Some very careful and interesting research work on the development of his method was described.

Among the guests present were: F. Mefferts and Dr. Von Riesen, of Berlin; Dr. Bartsch, of Breslau, and Dr. Theo. B. Wagner, of the Corn Products Company.

It was announced that at the January 9 meeting the papers and discussion would be on the subject of "Fireproof Wood."

## INDUSTRIAL NOTES.

The Salt Lake (Utah) Electric Supply Company has just completed the installation of a complete electric light system for Daly-Judge shaft and shaft house, Park City.

At a special meeting of the stockholders of the P. C. Austin Manufacturing Company, held at Chicago, Ill., the name of the corporation was changed to Austin Manufacturing Company.

The Chicago Pneumatic Tool Company recently received an order from the New York, New Haven & Hartford Railroad for one of the largest sizes of compressors to be installed at Boston.

The Tidewater Steel Company, of Chester, Pa., is having a Semet-Solvay by-product oven plant erected which will supply all the coke required by the company. The cost is estimated at \$125,000.

The Mine and Smelter Supply Company, through its Salt Lake branch, has filled an order for the Lincoln Mining Company, of Pearl, Idaho, for a safety cage, 1,000 ft. of 3/4-in. steel cable, rails, etc.

The Heime Safety Boiler Company, of St. Louis, Mo., through its New York office, has secured a contract from Cerveceria Cuauhteme, Monterey, Mex., for the shipment of boilers for installation in an electric plant.

Among the recent orders booked by the Utah Mining Machinery and Supply Company, of Salt Lake, are a 6-h.p. electric hoist for the Manhattan Company, of Pioche, Nev., and an 800-lb. steam hammer for the United States Smelter.

The Harrisburg Foundry and Machine Company, of Harrisburg, Pa., has recently sold a 500-h.p. engine for the new plant of the Eastern Steel Company, at Pottsville, Pa.; a 400-h.p. engine for the Tennessee Coal, Iron and Railroad Company.



The Salt Lake branch of the Ingersoll-Sergeant Drill Company has moved into larger quarters at 209-211 South West Temple Street, and will keep in stock at the new location a complete line of compressors, drills, etc.

Messrs. Dodge & Day, engineers, have been commissioned by their clients, the Heating, Ventilating and Foundry Company, of Pittsburg, Pa., to equip the new plant which is being erected for that company at Wheeling, W. Va.

The Allis-Chalmers Company, through its New York office, has made a substantial shipment via Vancouver, B. C., of gold mining machinery to be installed in the Korean gold-fields, which are operated by the Oriental Consolidated Mining Company, a New York concern.

The Osceola Silica and Fire Brick Company, Osceola Mills, Pa., which was recently organized by Henry W. Todd, Phillipsburg, S. W. McLarren, McLarren Brothers, Osceola Mills, and R. L. Coffy, of West Decatur, will, it is stated, have works with a capacity of 100,000 bricks daily.

The exports of iron pipe in November, through Eastern seaboard points by the National Tube Company, aggregated 2,559 tons. Mexico was the largest purchaser, taking 1,241 tons. Six hundred and ninety-five tons were shipped to Europe, Antwerp taking 280 tons. China and Japan were buyers to the extent of 360 tons.

The Link-Belt Machinery Company, Chicago, says that the outlook for the balance of this year and for next is flattering. The company is very busy preparing proposals for work, and will carry over into the new year more unfinished business than ever before in its history. It is erecting, as an addition to its plant, a new structural iron shop, 125 by 336 ft., which it hopes to have completed by February 1.

The Currie Fertilizer Company of Louisville, Ky., had that portion of its plant containing most of the grading, mixing and acidulating machinery completely destroyed by fire recently. The buildings containing the reserve boilers and engine, chemical laboratory and warehouse space were saved. The company expects to have its plant in shape to fill all orders for the spring trade.

The site of the Walker works of the American Bridge Company at Hay Station, Pa., has been sold for \$112,000, and as soon as the company's new plant at Economy, Pa., is near completion the Walker plant will be dismantled and a large part of the machinery will be removed to it. The Walker plant has a monthly output of about 2,000 tons, but the Economy works will have a monthly output of 25,000 tons.

T. Pautchenko, engineer of ways and means of the Russian Government and director of the coal mines at Rostoff, recently visited the works of A. Wyckoff & Son Company, at Elmira, N. Y. His visit was due to the fact that iron pipes used for mining purposes in Russia are often unsatisfactory. The Wyckoff Company reports orders for its wood pipe and pipe coverings from Germany, Mexico and British Columbia.

Within the past few weeks orders for the Durkee electric drill have been received by the Mine and Smelter Supply Company from the following firms: Two drills for the Bonanza Mining Company, of Divides, Mont.; 2 drills for the Haggerty Consolidated Mining Company, of Grand Encampment, Wyo.; 3 drills for C. J. Bailey, Needles, Cal.; 4 drills with engine, dynamos, etc., complete, for S. A. Parnall, Terasaz, Mex.; 6 drills for Crooke & Orman, contractors.

The J. H. Montgomery Machinery Company, of Denver, Colo., reports an exceedingly gratifying increase in its export business for the last year. Among recent foreign shipments are large orders of mining machinery to Chile and Peru, South America, and a consignment of Common Sense steel whims to South Africa. Its business with Mexico has more than doubled in the past year, and recent shipments to that country include a 50-ton copper smelter and a carload of ore cars and ore buckets.

The West End Furnace Company has been incorporated with \$500,000 capital, and will operate Roanoke Furnace and the Roanoke Iron Works, Roanoke, Va., which were purchased early in August by Donald Macleod, of Philadelphia, for \$170,000. The officers and directors are: President, H. T. Deckert, of Philadelphia; secretary and treasurer, Donald Macleod, of Philadelphia; T. D. Richardson, R. G. Stewart and C. C. Norris, of Philadelphia, and J. F. Sener, of Lancaster, Pa.

Fairbanks, Morse & Co., through their Salt Lake office, recently shipped to the California-Tonopah Company, of Tonopah, a 34-h.p. gasoline hoist and a full line of mining supplies; also a 12-h.p. hoist for the Montana Consolidated Company, of Stockton, Utah. There is a great demand for Fairbanks-Morse gasoline engines. The Salt Lake branch is now carrying a full line of steam pumps from the smallest to large size duplex, outside packed, outside connected mining pumps, built by Fairbanks, Morse & Co.

The directors of the Wheeling Potteries Company, recently incorporated, with a capital stock of \$1,250,000, have elected these officers: C. A. Fraugheim, vice-president; G. K. Wheat, secretary; W. A. Isett. The new company embraces the Wheeling Pottery Company, Riverside Pottery Company and the Avon Faience Company, of Tiltsonville, W. Va. The merger will take effect on January 1, 1903, at which time the property of the constituent companies will be taken possession of by the Wheeling Potteries Company.

The Locke Steel Belt Company recently held its annual stockholders' meeting at Bridgeport, Conn. The following directors were elected: Fred R. White, Cleveland, O.; T. B. Little, Cleveland, O.; Jasper R. Rand, New York City; J. A. Beeber, Williamsport, Pa.; Allen R. Bole, Brooklyn, N. Y.; C. C. Woolworth, Albany, N. Y.; M. McVey, Jr., New York, president; S. D. Locke, Bridgeport, Conn., secretary and treasurer; L. B. Ball, Bridgeport, Conn., general manager.

Alexander E. Brown, of Cleveland, O., president of the Brown Hoisting Machinery Company, was at Superior, Wis., recently inspecting the machines installed by his firm for the Northwestern Coal Company. The electric current is generated by the dock's power plant and runs the entire rigging. During the test the machinery unloaded 1,800 tons of soft coal from a boat in about 5½ hours. This was at the rate of over 300 tons an hour. In order to do this the buckets were loaded and unloaded at the average rate of 70 per hour, and each load carried over a ton of coal. The machinery worked well.

The Hothoff Machinery Company, of Cudahy, Wis., reports conditions of trade about the same as for several months, with no indication that demands are lessening. On the contrary, the demand for mining machinery, boilers, tank work, pipe lines, etc., has been far in excess of what was contemplated when the company was organized about 4 months ago, and there is every indication that it will continue. The company is reported to have recently taken orders for mining machinery for shipment to Mexican and South American points. A contract has also been received from Scotland.

#### TRADE CATALOGUES.

Some recent bulletins issued by the Fort Wayne Electric Works, of Fort Wayne, Ind., describe the various types of Wood electrical apparatus made by the company, including arc lamps, small motor panels, electrostatic ground detectors and small direct current motors.

The Tengwall File and Ledger Company, of Chicago and New York City, is sending out printed matter calling attention to the Tengwall system of self-indexing files and ledgers. The Eastern office of the company is at 87 Maiden Lane, New York City, in charge of Charles E. Sheppard.

The Denver Balance Company, of 3000 Larimer Street, Denver, Colo., sends out a neat circular descriptive of its portable balances. The concern manufactures high-grade assay and analytical balances. It also does an extensive business in repair work on balances and surveying instruments.

An illustrated booklet of 100 pages, entitled "Work Done," is issued by Westinghouse, Church, Kerr & Company, of New York City and Pittsburg. The pamphlet describes the development of interurban railway systems in southern Michigan, between Lake Huron and Lake Erie, including construction and equipment of the Grand Rapids, Grand Haven & Muskegon Railway, the Detroit & Port Huron Railway, the Toledo, Fremont & Norwalk Railway. The booklet contains numerous illustrations, is clearly and interestingly written, and is of value to any one seeking information regarding street railway equipment.

#### GENERAL MINING NEWS.

##### ARIZONA.

###### COCHISE COUNTY.

(From Our Special Correspondent.)

*Bisbee-West.*—A deep 3-compartment shaft is being sunk at Bisbee. The company has a franchise to supply the town with water.

*Blair Group.*—These claims at Bisbee have recently been sold to R. Oates, of Calumet, Mich.

*Black Diamond Copper Company.*—This company, 12 miles from Pearce, has blown in its 100-ton smelting plant.

###### GILA COUNTY.

(From Our Special Correspondent.)

*Confederate Mining Company.*—This company has men at work developing copper claims at Tonto under the management of T. Crandall.

*Pinto Creek Company.*—This company is installing 2 concentrating tables for handling the ores from its mines on Pinto Creek.

*Yo Tambien.*—The sawmill at this mine at Tonto will probably be completed by January 15.

###### MARICOPA COUNTY.

(From Our Special Correspondent.)

*Oro Grande.*—A reduction plant of 500 tons daily capacity is projected for this mine near Wickenburg.

###### MOHAVE COUNTY.

(From Our Special Correspondent.)

*German-American Company.*—This company has disposed of its group of 14 gold claims, 5 miles from Acme, to a French syndicate, owning and operating the Gold Roads mines.

*Gold Roads Company.*—This company, at Gold Roads, is driving a tunnel to tap the vein at the level of the tramway. Superintendent Stevens has charge.

*Homestake Group.*—R. J. Holmes, at Acme, has a small force of men opening this group of 6 gold claims.

*Minnesota.*—The recent gold ore discovery in this mine at Chloride continues good.

*White Hills Mining and Milling Company.*—D. H. Moffat, of Denver and New York, is foreclosing an attachment on this company at White Hills for \$26,000.

###### CALIFORNIA.

###### BUTTE COUNTY.

(From Our Special Correspondent.)

*Steifer Mining Company.*—This company, at Magalia, M. V. Steifer manager, has secured machinery and sunk shaft 100 ft. It expects to strike the old Magalia or Perschbaker gravel channel at about 300 ft.

###### CALAVERAS COUNTY.

(From Our Special Correspondent.)

*Alpha.*—This mine, near Angels, has closed down pending the installation of new pumping machinery.

*Costa.*—Several gravel claims near Calaveritas, 15 miles from Valley Spring, are to be opened by W. J. Nelson, of New York City. The ground includes the placer claims of Costa & Terwilliger, Roncolio and land of L. Costa. The Old Gulch and McDermont ditches are included. About 15 men are at work. The present ditch is to be enlarged.

*Western Mining Company.*—This company has taken hold of the old Foot & Thompson claim at Rich Gulch, Thomas Kavanaugh and W. J. Lewis, of Cripple Creek, Colo., are in charge. A compressor pipe and other material for reopening the mine have been shipped. The mine was formerly owned by H. Attwood.

###### EL DORADO COUNTY.

(From Our Special Correspondent.)

*Roscerans.*—It is reported that this mine at Garden Valley is to be reopened.

*Two Channel.*—At this mine, near Georgetown, J. F. Oldfield superintendent, work will shortly be resumed.

###### FRESNO COUNTY.

(From Our Special Correspondent.)

*Fresno Copper Company.*—This company, 18 miles from Fresno, H. Grafton Vercoe manager, is putting up the largest hoist in the district, and also a 6-drill Ingersoll-Sergeant compressor. There are 2 75-h.p. hoisting engines, with double reels. The mines are to be lighted by electricity.

###### HUMBOLDT COUNTY.

(From Our Special Correspondent.)

*River Bar.*—Herman Behrens and D. B. McDonald have each filed on 20-acre claims on the Klamath River near Mettah Bar.

###### INYO COUNTY.

(From Our Special Correspondent.)

*Argus Range.*—Several properties are now being worked in this range, near Ballarat. The Morton group in Snows' Canyon, and adjoining the Golden Argus property, has been sold to S. R. Phail and Mr. Thurman, who intend developing. On J. C. Cress' claim a 5-stamp mill is at work. At Arondo, in the same range, the Cornish rolls have been started up, and a water supply of good quantity has been developed. The Arondo Mining Company employs 20 men. The cyanide plant capacity is 50 tons daily. The average extraction from several thousand tons is \$5.77. G. L. Dean is president.

###### MONTEREY COUNTY.

(From Our Special Correspondent.)

*Coldstream.*—A group of claims on Ajax Hill, composed of the Coldstream, New York and Never-sweat claims, near Mansfield, has been bonded by Babsbee & Bowers, who have also bonded the Brewery Mine.

###### NEVADA COUNTY.

(From Our Special Correspondent.)

*Buckeye.*—This mine in Willow Valley District, owned by T. B. Gray and others, of Nevada City, is being rapidly developed. It has as yet no mill.

*Contin.*—The new hoisting works for this mine at Grass Valley are completed. The company intends to build a large mill to take the place of the one recently destroyed by fire, but work will not begin until next summer.

*Gold Flat.*—This mine, near Nevada City, which has been idle for some years, is to be reopened by a new company, with George Levinski as principal owner. The mine is to be pumped out and equipped with machinery.

*Graham.*—The gravel claim at Blue Tent, near Nevada City, being developed by Clifford Graham, has good prospects. It is expected that a mill to crush the cemented gravel will be erected.

*Lecompton.*—A rich strike is reported made in this mine in the Willow Valley District, near Nevada City. The mine is under lease.

## PLACER COUNTY.

(From Our Special Correspondent.)

*Gaylord.*—At this gravel mine near Auburn, an Oakland company is running a tunnel, laying foundations for a mill, etc. E. C. Gaylord is superintendent.

*Jubilac.*—S. D. Nesmith is working this mine, near Auburn, the ore to be crushed at the Marguerite Mill.

*William Mitchell.*—This mine, near Centerville, has been purchased by H. Estorf, of Colfax, and development work will begin in January.

## PLUMAS COUNTY.

(From Our Special Correspondent.)

*Stone & Richards.*—A group of mines on North Canyon, near Greenville, belonging to Stone & Richards, has been sold to Droegge Brothers, of Covington, Ky.; E. N. Cornell, of Milwaukee, Wis., and W. Day, of Oroville. The new owners will begin development as soon as weather permits.

## SAN BERNARDINO COUNTY.

(From Our Special Correspondent.)

*Mountain Jewel Mining Company.*—This company, of which J. P. Hays is president, is planning a 10-stamp mill in the Old Woman Mountains, near Danby.

*Vanderbilt District.*—In this district around Manvel, considerable work is being done. The Santa Fe Railroad Company is about to build a 12-mile branch from Dry Lake to Vanderbilt. There are between 150 and 200 men at the camp at present. The St. George and Gold Bronze claims, under bond to the Federal Mining Company, L. C. Gillian superintendent, are worked, with 30 men, and shipments of ore have recently been made.

## SAN DIEGO COUNTY.

(From Our Special Correspondent.)

*Boulder Creek Mining Company.*—At the mine, near Julian, the tunnel has been driven 150 ft., and the ore is stated to average \$12 per ton. Drifting from the tunnel is in progress.

*Julian Reduction Company.*—This company, with M. Jacoby as manager, intends to put up reduction works at Julian, including a 100-ton furnace.

## SHASTA COUNTY.

(From Our Special Correspondent.)

*Americus.*—This property on Mule Mountain, near Shasta, has a shaft down 100 ft. A hoisting plant has been installed under the foremanship of Joseph Wolf.

*Gold Mountain Mining and Milling Company.*—This new company, recently incorporated, has obtained 6 claims on Salt Creek, near Shasta. The claims are the Hawaii, Atlanta, Montezuma, Gladstone, Midas and Dewey. The headquarters are at Redding, and Aaron Bell, E. P. and J. G. Conner and D. N. and F. L. Honn are incorporators.

*Mountain Copper Company.*—This company, with mines at Fielding and smelters at Keswick, has stopped all work on account of the smelters' strike. The town of Keswick, with a former population of over 2,200, is being entirely deserted. The merchants have refused further credit, and most of the single men have gone to other camps. Families are also leaving as fast as possible. From present appearances the smelter and mine, the most productive in the State, will be closed for an indefinite period. Lewis T. Wright is manager.

## SIERRA COUNTY.

(From Our Special Correspondent.)

*New Enterprise.*—This mine at Rattlesnake Gulch, near Downieville, J. H. Stewart superintendent, has closed until spring. Considerable work was done this season, but not enough to continue during the winter.

## SISKIYOU COUNTY.

(From Our Special Correspondent.)

*J. O. Welch.*—Advices from Etna are that work has started on the big ditch from French Creek for supplying water to the J. O. Welch hydraulic claim, which was recently sold to an Eastern company.

*Quartz Hill.*—This mine at Scott River has been

incorporated under the name of Scott River Gold Mining Company, New York City men having bought the property. Machinery is being forwarded, and also pipe for a water power plant for a 40-stamp mill.

## SONOMA COUNTY.

(From Our Special Correspondent.)

*Haldsburg.*—In this quicksilver mine, near Walls Springs, a strike of rich cinnabar ore has been made. The mine is owned by J. H. Cruse and other Sonoma County men.

*Sonoma Consolidated Quicksilver Mining Company.*—A lot of machinery has been shipped for the mines at Pine Flat. The mines have started with a good force.

## TRINITY COUNTY.

(From Our Special Correspondent.)

*Fairview.*—A \$5,000 brick was the result of the first month's run of the new 10-stamp mill, near Minersville. Joseph Porter is manager and Charles Alenberg, of San Francisco, president of the company. The mine was purchased last spring for \$60,000.

## TUOLUMNE COUNTY.

(From Our Special Correspondent.)

*Altadina.*—This mine, 2 miles from Sonora, was recently sold by M. T. Fillmore, the present superintendent, to A. W. Holmes, of Detroit, Mich.

*Baker.*—A new shaft is being sunk on this mine at Carters. It is an extension of the old Eureka claim.

*Bright Star.*—This group of 7 claims, near Groveland, has been sold by Lawrence White.

*Basin.*—Men are at work on this mine near Carters, John Rocco, owner.

*Cosmopolite.*—At this mine at Groveland, Harry Argall superintendent, an air compressor and 3 air drills are at work.

*Dreisam.*—This mine, near Carters, A. Trittenbach superintendent, is to sink from the 400 to the 600 level, where a body of ore is expected.

*Dulcek.*—At this mine at Groveland, W. J. Graham superintendent, an 800-ft. tunnel is being run to tap the vein.

*Dutch.*—At this mine at Quartz, A. Trittenbach superintendent, the shaft is now down 1,420 ft.

*Golden Gate Company.*—The chlorination works at Sonora are to be fired with crude petroleum hereafter.

*Michigan.*—A hoist and saw mill have been shipped and a mill is to be put up to be run by water power. Pipe has been provided.

*Miner's Dream.*—At this mine, 8 miles from Carters, the Berger Brothers are running a 1-stamp mill by wind power. Both ore feeder and water supply are regulated by the windmill. About a ton of ore daily is crushed when there is wind. The ledge, though small, is quite rich.

*Ranch.*—At this mine, near Columbia, the old river channel has been cut. The operators have the mine bonded from Doyle Brothers.

*Top Notch.*—At this mine the extension of the Dead Horse, at Carters, sinking continues.

## YUBA COUNTY.

(From Our Special Correspondent.)

*Barker.*—The gravel claim of H. P. Barker, near Camptonville, has been bonded to San Francisco men, who will drift on the gravel.

*Eagle Canyon Mining Company.*—Work is progressing on the mine of this company, near Yuba River, south of Dobbins. A mill is to be put up next spring.

*Ralston Mining Company.*—The late superintendent of this company, J. W. Van Winkle, has sold his interest. He has other interests at Los Burros camp.

## COLORADO.

(From Our Special Correspondent.)

The final struggle for the control of the Colorado Fuel and Iron Company occurs on December 10. Denver people naturally prefer the triumph of the Osgood faction, but Colorado people generally desire to see the stockholders, who own the majority of the stock, in actual control.

Persistent rumor say that the United States Reduction and Refining Company's big plant at Colorado City has been taken over by a foreign syndicate, but close inquiry fails to confirm the report, though the impression is current that the deal has been made.

The Colorado Mine Operators' Association has arranged for a banquet in Denver on December 13, at which the representative mine operators of Colorado are expected to attend, the object being to cultivate closer social and business relations.

The action of the authorities of San Miguel County in calling a special grand jury to investigate the Collins murder gives a distinctly hopeful tone to the mining situation in that section, as law can be enforced only when public sentiment demands it; and public sentiment has apparently at last been aroused. Dr. R. A. F. Penrose, Jr., manager of the Com-

monwealth Mine, of Pierce, Ariz., is spending a few days in Denver, Colo., after an absence of several months in the Orient. Dr. Penrose has prepared some account of his trip for publication.

The rich surface strike of high-grade ore in the Livingston Mine in Boulder County is being systematically prospected by a drift northwest along the dyke toward the Sphinx lode, an extension of the Livingston. A consolidation of the 2 properties has been effected, and the new company has been organized under the management of George Teal, a mining engineer of Boulder County. The company intends to pursue development, and sink a deep shaft. On the south end of the Livingston, in the Anchor group, a similar ore shoot has been opened, which will be systematically developed by Topeka, Kan., parties.

The leading mine owners of Gilpin County are preparing to issue a handsome lithographed map, showing all the mines of any prominence in the county. It is intended for free distribution, and represents quite an expenditure of money for such conservative operators.

An interesting showing of the value of lessees' work is found in the Horace Granfield lease on the C. K. & N. Company's property on Beacon Hill, Cripple Creek. For 2 years Mr. Granfield worked in barren ground without shipping a pound of ore. At the 300-ft. level drifts were started a year ago, opening a shoot that has produced in 12 months \$110,000 at an approximate expense of 40 per cent. As a result of this work, the C. K. & N. has declared a dividend of \$14,319. Cripple Creek, Leadville and other camps in Colorado can show similar testimony of the work of lessees.

While the mining situation in Colorado from the broker's point of view is dull, there has perhaps never been such a demand for good going properties, though the price of silver is a bogey to many. Mining men here, of course, hope for a continuance of the present Mexican financial system, as a change to the gold standard down there would mean another jolt for silver.

A strike of anthracite coal 9 ft. thick has been reported 10 miles east of Pueblo. Messrs. Tabor, Moffat and others, while boring for oil, encountered the vein, which they expect to open, leaving the search for oil to the future.

*Colorado Fuel and Iron Company.*—The following statement was given out early on December 10 by representatives of the parties who have been fighting for control: "Members of the three proxies committees representing stockholders of the Colorado Fuel and Iron Company met on the evening of December 9, 1902, and agreed that three committees should vote the stock represented by them for 13 directors, 4 of whom should be named by the Osgood committee, 4 by the Butler-Gould-McClement committee, 4 by the Hawley-Harriman committee, the thirteenth member of the board by mutual agreement to be James H. Hyde, vice-president of the Equitable Life Assurance Society of New York. The three proxy committees will meet at the annual meeting December 10, 1902, and vote for the same ticket of 13 directors in accordance with the foregoing agreement. The suit now pending in the United States Court, District of Columbia, is to be dismissed."

The directors agreed upon were James H. Hyde, H. E. Huntington, E. H. Harriman, J. A. Kebler, J. M. Herbert, A. C. Cass, George J. Gould, J. L. Jerome, Edwin Hawley, John H. McClement, Frank Trumbull, Charles Henry Butler and J. C. Osgood. The above-named directors were unanimously elected at the shareholders' meeting on December 10.

## CHAFFEE COUNTY.

The Liberty Bell Mining and Development Company has been organized to operate properties in the Turret District. The company is capitalized for \$300,000, with the following officers: President, A. Dawkins, of Boise City, Idaho; vice-president, D. J. Kramer, of Salida; secretary and manager, W. S. Charles, of Salida. In addition to these officers are the following directors: Charles Garfield, of Washington, D. C.; W. W. Kramer, of Sunfield, Mich.; E. A. Sherman, of Salida. The property of the company is near Turret, and on the Independence vein. A shaft is down 50 ft.

## CLEAR CREEK COUNTY.

*Pelican-Dives Mining Company.*—In reversing a decision of the New York Supreme Court, in the matter of the application of this company, a Colorado corporation, to have an assessment on its personal property in New York City stricken from the rolls, the Appellate Division has decided that a foreign corporation whose office in New York is merely used for directors' meetings and clerical work incidental to the distribution of dividends, is not subject to taxation on its personal property. The corporation was assessed \$3,500 for its office furniture and a deposit in the bank for the purpose of paying dividends.

## GUNNISON COUNTY.

*Revenue.*—This group of claims, in the Box Canon District, between Ohio City and Waunita, is reported sold for \$500,000 by H. C. Lucas to Edwin K. Buttolph, of Denver, representing New York capital.



## GILPIN COUNTY.

(From Our Special Correspondent.)

**Gilpin Ore Shipments.**—For November the shipments of smelting and crude ores, tailings and concentrates from the Black Hawk depot to the Golden and Denver smelters and to outside points were 288 cars, or 5,760 tons. The month did not show the usual 25 per cent increase, due mainly to early snows, which delayed traffic.

**Buckley.**—E. W. Williams, of Denver, and New York men are interested in a lease and bond. They will clean out levels and get ready for production. The property is being connected by switch to the main lines of the Gilpin Tramway Company, giving cheaper transportation. J. Laughran, Central City, is superintendent.

**Ivanhoe.**—St. Louis, Mo., men who own this property on Quartz Hill, will soon make a visit to the property, with a view of resuming operations. The mine is developed by a 1,200-ft. shaft, and has been a good producer at intervals.

**Machinery Receipts.**—Two cars of machinery have been received at the Black Hawk depot for the Avon Gold Mining and Milling Company operating in the Nevada District, and one car for the Boston-Occidental Mining Company operating at American City, in the Pine District.

**Nevada Consolidated Mines Company.**—Operations have been resumed at the King properties on King flats, under the superintendence of W. H. Richards, of Bald Mountain. Developments will be confined to the King, Lamberson and Warren mines, and the company is figuring on erecting a concentrating plant during the coming year.

**Newfoundland.**—A strike of high-grade ore has been made in the 600 level of this property on Gunnell Hill, the smelting ores running into the hundreds of dollars per ton in gold. The property is owned and operated by George W. Mabey, Sr., of Denver.

## LAKE COUNTY—LEADVILLE.

(From Our Special Correspondent.)

The fall in silver is viewed with much apprehension by mining men. Up to present writing no mines have suspended, as operators are in hope that the drop in price is only temporary. The iron tonnage continues very heavy.

**Ballard Mining Company.**—The company is pushing work on its new cyanide mill to handle its low-grade siliceous material, which would not stand the \$4 treatment charge of smelters. A 70-ton mill is being built.

**Bohn.**—A new leasing company, headed by E. L. Daniels, is working this downtown mine.

**East Tennessee Group.**—A new company is being organized to prospect this property in Tennessee Park, near the Helen Gould, with diamond drills.

**Fryer Hill Mines Company.**—A gradual increase is noted in shipments, which will be heavier after January 1. A breast of good-looking mineral has just been opened up in the Bangkok-Cora Belle. The water handled through the El Paso is down to 500 gal. a minute. Work is being pushed on the new shaft to tap the Progressive shoot.

**Hopkins.**—This proposition on Mt. Sheridan is worked through an old tunnel and a fine vein of lead ore has recently been opened. The workings include an incline 250 ft. long, by which a vein has been opened. The ore averages about \$40 in silver and lead, and arrangements are being made to ship.

**La Plata Mining Company.**—This company's territory on Rock Hill was to have been leased to local people, but at the last moment the English owners turned down the proposition and insist on a sale or nothing. It is likely the matter will be dropped for the present. It is understood that the price asked was \$15,000.

**Valentine Mining Company.**—Machinery is being put in by the reorganized company. It will take some weeks to drain the workings which have been idle for months. Indications are very good.

**Valley Leasing Company.**—The recent strike continues to improve, and arrangements are being made to ship. The mineral in the shaft and drift averages \$30 to \$40 to the ton.

**White Cloud.**—This new shaft on Breece Hill is making headway. Eastern capital is back of the enterprise.

## OURAY COUNTY.

(From Our Special Correspondent.)

**Camp Bird, Limited.**—The October report shows that the mill crushed 5,900 tons of ore and about 3,100 tons were deposited in the cyanide tanks. The estimated return from all sources is \$226,634, and the working expenses and development were \$65,785. The net profit is estimated at \$32,396.

## SAN JUAN COUNTY.

(From Our Special Correspondent.)

**Anglo-Saxon.**—This Silverton property, owned and operated by the Gold King Company, has a 50-h.p. engine, just put in to supply air for the drills. A rich strike is reported.

**Bessie.**—Twelve men will be employed all winter at this Silverton property. W. A. Ptolemy will be manager, and a 100-ft. shaft will be sunk.

**Black Prince.**—This company has purchased the possessions of the Contention Mining Company on King Solomon Mountain, near Silverton, and is making many improvements. The old Contention tram is also being extended to the Black Prince lode.

**Equality Tunnel.**—The long cross-cut has broken into the Nevada vein, and drifting will be pushed both ways.

**Fairview.**—While driving an upraise 550 ft. from the surface, a rich body of gray and yellow copper was broken into, measuring nearly 3 ft. across. Mr. George Bibb, of Silverton, is owner and manager.

**Gold Tunnel and Railway Company.**—The Highland Mary Mill, near Silverton, has been started, and is running smoothly on ore from the Lookout vein.

**Guggenheim Exploration Company.**—This company is negotiating for the purchase of the Iowa-Tiger and several other prominent groups of claims near Silverton. It may erect several large mills near Silverton next season.

**Kendrick Promotion Company.**—A vein of rich ore has been cut in the 7th level, and is being stoped out for shipment in the spring. A tram will be built to connect with the railroad.

**Sunnyside.**—A recent shipment from this Silverton Mine is said to have been worth \$30,000.

**Silver Ledge.**—The new mill and tram near Silverton recently went in successful operation, and 150 tons daily are treated.

**Scranton City.**—A large vein of high-grade milling ore has been cut in No. 1 claim, and several new buildings are being erected. The 3 claims are owned by the Silver Lake Company.

**Western States Gold Mining Company.**—This company has secured title to considerable land containing several lakes near Rockwood, which will be converted into a reservoir for supplying electric power throughout San Juan County.

## SAN MIGUEL COUNTY.

(From Our Special Correspondent.)

A grand jury, of which N. I. Mansfield, formerly manager of the Smuggler-Union Mine, is secretary, is investigating the murder of Arthur L. Collins and other outrages growing out of the action of the local miners' union.

## TELLER COUNTY—CRIPPLE CREEK.

(From Our Special Correspondent.)

**C. K. & N. Gold Mining Company.**—This company has declared a dividend of 1 cent per share. At present there are in the treasury about \$21,000, received by royalties paid by Horace Granfield, who has a long lien on the Raaler claim, from which a large amount of rich ore has been shipped.

**C. C. Consolidated Gold Mining Company.**—At the annual meeting the following directors were elected: John G. Shields, D. I. Christopher, J. F. Humphrey, Irving Howbert and J. H. Madden. The report of the secretary showed the company to be in fair financial condition. No work is done on company account, but considerable leasing is in progress. The leasers on the Colorado Boss have shipped a good deal of ore during the year. At the directors' meeting the old officers were re-elected, as follows: Mr. Humphrey, president; Mr. Shields, vice-president; Mr. Irwin, secretary, and Dr. Christopher, treasurer.

**Cripple Creek Drainage Tunnel.**—Talk about a deep drainage tunnel continues, and in many ways the outlook for such a tunnel is better than ever. A number of shallow tunnels have been discussed, and while these would be available sooner than a deeper one, the benefits would not be lasting. Some prominent mining engineers have been advocating a pumping association as temporary, and a deep drainage tunnel as permanent relief. A tunnel between 6 and 7 miles long cut the district at an average depth of little less than 3,000 ft. It is understood that outside capital is willing to take hold of the project, provided that adequate royalty for draining can be assured.

**Golden Cycle Gold Mining Company.**—Judge Hallett, in the United States District Court at Denver, has decided that the action brought by Carlton, Tucker-Ballard & Co. against Millken and Hill, must be heard in the District Court of Teller County, as it does not come within the jurisdiction of the United States Court. The defendants are now trying to get a change of venue from Teller to El Paso County, on the grounds that the influence of A. E. Carlton, one of the plaintiffs, is such in the Cripple Creek District that it is prejudicial to the interests of the defendants. The war between the directors thus goes merrily on, and the end is not yet.

**Isabella Gold Mining Company.**—During a severe storm the smokestacks were blown down, and not much work was done for several days. Considerable work is now underway, some by the company and some by lessees. The property is at present showing up well, though nothing remarkable has been disclosed of late. E. M. De la Vergne, of Colorado Springs, is general

manager, and A. G. Campbell, of Cripple Creek, is superintendent.

**Morning Star Gold Mining Company.**—At a meeting of the directors during the week the company's business was practically wound up. The company has sold its claim, the Morning Star, to the El Paso Consolidated Gold Mining Company, and now has no ground. The price was \$50,000, \$2,000 being paid when the option was granted, and \$48,000 when the deal was closed. It is understood that the Morning Star Company will declare a dividend of 5 per cent per share on outstanding stock.

**Pharmacist Gold Mining Company.**—A small cyanide mill is being erected for treating the dump which is worked under lease. Quite a number of old dumps have been treated by the cyanide process, and it is understood that when the ore is suitable it can be treated at a profit even when very low grade. A successful treatment of \$4 or \$5 ore in this camp will mean much. In the underground workings of the Pharmacist, lessee McDade is shipping considerable ore, and some is shipped by other lessees on the main workings. On the north end very little is being done.

**Pinnacle Gold Mining Company.**—At the annual meeting of the stockholders at Colorado Springs, the following officers were elected: F. E. Brooks, Charles Farnsworth, F. M. Woods, Frederick Farnsworth and S. L. Caldwell. The property is at present worked under lease and the prospects are good.

**Sunshine vs. Sedan.**—After all of the evidence was in, it was discovered that one of the persons had been guilty of soliciting a bribe, causing a mistrial, and the suit will have to be tried over again. This is the second trial in which no conclusion was reached, and a large amount of money has been expended. The suit involves apex rights to properties on Galena Hill.

## IDAHO.

## BLAINE COUNTY.

**Liberty.**—This company, near Hailey, has laid off its miners until the air compressor and drills recently ordered have arrived and been installed. Major Fred R. Reed is manager.

## IDAHO COUNTY.

**Consolidated Royal Flush and Virginia Mining Company.**—This company, capital \$1,250,000, was incorporated at Trenton, N. J., to acquire the Royal Flush, Virginia, and Virginia No. 1 mines, in the Elk City region. The incorporators are D. W. Mahoney, W. H. Carroll, John J. Bowers, J. V. Morisse, J. A. Parker, Passaic, N. J.; A. F. McBride, H. H. Schoonmaker, R. D. Buckley, G. H. Van Houten, A. B. Jeffrey, of Paterson, N. J.

**Quartz Gold Mining Company.**—Louis B. Whitney, trustee, of Pittsburg, Pa., has sued Frank Haskell for \$15,000 alleged to have been paid on an agreement to pay \$50,000 for a property of this company in the Thunder Mountain District. The plaintiff says the defendant never owned the property he described for sale, and that the property was absolutely worthless, which, he says, he learned after making payments aggregating \$15,000, which the defendant refuses to refund.

## SHOSHONE COUNTY.

**Beaver Creek Dredges.**—Lumber is being hauled in for a fourth dredger on Beaver Creek, near Delta. It will be built on the Louis Nistler claim. Carpenters are busy constructing the boat for dredge No. 3. The pit is dug at the mouth of Trail Creek, on the Coulson & Heustis claim.

**C. S. Crysler,** manager of the several dredger companies, has taken up the bond on the F. C. Gordon properties, about 170 acres, including the sawmill, water right, residence, etc., and is now in possession.

**California Consolidated Company.**—This company, it is said, will take over the Portland, Monarch, Black Cloud and other claims near Wallace. A mill with a capacity of 200 tons daily has been built.

**Beaver Creek Gold Mining Company.**—This company has sold to the Mascot Gold Mining Company about 100 acres of placer land near Delta for \$11,000. Both of these companies, operating on adjoining land, have started the construction of large dredges, with the intention of carrying on placer mining.

**Houle.**—R. D. Bohannon is drifting for bed rock on this hydraulic property on Pony Gulch.

**Skookum.**—Kennedy J. Hanley has been served with a writ to show cause why he should not be punished for contempt of court in accepting \$5,500 on account of his claim against Charles F. Sweeny, F. Lewis Clark and the Empire State-Idaho Company. On November 17 the United States Circuit Court of Idaho entered a final decree in the Hanley case, canceling the deed which the Court of Appeals found that Chas. F. Sweeny and F. Lewis Clark had procured from Hanley through fraud. The decree quieted Hanley's title to a one-eighth interest in the Skookum and the ores therein contained, and provided that Hanley was entitled to recover \$175,867.

**Morning.**—This mine, at Mullan, has stopped work temporarily, owing to the water supply running short through cold weather. About 275 men are idle.



## ILLINOIS.

(From Our Special Correspondent.)

**Waste in Coal Mining.**—On Tuesday, December 2, a meeting was held at the State House at Springfield, at which the secretary of the State Labor Bureau, State and county mine inspectors, coal operators, mine superintendents and mine managers and State officers of the United Mine Workers of America were present. The object of the meeting was to try to devise some means of stopping the reckless and extravagant use of powder in the coal mines of the State. The meeting lasted all day, and resulted in much interesting discussion. Except for the mine workers the consensus of opinion seemed to be that the only remedy was to change to the lump coal from the mine run system of weighing coal for the miners, for under the mine run system the miners' main object is to get plenty of powder in his shots to be sure to blast down plenty of coal, regardless of the quality thereof. The miners bitterly opposed the abolition of the mine run system, and left the meeting. On unanimous vote of those remaining a committee was appointed to draft resolutions to present to a future meeting. The committee is made up of 3 State mine inspectors, 3 from the operators and superintendents, and 3 mine managers. The operators and superintendents are represented on the committee by Richard Newsome, operator of Peoria; George T. Simpson, of Mt. Olive, division superintendent of the Madison Coal Company, and William Smith, of Riverton, general superintendent of the Riverton Coal Company. This committee will probably recommend that the next annual convention of operators and miners be urged to adopt the lump coal system of paying the miners, same as is now used in Ohio, Indiana, and Western Pennsylvania.

## MICHIGAN.

COPPER—HOUGHTON COUNTY.

(From Our Special Correspondent.)

**Atlantic.**—The cross-cut from the exploratory shaft on section 16 is in 1,625 ft., and still in trap. The November production of the mine was 287 tons of mineral.

**Baltic.**—The November production was 495½ tons of mineral. The 4th head at the mill is in commission, stamping rock from the Champion. It will handle Baltic rock beginning with the new year.

**Calumet & Hecla.**—Three furnaces and the cupola at the Lake Linden smelting works are in blast again. Sufficient coal has been secured to last all winter.

**Champion.**—The November output was 420 tons of mineral. The new stamp mill at Freda is in commission with 1 head working. The second head will be ready next week.

**Elm River.**—The cross-cut from the bottom of the exploratory shaft has encountered the Winona lode. Drifting north and south is in progress. The lode is 12 ft. wide, but not very rich in copper.

**Franklin.**—This mine produced 366 tons of mineral in November. The dry house at the Junior branch of the mine has been destroyed by fire.

**Quincy.**—This November product was 1,086½ tons of mineral.

**Tecumseh.**—This mine has been closed down, and the force discharged. Work was for some time past confined to No. 1 shaft, on the Kearsarge amygdaloid lode, a half-mile from No. 6 shaft of the Osceola Mine. It is 2,275 ft. deep.

**Wolverine.**—This mine produced 508¼ tons of mineral in November.

COPPER—KEWEENAW COUNTY.

(From Our Special Correspondent.)

**Ahmeek.**—The exploration shaft is down 75 ft., 25 ft. through overburden. Cross-cutting will soon begin.

**Mohawk.**—One head at the new mill on Traverse Bay has gone into commission. The second head will be ready to commence stamping within a short time. Opening work at the mine is advanced and there is ample territory to supply 2 heads with selected rock.

COPPER—ONTONAGON COUNTY.

(From Our Special Correspondent.)

**Mass Consolidated.**—C shaft, on the Butler lode, is down 485 ft. A cross-cut is to tap the Knowlton and Evergreen lodes. The output of mass and barrel copper is large. New hoisting, boiler and compressor plants will be erected at C shaft. Part of the foundations has been laid.

## MINNESOTA.

IRON—MESABI RANGE.

(From Our Special Correspondent.)

**Commodore.**—This property, which has been idle for 2 years in an effort to secure a reduction of royalty, has this fall shipped its old stock pile of 66,000 tons, and is being reopened for mining. It will be worked this winter and next summer on a considerable scale.

**Explorations.**—The Williams estate, of Chicago, which has been exploring in sections 4 and 9, T. 58, R. 16, for the past year on lands of its own, has found a very small deposit of ore in section 9, in the

n. e. of the n. w. After the estate abandoned exploring in section 4 the work was taken up by others, who have found some ore, though not in any great quantity. Directly east of section 4 work that has been under way under the charge of S. Jarchow for the Oliver Snyder interest, has ceased. On the adjoining lands to the south the Minnesota Iron Company is exploring, but has made no finds. The ore-bearing horizon is here very narrow, so far as exploring has shown, and the work done has been largely unproductive. In section 8, just west, the Roberts Mine lay right up on the diorite, and the opened ore has been mined out, the mine abandoned and the machinery removed, after mining about 200,000 tons. Explorations will be undertaken soon to the southeast of the old mine, where the ore-bearing formation has thickness enough to be a possible field. The McKinley Mine, belonging in fee to the Minnesota Iron Company, just east of this, is known to contain a considerable deposit, though how large is not generally understood. A quarter of a mile further to the southwest Messrs. Maitland, Thompson, et al., are opening their new Wills Mine, and are shipping a first lot of about 10,000 tons of excellent coarse ore. Adjoining to the southwest, Pickands, Mather & Co. have a very considerable deposit of low-grade ore, before reaching their Corsica and Elba mines, still further southwest, and adjoining the last exploration. This is all the new work going on now in that township, except at the east end. There Alfred Merritt, of Duluth, has a couple of drills working in the bottom of a basin between the village of Biwabik and old Merritt town site, and though quite low in surface and deep with his holes, is in surface and boulders all the way down. This is in the north central part of section 11. In section 1 the old Kanawha and Hale mines will probably be abandoned and explorations will be undertaken to extend their ore body. East of these mines the W. P. Snyder explorations in section 6, T. 58, R. 15, have stopped, as they found no ore.

**Interstate Mining Company.**—This company, which is the Minnesota branch of Jones & Laughlins, has mined this year about 140,000 tons, of which 88,000 has been from its fee Lincoln Mine, near Virginia, and the rest from its Grant state lease near Buhl. The latter is now being equipped for much heavier work by the enlargement of the single compartment shaft. It will mine about 100,000 tons next year. The Lincoln will mine about 250,000 tons next year. It has now a fine equipment, both surface and underground, 2 large shafts and large openings. Its ore is of high grade, and there is a great deal of it. The Grant is also a large property, probably not less than 10,000,000 tons being now in sight.

**Jordan.**—This mine, a new property, near Hibbing, has shipped in the past 3 months, since it was put in shape for mining, 148,000 tons. It is a milling property, and is now working underground, extending the drifts, etc. The ore mined in this work will be dumped in the milling pit, to be milled down and rehoisted next season, as it is considered cheaper to rehandle ore in this way than from a stock pile.

**Minorca.**—This property, belonging to Pickands, Mather & Co., a mile north of Virginia, has been developed into a promising mine this year. Underground development continues steadily.

**Stevenson.**—This mine closes the year with a shipment of 1,440,000 gross tons, of which about 10,000 went all rail. The mine shipped in 1900 56,000 tons, in 1901 666,000 tons. The highest credit is due to the general superintendent, Ames Shepard, the owners, and all connected with the enterprise. The mine will let stripping contracts in a short time that will require several years, and will necessitate the removal of about 500,000 cu. yd. The company will also carry on a large amount of stripping this winter. The mine is to be made ready for a production of not less than 2,000,000 tons in 1903.

**Wills.**—This mine, which was opened in September, is closing the year with a shipment of about 15,000 tons. It will be developed for a large output the coming year.

IRON—VERMILION RANGE.

(From Our Special Correspondent.)

**Section 30.**—Another decision in this famous case has just been made by the United States Court at St. Paul, in which the judge followed the ruling of the United States Supreme Court, and decided for Eaton & Merritt, and further stated that the new evidence brought forward by the other side was of no consequence, and did not deserve consideration. Probably this decision will be appealed to the Supreme Court, which can decide in no other way without overruling itself. Negotiations that have been pending between Eaton & Merritt and Pickands, Mather & Co. for the lease of this famous property, are said to have terminated.

## MISSOURI.

JASPER COUNTY.

(From Our Special Correspondent.)

Complete figures show that at the present time all the concentrating mills of the Arkansas District aggregate in capacity 1,040 tons. This showing may be disappointing, as the total mill capacity is far less than

that of some individual companies in the Joplin District, but it is very good when it is considered that inadequate railroad transportation has interfered with development.

**Missouri-Kansas Zinc Miners' Association.**—At a recent meeting two plans were presented for staying the slump in zinc ore prices, both of which have been tried with good effect at previous times. Most of the operators favored a shutdown either for a definite time or a certain part of every week. The first alternative was considered the best, as almost all of the mines are in need of overhauling and a week or two could be profitably spent in timbering and much more time in general development. After a thorough discussion it was provisionally agreed to shut down after Christmas and suspend as much work as possible until there was a general better feeling in the ore market.

The second plan discussed was to export zinc ore to Europe. It was provisionally agreed to export a considerable quantity of ore. Several of the members of the association had been in communication with Belgian smelters, and believed that much more could be shipped without great loss. A paper was circulated and over a thousand tons were pledged for export.

**Perry No. 3.**—This mine and lease on the Perry Company's ground has been sold by its owner, Paul J. Murphy, to Ellis L. Ortris, of Philadelphia, for \$70,000 cash. Mr. Ortris takes title to the property as trustee of the Republic Lead and Zinc Company. The property consists of 54 lots and a 1,000-ton mill. The mine has made 100 tons of high-grade concentrates a week.

**Prairie Chicken.**—This mine on the Howard Murphy lease west of Joplin was sold recently for \$95,000. The property included only a 10-year lease on seven mining lots, together with the mine and a 1,000-ton mill, but it has been one of the best individual mines in the vicinity. It was opened only a year ago by Thomas Kinmouth, A. J. Baker and Howard Murphy, all of Joplin, and at the time sold \$75,000 of ore was in sight. The turn-ins every week were very large, the week before the mine was sold the turn-in being 202 tons.

**W. D. W.**—The 4-lot 10-year lease and the 80-ton mill of this mine on the Big Six Development Company tract on the S. Duffield Mitchell land at Duenweg was sold recently for \$25,000. The sale was made to Chicago parties by the owners, C. T. and E. A. Williams, of Joplin; C. R. Dumars, of Carthage, and E. Frerer, of Duenweg. During the past week the sales from this mine were 20 tons, and it has averaged about a car-load of zinc concentrates a week.

ST. FRANCOIS COUNTY.

(From Our Special Correspondent.)

**Catherine Lead Company.**—This company has started its mine again at Fredericktown with a Hungarian crew, after a shut down due to a strike among the native miners. During the shut down the plant has been put in fine condition.

**Manhattan Lead and Land Company.**—This company has been incorporated with a capital of \$1,000,000, to take over the Cantwell township lead lands and some other valuable properties. This is one of the few companies composed of local men, as most of the mines in this district are controlled by Eastern capital.

**St. Joe Lead Company.**—This company is making extensive improvements at its smelting works at Herculaneum, which will effect an important saving in labor. When these, with the big improvements now being made at the Bonne Terre mines, are completed, it will effect a large economy in cost of making lead.

## MONTANA.

BEAVERHEAD COUNTY.

**Grasshopper Creek Dredges.**—The dredge boats at Bannock have stopped work for the season. M. M. Donald, superintendent, has gone East to spend the winter with his family. The A. F. Graeter boat has stopped work for good, as its ground has been worked out. The F. I. Graves stopped work over a month ago. Its ground is nearly worked out. The boat may start next spring. The Gold Dredge Company, which owns the boats, is considering moving them either to a placer in Missoula County or to one in Oregon. Dredging on the Grasshopper started 12 years ago, and next spring the Montana Company's boat at the mouth of Spring Gulch will probably be the only dredge left. The Maggie Gibson, after working out its ground, was moved to the mouth of Alder Gulch, where it has had a successful season. The Bon Accord, which had hard luck, and closed down 3 years ago, was moved a little over a year ago to the John Day River in Oregon.

FERGUS COUNTY.

**Alder Gulch Mining Company.**—This company is doing considerable development on the Alabama Mine, near Gilt Edge, and its group of cyanide claims. One of the tunnels is 400 ft. in length and another is in 150 ft. The company is also doing some development on the Alabama Mine. The August Mine on the north slope of the range is being worked.



## JEFFERSON COUNTY.

**Basin & Bay State Mining Company.**—The district court, in the suit brought by Bert C. Kemp, an Eastern stockholder, recently declared legal the lease of the mill and other property to A. Aug. Heinze, of Butte.

## LEWIS &amp; CLARKE COUNTY.

**Big Indian.**—The main water supply is from Clark's Creek, 1 mile distant, by a dam 16 ft. in height. The water is conveyed to a reservoir 150 ft. above the mill, and thence conducted to the mill by 2 pipes, one of 3 in. for general purposes, and one of 5 in. for fire protection.

The tailings are run from the mill to a settling and pump-house where they are filtered, and the decanted clear water is pumped back to the mill tank which has a capacity of 28,000 gal. The pumps are operated from a steam boiler which also supplies the heating apparatus. The total area of the company's property exceeds 325 acres. Allen C. Mason is president and general manager.

## MADISON COUNTY.

**Watscka Company.**—Preparations for the erection of the new mill near Rochester are progressing. Ground for the building has been broken, and the machinery has been ordered.

## MISSOULA COUNTY.

**Bullion Mining Company.**—This company, operating a group of copper claims near Saltese, has filed articles of incorporation. The trustees are B. F. O'Neil, James F. McCarthy, James H. Taylor, D. A. Mackenzie, F. D. Frazer, Mike Steffens, N. W. Thornton and John P. Gray, all of Wallace, Idaho. The capital is \$1,000,000. Considerable tunneling has been done, but all work is centered in sinking a shaft. The lead is 13 ft. wide, showing copper and some values in silver.

## NEVADA.

## WHITE PINE COUNTY.

(From Our Special Correspondent.)

**New York & Nevada Copper Company.**—This company now has about 50 men employed. The workings on the Star of the West claim are developing bodies of copper ore, chalcocite and chalcopyrite in a gangue of friable quartz porphyry. Shaft No. 2 is down 75 ft., and will be connected with the 300-ft. level of shaft No. 1. The new hoist is being installed on shaft No. 1, on the Star of the West Claim, and sinking is to be immediately resumed. A large crew of mechanics is now employed on the construction of the 500-ton concentrator plant and smelters. The work is being done by Smith McKay, the well-known millwright.

## NYE COUNTY.

**Ohio-Tonopah Company.**—This company's hoisting plant has a double engine, with 8-in. cylinders, and a 12-in. stroke, a double 5-ft. reel, and a 7-ft. spur-wheel, geared 8 to 1. The boiler is of 50-h.p. capacity, of the locomotive type. The reels carry 1,500 ft. of 1-in. steel cable. The condenser, in which all the steam is trapped, is a galvanized iron tank 6 ft. 6 in. in diameter, and of the same height, with a goose-neck which conveys all excess of steam into an 8-in. galvanized iron pipe 100 ft. long. The cost of wood at the mine is \$12 a cord, and water costs 1½¢ a gallon in the tanks.

## OREGON.

## JOSEPHINE COUNTY.

**Oregon & California Gold Fields.**—At the Eureka Mine of this company, near Grant's Pass, the Hammond 10-stamp mill is running day and night working about 30 tons of ore a day, said to plate \$25 to the ton, besides the sulphurets. The company now has a very complete plant, including air compressor, drills, concentrate dryer, electric light plant and good buildings. A force of 22 men is at work at the mine. F. B. Russell is secretary and manager.

## PENNSYLVANIA.

## ANTHRACITE COAL.

**Lehigh & Wilkes-Barre Coal Company.**—Four men were instantly killed and 9 badly injured by an explosion at this company's No. 5 shaft at Wilkes-Barre on December 9. A miner dropped a box containing 20 sticks of dynamite. Little damage was done to the mine.

**Luke Fidler.**—At this colliery of the Mineral Railroad and Mining Company at Shamokin on November 30 an explosion of gas killed 4 men and fatally injured 3 more. The accident was probably due to a miner removing the covering from his safety lamp.

## BITUMINOUS COAL.

**Conomaugh Coal Company.**—This company has been granted a charter, and has begun operations at Etri on the West Penn Railroad. The company has purchased about 300 acres of the most valuable coal land in the neighborhood. The price paid was \$125 an acre. The company is capitalized at \$50,000, and this amount will be increased to enable the officials to buy the most improved machinery and establish a large coal tippie.

**Keystone Coal and Coke Company.**—This company has begun operations at the coal plant, near Seward, where it owns 1,000 acres of coal land. A tippie has been completed and the coal is mined from a slope. The coal goes to the Eastern markets and the daily shipments already total 3 or 4 cars. It is the intention of the company to build at once 50 coke ovens.

**Pittsburg Vein Coal Company.**—This company is to start work at once on 2,000 acres of coal land in Washington County, which the company acquired some time ago. The property is connected with the Panhandle and Baltimore & Ohio railroads. The offices of the company are in Pittsburg. The officers are Samuel C. Grier, president; John F. Steel, secretary and treasurer. Directors: Henry Buhl, Jr., William Witherow, Samuel Dempster, John M. Anderson, Samuel P. Conner, E. P. Remington, Joseph Hastings and J. N. Davidson.

**Uniontown Coke Company.**—This company, composed of Uniontown men, will operate a big coke plant at Springdale. The company owns 2,300 acres of coal land, and will begin development work at once. Fifty ovens will be erected, to be followed by 150 more. The new concern is made up of J. V. Thompson, A. L. Moser, George D. Howell, C. H. Seaton, D. S. Richey and W. Thompson. The main office is to be at Uniontown; works at Outcrop.

## SOUTH DAKOTA.

## CUSTER COUNTY.

(From Our Special Correspondent.)

**Black Hills Porcelain Clay and Marble Company.**—A reorganization has been effected, owing to the death of President B. R. Noble, at Yale, Mich., a few months ago. Shipments of mica continue at the rate of 30 tons a month, for which the company received \$75 a ton on board the cars at Custer. Work has stopped on the lithograph quarry, owing to cold weather. L. P. Woodbury continues as manager.

**North Star Mining Company.**—A 12-ft. vein of rich ore is reported cut by the diamond drill 286 ft. from the main shaft. The drill was operated at the bottom of the shaft, 300 ft. deep. The 10-stamp mill is running on ore from the main shaft. Mill runs are said to show an average value of \$18 a ton. This ore body is 40 ft. wide. About \$10 a ton is saved by amalgamation and the remainder by concentration. The vein discovered is parallel to that worked.

**Saginaw Gold Mining Company.**—The shaft is 140 ft. deep. Five diamond drill holes were put down, the deepest being 500 ft. A steam hoist was purchased of the Newark Mining Company.

## LAWRENCE COUNTY.

(From Our Special Correspondent.)

**Golden Treasure Mining Company.**—A tunnel has been started towards a vein of rich ore recently disclosed in a shaft from near the apex of Bald Mountain. Shipments will be made to a local reduction plant.

**Imperial Gold Mining Company.**—Plans are perfected for increased capacity and orders have been placed for machinery. There will be a second set of finishing rolls, a set of intermediate rolls and double the present number of tanks. The tanks will occupy the part of the building at first intended for the roasters. When completed the plant will receive more custom ore.

**J. G. Reid Mining and Development Company.**—This company has purchased several claims near Galena, and is preparing to ship pyritic ore to the Horse-shoe Smelter in Rapid City. J. G. Reid, of Fulton, is president. The company also has a body of silver-lead ore from which ore is being taken for shipment.

**Oro Hondo Mining Company.**—The shaft house is complete and sinking has been resumed.

**Portland Mining Company.**—A contract has been closed with the Imperial Mining Company to treat the ore from the Portland mines. The shipments amount to from 500 to 1,500 tons a month. For two years the Portland Company operated a plant at Gayville under lease, surrendering September 1.

## PENNINGTON COUNTY.

(From Our Special Correspondent.)

**Copper Mountain Smelter.**—S. A. Baxter and others of Lima, O., who are building the 100-ton plant near Sheridan, expect to have it running by spring.

**Maloney-Blue Lead.**—The drift on the copper vein from the main tunnel is said to show ore carrying 2 per cent copper and \$3 a ton gold. Work is also under way at the outcrop. The capitalization of the company is being increased from \$750,000 to \$2,500,000.

**Montezuma.**—George W. Bock, S. J. Zerega and Oliver Leonisio, owners, are forming a company for the development of the mine.

## TEXAS.

## ANDERSON COUNTY.

(From Our Special Correspondent.)

**Palestine Mining and Petroleum Company.**—This

company has let a contract for a well to be drilled 9 miles east of Palestine.

## HARDIN COUNTY.

(From Our Special Correspondent.)

**W. E. Brice No. 3 well at Saratoga** is being bailed at 750 ft. on account of fine sand. A 54-ft. strainer is being used.

The Bryd Syndicate No. 1 well, 4½ miles north-east of Saratoga, has been abandoned, and the No. 2, which is 2 miles northeast, is down 1,700 ft.

## JEFFERSON COUNTY.

(From Our Special Correspondent.)

**Beaumont Oil Field.**—Crude is very scarce and November shipments were much curtailed, being about 200,000 bbls. less than in October. No long-time contracts are desired by sellers.

**National Oil and Pipe Line Company.**—This company has purchased 5 acres 3 miles south of Beaumont, and ordered the machinery for a small refinery, which is expected to be operating inside of 3 months.

**Patillo Higgins.**—This well, which was started 3 months ago on the western edge of the hill near Gladys Station, is the only well near Beaumont attracting any attention. The drillers are down 1,080 ft. in hard rock, and making slow progress. The well is several hundred feet from the nearest former gusher, and if brought in will add about 50 acres to proven oil territory.

**Texas Company.**—This Beaumont company has entered suits against the San Jacinto Oil Company, the Cascade Oil and Storage Company, the Buffalo Oil Company and the Drillers Oil Company, claiming heavy damages for non-delivery of contract oil at low prices. The plaintiffs allege in their petition that crude is worth 40¢ bbl., and that 50¢ will soon be the value.

## LIBERTY COUNTY.

(From Our Special Correspondent.)

**Taylor Dayton Company.**—This company has started drilling another well at Dayton.

**Wilson.**—This well, near Dayton, was abandoned November 26 at 1,780 ft. Strong gas pressure was encountered at various depths, but no oil. Another well will be started near the abandoned hole.

## UTAH.

(From Our Special Correspondent.)

**Ore and Bullion Settlements.**—For the week ending December 5 the Salt Lake banks report: American bullion, \$186,000; gold, silver, lead and copper ores, \$220,000; gold bars and bullion, \$133,700.

## BEAVER COUNTY.

(From Our Special Correspondent.)

**Frisco Shipments.**—The reported shipments of the Horn Silver were 4 cars for the week closing December 5.

**Blue Bird.**—This property at Milford will soon resume sinking its 275-ft. shaft. It is to reach the sulphides below and run levels to open the ground fully.

**Cactus.**—It is stated that a new tunnel a mile long will be started soon to tap the ore bodies at greater depth.

## BOX ELDER COUNTY.

(From Our Special Correspondent.)

**Century.**—The usual fortnightly consignment of a bar of gold is reported. The stamps are dropping steadily on good ore.

**El Amigo.**—Some nice-looking lead ore, that contains silver, is being raised.

**Sunrise.**—Drifting on fissures is under way, and some values are coming in.

**West Century.**—The workings have broken into decomposed material, in which some free gold is reported. It is intended to drive this channel to intersect the quartz ledge some 300 ft. distant.

## JUAB COUNTY.

(From Our Special Correspondent.)

**Tintic Shipments.**—For the week ending December 5 the Bullion-Beck shipped 2 cars; Carisa, 6 cars; Mammoth, 11 cars; Eagle & Blue Bell, 5 cars; Gemini, 9 cars; Yankee Consolidated, 5 cars; Lower Mammoth, 4 cars; Victor, 2 cars.

**Centennial Eureka.**—The output is now 100 tons daily to the United States Smelter.

**Gemini.**—Superintendent McChrystal is quoted as saying the deeper workings show \$4 gold ore and 5 per cent copper, while the percentage of lead is increasing. From the 1,600-ft. level he claims to get ore running over 100 oz. silver per ton.

**Mammoth.**—One hundred men have been laid off, and the mill has closed down. It is stated the mill is closed for repairs, and for a short time only.

## SALT LAKE COUNTY.

(From Our Special Correspondent.)

**Bingham Shipments.**—The samplers report the following receipts from Bingham for the week closing

December 5: United States, 4 cars; Ben Butler, 7 cars.

**Dalton & Lark.**—At 5,000 ft. the drain tunnel is carrying more water than ever. The Congor Mine is fully unwatered.

**Yampa.**—This company has purchased the Honest Abe and May claims adjoining into which the Yampa channels run. The price paid is said to be about \$50,000. J. B. Thompson was the promoter of the deal.

#### SUMMIT COUNTY.

(From Our Special Correspondent.)

**Cincinnati Consolidated Company.**—This company has a capital of \$500,000, represented by as many shares of the par value of \$1 each. John A. Kirby, of the Daly-West, is president; E. D. Woodruff, vice-president; Abram Hanauer, secretary and treasurer; these, together with D. S. Taggart and Joseph Oberndorfer, complete the board of directors. The company's holdings consist of the Cincinnati group of 4 claims, the Sunrise and Postmaster groups, in all 12 claims, embracing over 200 acres almost due east of the Ontario Mill at Park City.

**Ontario Consolidated Gold Mining Company.**—This company has a capitalization of \$300,000, divided into 300,000 shares of the par value of \$1 each. Salt Lake will be the principal place of business. The company proposes to develop the Willie, Park Extension, Morning Star, Johnny, Lucky Boy and Silver Dick claims in Uintah District. The officers are: Julius Goldberg, president; P. J. Clark, vice-president; John E. Lucey, secretary, and Thomas Sell, treasurer, who, with Dan McCann, are the directors.

(From Our Special Correspondent.)

**Park City Shipments.**—The Mackintosh sampler reports the following receipts for week ending December 5: Daly West, 2,447,180 lbs. ore; Anchor, 211,010 lbs. ore; Silver King, Gerard lease, 38,000 lbs. ore; Silver King, Loring lease, 149,400 lbs. ore; Ontario, 670,670 lbs. ore.

**Creole.**—The new hoist and boiler have been delivered. The buildings are completed.

**Daly-Judge.**—The latest news indicates some rich finds underground. The main tunnel has been in ore for several days, and it is stated that for 48 hours but one mine car of waste was hauled out. The ore is said to run as high as 60 per cent lead and over 50 oz. silver.

**Keystone.**—The gallows frame is completed, and the installation of the hoist will follow.

#### TOOELE COUNTY.

(From Our Special Correspondent.)

**Stockton Shipments.**—For the week closing December 5 the shipments reported are: Stockton Gold Mining Company, 1 car ore; Cygnet, 2 cars.

**Deep Creek Mines.**—A meeting of all those operating in this district will be held in Salt Lake, when measures looking to better marketing and output facilities will be discussed. The meeting will be addressed by Marcus Jones, who has been giving much attention to this region.

**Midas.**—This property in the Deep Creek District has been trying-out the new mill, and will close it down until the spring thaw according to reports. Manager Chipman estimates large ore reserves in sight.

#### WEST VIRGINIA.

(From Our Special Correspondent.)

**West Virginia Coke and Coal Production.**—The annual report of Chief Mine Inspector J. W. Paul for the year ending June 30, 1902, shows that coke production aggregated 1,932,291 tons, with 6,984 ovens operating, and nearly 4,000 idle. Total production of pick mined coal was 16,522,138 tons; machine mined, 3,582,853 tons; product of peddling mines, 175,000 tons. Total production, 20,279,991 tons. Total value of coal at the mines, \$18,104,391. Out of 32,386 employees there were but 186 fatalities. The movement of coal since the first of November has been almost unprecedented, and the zone of production is expanding fast.

Two French experts, M. T. A. Picard and brother, are inspecting coke and coal fields in the State. It is said that they are looking about with the intention of securing a large acreage of land for the future use of a French syndicate. The visitors are now in the Charleston District, and in due season will go to the Flat Top, Red Ash and Pocahontas.

#### TAYLOR COUNTY.

**Irondale Valley Coal Company.**—This company has completed its big coal tippie and other improvements on its coal property recently purchased from S. H. Gramm, of Grafton, for \$85,000, and is ready to begin the shipment of coal. The president of the company is S. W. Shrader and Mr. Gramm is vice-president. The company is under contract to load 1,000 tons of coal daily by April 1.

**West Virginia Central Railroad.**—The contract for 71 miles connecting part of the Little Kanawha and

the West Virginia Central has been awarded to Clemens & Co., of Philadelphia, Pa., and J. H. Miller, of Baltimore. The contract amounts to \$2,500,000, and the work is to be completed within 16 months. The line to be built runs from Sandy Bend to Burnsville. Contracts for the remainder of the 118 miles will be let before February 1.

(From Our Special Correspondent.)

**McGraw Lands.**—A tract of 50,000 acres of coal land has been sold by Charles R. Durbin, of Grafton, and Lloyd Canning, of Valley Falls, representing Col. John T. McGraw, to a Pennsylvania syndicate, thus far unknown. It is said the field is to be opened shortly, and in scope and production will soon be a second Fairmont. The cost of the property, all of which is near Grafton, is said to have been fully \$1,000,000.

#### MONONGALIA COUNTY.

(From Our Special Correspondent.)

At Morgantown Lazzelle & Stewart, attorneys, acting with J. C. Work, of Uniontown, Pa., are paying out about \$300,000 for 10,000 of coal land. New mines will be opened on the east side of the Monongahela.

The Hitchman Coal Company, at McMechen, will install its own water system, and add largely to its capacity. The Katylick Railroad Company, with \$50,000 has been organized to build 14 miles of track from Reynoldsville to Mannington, in order that the Chief-ton Coal Company may acquire a way to the main line of the Baltimore & Ohio.

The Irondale Coal Company is making improvements to increase production. The Hamilton Coal Company will increase production from 250 to 1,000 tons of coal, and 150 tons of coke daily.

### FOREIGN MINING NEWS.

#### CANADA.

##### BRITISH COLUMBIA—ATLIN DISTRICT.

(From Our Special Correspondent.)

Winter work is in progress on all the creeks. On Spruce Creek about 150 men are busy. New drifts are opening the old high bench channel. Many of the drifts and shafts on Pine and Willow are being cleaned out and reopened, while on Gold Run nearly a hundred men are employed. On Boulder Creek over 100 men are busy. On the Societe Miniere's ground 10 men are employed, under Mr. Fall. Complete arrangements are made for sluicing the dirt as it comes out of the drift.

##### NOVA SCOTIA—CAPE BRETON.

**Dominion Coal Company.**—Coal shipments reported in November were 267,610 tons, being 28,254 tons less than in October. For the nine months of the fiscal year from March 1 to November 30 total shipments were 2,403,543 tons, against 1,958,915 tons for the corresponding period in 1901; an increase of 444,628 tons, or 22.7 per cent.

**North American Coal and Development Company.**—It is stated this company now controls  $8\frac{1}{2}$  square miles of coal lands at River Inhabitants. The officers of the syndicate are as follows: President, William A. Prendergast, New York City; vice-president, Robert J. Campbell, New York City; secretary-treasurer, James A. Miner, New York City. Directors: Thos. E. Wing, New York City; E. Guerin, Montreal; H. J. Ballentin, New York City; Duncan Finlayson, M. P. P. Arichat, Simon Joyce and M. P. P. Descusse.

##### ONTARIO—HASTINGS COUNTY.

(From an Occasional Correspondent.)

**Atlas Arsenic Company.**—This company at Deloro is working the Gatling and the Pierce properties. The compressed air used for power at the Pierce is conveyed through 5,000 ft. of 3-in. pipe from the compressor at the Gatling. The Pierce shaft is down 175 ft., and 2 levels have been driven on the vein for 300 ft. The ore is mispickel, carrying good values in gold. The veins average over 4 ft. wide. The Gatling shaft is down 200 ft., with levels at 80 and 180 ft., and enough ore is taken out to keep a 10-stamp mill running full time.

The company also owns the Gawley property, 6 miles north of Deloro. The shaft is down 100 ft., and the vein at that depth is 15 ft. wide. The company intends to erect a reduction plant at the property in the near future.

The 10-stamp mill at the Gatling is said to save over 70 per cent of the gold values by amalgamation, enough to pay all mining and development expenses. The concentrates are saved, and will be treated at a cyanide plant to be erected in the spring. A plant for manufacturing arsenic will be erected also. W. A. Hungerford is manager.

#### MEXICO.

##### CHIHUAHUA.

**Batopilas Mining Company.**—An attachment against the property of this company has been granted by Justice Maddox of the Supreme Court, at

Brooklyn, N. Y., on the application of John C. E. Randolph, a stockholder. It is alleged by the plaintiff that property belonging to the company is about to be removed from the State for the purpose of defrauding creditors. There are funds belonging to the company now in possession of the Wells-Fargo Company. It is these funds that the plaintiff wants attached. The plaintiff seeks to recover the value of 8 first mortgage bonds and interest amounting to \$4,830. They matured in December last, but payment was refused at the office of the Colonial Trust Company, the trustee for the bondholders, which referred all the bondholders to the Wells-Fargo Company. It is alleged that while the mines are shown, according to the last report, to have produced \$13,000,000 worth of silver, neither dividend nor interest has been paid. In November the company's officers declared that an extension of the life of the bonds for 5 years had been agreed to by the bondholders. The plaintiff says that this statement was untrue so far as he was concerned. He further declared that the affairs of the company had been very badly managed for the last 15 years.

#### DURANGO.

(From Our Special Correspondent.)

**Velardena.**—The conditions of a revised concession between this company and the Government are made public.

The company obliges itself to increase its smelting works by adding a plant for concentrating ores, the addition to be completed within one year, and to have a capacity sufficient to treat 400 tons of ores daily; the cost of the concentration plant not to be less than \$250,000. The company will continue until December 17, 1906, to enjoy the franchises and exemptions which it has hitherto enjoyed, but from January 1, 1903, the exemption from coinage dues shall be reduced one-half from those mentioned in the law of March 27, 1897.

#### SONORA.

**Greene Consolidated Copper Company.**—According to a press dispatch, John Edward Addicks, of Delaware, in company with A. W. Hallenborg, a New York broker, has sued William C. Greene for equities in mines in Sonora to the value of about \$1,200,000. The Greene Consolidated Copper Company and its Mexican collateral corporation, the Cananea Consolidated Copper Company, are included as defendants, as well as the Phoenix National Bank, which had acted as trustee in a transaction whereby Greene acquired control of the stock of the Cobre Grande Copper Company in a manner charged as conspiracy by the plaintiffs. Hallenborg alleges that he is entitled to the possession of 8,000 and Addicks of 5,000 shares of the original \$200,000 capitalization of the Cobre Grande, sold to Greene by the trustee for \$2.50 a share. Greene, it is said, spent a great sum in the attempt to settle all adverse litigation, but it now appears that the trouble may break out as violently as ever.

#### DUTCH EAST INDIES.

##### SUMATRA.

(From an Occasional Correspondent.)

**Ketahaan Mining Company.**—This is a new name for the company which operates the Soelit Mine, not far from the Redjang-Lebong. Development work is well advanced, and the company expects to begin treating ore on a considerable scale early in January.

**Redjang-Lebong Mining Company.**—This company reports details of its working during the past few months as follows: During July 2,160 tons ore were crushed, of which 1,599 tons were treated, giving an extraction of 2,254 oz. gold, 11,724 oz. silver. The 561 tons remaining were slimes reserved for later treatment. August, 2,199 tons crushed, 1,550 tons treated, 649 tons slimes reserved; extraction, 2,171 oz. gold, 11,388 oz. silver. September, 728 tons crushed, 820 tons treated, including 92 tons slimes taken from reserves; extraction, 1,299 oz. gold, 6,625 oz. silver. October details are not yet to hand, but the company cables that the extraction was 862 oz. gold, 4,748 oz. silver. Of the ore treated during the months of July, August and September, 1,109 tons were slimes, giving a result of 1,240 oz. gold and 6,383 oz. silver.

This will give an idea of the richness of the Redjang-Lebong slimes, of which very large quantities are now in reserve, awaiting treatment. New Dehne filter presses have been sent out to the mine, and it is hoped, after the extensions to the filter press plant have been erected and are in full working order, to increase greatly the quantity of slimes treated, and ultimately to reach an average of about 60 tons a day, instead of about 12½ tons, the average of the above three months.

As regards the falling off of the tonnage crushed in September and October, this is solely owing to an unprecedentedly dry season in Sumatra. The whole of the machinery at the mine is driven by electricity, for which the power is obtained from Pelton wheels, and there has at times been so little water in the flume that, with the exception of 5 stamps, everything has been hung up. However, matters have now improved and crushing is being carried on with between 20 and 30 stamps.



## MINING STOCKS.

(Complete quotations will be found on pages 804 and 805.)

## New York.

Dec. 10.

The combination coppers were stronger early in the week, being fed by persistent rumors of an early settlement of trade difficulties, which will give the Amalgamated full power. How true this is must be proved by events, as interested parties refuse to make public their plans. Meantime Amalgamated shows larger transactions on 'change at see-saw prices, while Anaconda is hardly visible. Amalgamated business has been done at \$58½@54¼. The lower figure is about one-eighth the price of Calumet & Hecla, whose property Amalgamated people are reported to be negotiating for.

On curb coppers have attracted more attention, though trading is still limited. Greene Consolidated, of Mexico, was quoted at \$25¼@26, as the company has just blown in the seventh smelter. Tennessee is not offered in a large way, being closely controlled, but the price has risen to \$18½. White Knob, of Idaho, fluctuates between \$11 and \$12, most of the business being done around the lower price. Montreal & Boston, of British Columbia, has been advanced by consolidation talk, and a report that an English syndicate is seeking control. The stock sold up to \$3½, which is the highest price in weeks. British Columbia shares sell above \$6, but transactions are not large.

In the gold and silver list little is doing. Portland, of Cripple Creek, Colo., brought \$1.90@1.80. Of the Comstocks, Consolidated California & Virginia, after rising to \$1.30 receded to \$1.15, as a 25c. assessment is being collected. Ophir touched \$1.35, assessment of 15c. paid. Mexican is also on the board for a 10c. assessment, and is quoted at 60c.

The St. Joseph Lead Company, of Missouri, has doubled its capitalization to \$6,000,000, for the purpose of enlarging its plant.

## Boston.

Dec. 9.

(From Our Special Correspondent.)

Nothing definite has yet come to the surface relative to the much-talked-of trade agreement among the copper producers, and, although denials that conferences have been held follow, it is thought they are technical. It is very certain that copper officials have met, yet the tape says that no favorable conclusions have as yet been arrived at. It is asserted that a certain large house has been taking all the offerings of Tamarack, Osceola and Calumet & Hecla, which is considered very significant in view of the past relations this house has had with the Standard Oil people.

Although there is a very strong undertone to the market, no great movement is looked for on account of the money situation. Banks do not wish copper stock for collateral, and here is where the shoe pinches. Brokers report an increasing number of big orders just under the market, and it looks as if higher prices might be attained were it not for the money situation as noted above.

Calumet & Hecla touched bottom at \$420, for the time being at least, and has risen \$25 to \$445. Tamarack has been well taken as offered at \$145@140, and Osceola has risen \$2 to \$52. Quincy is steady around \$105. The latter is steadily increasing its product, and a saving of a sum equal to \$2 a share is expected to be made in milling operations next year. Old Dominion has fallen \$1.25 to \$15.25 on the report of a cave-in at the mine. Late reports, however, say that it is not as serious as first expected. Copper Range has fluctuated with a \$2 range, closing at \$57.25. The railroad is proving to be a large contributor. The 285,000 shares of Copper Range Consolidated Company has been transferred from the unlisted to the listed department.

United States Mining has been a leading feature, although the price change has been small, keeping within \$1 with the close \$21.75. A house which has been a large buyer of this stock put out a circular which is very bullish. Continued good buying of Utah Consolidated is reported which has advanced the price to \$23.37½. Centennial has improved to \$17, Mohawk \$1 to \$39, and Daly-West \$3 to \$39, but business has been light in all these stocks. United States Coal and Oil holds around \$14, the rise in the price of crude oil not being reflected in the stock.

## Colorado Springs.

Dec. 5.

(From Our Special Correspondent.)

Good trading characterized the mines list this week, with prices holding fairly well. The preferred prospects were less sought after, while the common prospects were almost entirely ignored. The character of trading indicates that people are buying carefully and are confining their purchases only to stocks of demonstrated merit.

An unexpected weakness developed in El Paso which cannot be explained by anything at hand at this time. No late reports have been received from the company so that nothing of an official nature is at hand. In view of the absence of information the decline is being explained by stating that the inside has temporarily withdrawn its support from the mar-

ket for reasons best known to itself. The stock opened a week ago, selling at 67, dropping to 65 on December 2, from which point it has steadily gone down to 63½, at which point it closed to-day. Elkton opened the week, selling at 34, but dropped quickly to 32c. on December 4, when a small block of 250 shares sold at that figure. It closed to-day, selling weak at 32½@32c.

The most encouraging feature of the week was the declaration of an initial dividend by the directors of the C. K. & N. Company. At a meeting held December 4 a dividend of 1c. a share was declared, payable December 18, to stockholders of record December 13. The stock opened the week, selling at 10¼@10¾c., dropping to 10c. during the week, but recovering to-day to 10½c., at which figure it closed strong.

Golden Cycle sold at 59½, and was featureless the entire week in so far as the stock market is concerned. The courts, however, told a different story, for almost every day either one or the other of the factions contending for the control came forward with some new legal coup. The case got down to business to-day by the decision of the district court that the trial must be carried on in accordance with due process of law. Gold King came forward this week with a sale at 40c. Lexington sold this week from 4¼c. down to 4½c. The annual meeting, which was to have been held December 3, was adjourned until January 5, owing to a defect in the call. The report of the officers for the past year has been mailed to stockholders, and shows the company did no work of its own accord, but had the property developed by lessees who produced \$71,000 of ore, from which the company derived \$9,000 in royalties.

Isabella opened the week, selling at 33c., but declined sharply to 30c. on the 3d, the slump being caused by an accident, in which the five big smokestacks of the surface plant were blown down in a heavy gale. Temporary arrangements were made so that the mine continued running as usual. The stock recovered to 31@31½c. to-day. As foreshadowed in last week's letter, Portland was weak, selling from \$1.90 to \$1.88½.

## Salt Lake City.

Dec. 5.

(From Our Special Correspondent.)

The week has been one of lower prices all along the line, and the movement seemed most visible in the higher priced stocks. The recovery during the end of the week has been slow and uneasy. However, the volume of business done did not seem to decline, and buyers were plenty for those who wished to let go. Only a few were left comparatively alone at the scale of the previous week.

The sum of the week's business was 323,553 shares, which brought \$375,989.

## San Francisco.

Dec. 6.

(From Our Special Correspondent.)

Prices have been generally firm, and for the North End stocks they were higher. Buying orders were better than for some time past.

Some quotations noted are: Caledonia, \$1.20; Consolidated California & Virginia, \$1.15@1.20; Ophir, \$1@1.05; Best & Belcher, 74@80c.; Mexican, 60c.; Sierra Nevada, 25@35c.

Oil stocks have been much more active, and prices firm. Peerless sold for \$11.75; Stirling, \$1.70@1.75; Monte Cristo, \$1.25@1.45; Central Point Consolidated, 65c.; Monarch, 19c. The market was really quite a lively one.

## London.

Nov. 29.

(From Our Special Correspondent.)

The South African mining market continues in a very uncertain and shaky condition. Quotations have been falling all round in speculative stocks, and the controlling houses are making no effort to support the market. There is every sign that speculative accounts are being closed, so we may expect the market to sink to a lower level yet. The views as to the future of the South African market are now entirely different from what they were six months ago, and not even the greatest professional optimist can induce himself to utter prophecies of coming booms. The other sections of the mining market are just as hopeless, and the outlook generally is decidedly dismal.

The shakiness of the West Australian market is exemplified by the unexpected fall in Great Fingall shares, just at the moment when a particularly good report was issued. This company has been one of the most successful of the West Australians introduced and managed by Bewick, Moreing & Co. It was formed in 1899, with a capital of £125,000, and until the end of 1901 dividends amounting to 50 per cent of the capital were paid. During 1902 dividends amounting to 150 per cent have been distributed. The shares have stood at 15 to 20 times their par value, and there seems every probability that the mine will continue a large producer for some years. It was somewhat disconcerting, therefore, to the market to find a slump take place just as the announcement of another 50 per cent dividend was made. I know personally one speculator who had an account open for a rise who has had to close it owing to losses on the

South African market. It is probable that several similar cases have occurred, and that this is the cause for the break in prices. It certainly had nothing to do with the mine itself.

Some of the copper companies well known on the market have had to issue somewhat discouraging reports this week. For instance, the Namaqua, a neighbor of the Cape Copper Company in Cape Colony, has announced that there will be no interim dividend, which is usually paid about this time of year. The cause for this is the loss sustained by the Boer raid on their properties that took place quite unexpectedly during the last few weeks of the war. I understand, however, that everything is now in working order again, and that probably the year's operations will yield a profit sufficient to provide a dividend. The Mount Lyell Company's report for the half year ended September 30 is also somewhat less cheerful than previous ones, as the profit has sunk to £45,000, as compared with £125,000 during the corresponding six months last year. Details are not to hand yet giving the causes for this decrease, but I believe the fall in copper and in ore contents are about equally to blame. The £3 shares now stand at £2, a great contrast to £12 and £15 five years ago.

The report of Fraser & Chalmers, Limited, for the year ended June 30 last shows that the company is now on an excellent footing, although the South African war has prevented the company from arriving at its full tide of prosperity. The net profits on trading account were £43,000, and the dividends received from the holding of \$1,500,000 in 7 per cent preference shares in the Allis-Chalmers Company amounted to £21,549. After management expenses and debenture interest had been paid and depreciation provided for, the divisible profit was £47,316. Out of this dividends of 10 per cent on both preference and ordinary shares have been paid. The stock of machinery on hand and undelivered is considerable, and appears on the balance sheet at cost price. Most of this is waiting delivery in South Africa, and is actually sold, and in some cases paid for so the new year starts well with profits which may be described as accumulations from previous years. The separation of the London and Chicago business has worked well here for the Allis-Chalmers Company paid something like £250,000 in cash to the London company, as well as the large block of preference shares. This sum in cash has been devoted to redeeming the debentures to the extent of £261,000, so that there are now only £38,900 debentures outstanding. This naturally improves the position of the shares.

The reconstructed Smelting and Refining Company of Australia, Limited, is, from all accounts, getting along much better than appeared probable. The old company's works were excellent ones, but owing to the difficulties in obtaining a supply of ores the company was in a moribund condition for a long time. The new management have turned their attention to gold ores, as the opening for much expansion in silver-lead ores, for which the works were originally started, did not appear hopeful. Low-grade copper ores containing gold are also being treated, and the works are being gradually remodeled for a general smelting business. All the lead is now being refined on the spot and marketed locally and in Japan. At the present time the gold bullion and copper matte are shipped to England, but eventually the intention is to make the works self-contained. Altogether it looks as if the energies of the directors and managers were to be rewarded with success.

The Tungsten & Rare Metals Company, which was formed two years ago to start the manufacture of tungsten in England, is now raising more capital to extend operations. Prospectuses offering new shares for subscription have been circulated, but I understand that the money is guaranteed and the public offer is only a formality to comply with company law, so as to enable the company to pay commissions on capital subscribed. Until this company started no tungsten was made in England at all, and the company finds a very good field for their products among English steel manufacturers. There is also a demand from makers of tungstate of soda. The source of supply of the ore is the San Fina Mines in Spain. These mines were originally introduced in London as tin producers, and a good deal of money was spent in opening them up. After they failed as tin mines, the wolfram in the ore was found to be a useful asset. As the Tungsten Company is under the direction of experienced chemists and is not over-capitalized it will without doubt develop into a profitable trading concern.

## COAL TRADE REVIEW

New York, Dec. 11.

## ANTHRACITE.

Last week mention was made of the unusually mild weather that had prevailed, and what a relief this had been to the anthracite trade. Since then a cold wave from Medicine Hat, or thereabouts, has swooped away in all the territory that consumes anthracite.



and considerable inconvenience and even distress has resulted. However, the situation is nothing like as bad as newspapers in New York and other Eastern cities would have their readers think and talk of a coal famine at New York barring some serious and continued interruption of shipments, is yellow journalism and nothing else. Enough coal is now arriving at New York to satisfy all the needs of the public, provided consumers would be satisfied with getting enough for current use. The trouble is that a lot of consumers want to get their winter's supply at once, order 10 tons or more at a time, give the same order to several concerns, and then make a fuss because they only get a ton or two. With the coldest weather for this date in nearly 30 years prevailing, some allowance must be made for human nature, but talk of a coal famine is premature. A story is going the rounds of a certain dealer who said that for every ton he had in his yard he had orders for 500 tons. This statement impressed some of his hearers greatly, but another man who heard of it said it was possibly true, since the dealer was a speculator and had no yard.

Total shipments from the mines in November are estimated at 4,984,000 tons, compared with 2,897,950 tons in October and 4,650,000 tons in November, 1901. The Reading, Pennsylvania, Lehigh Valley and Coxe Brothers probably were below normal in their shipments, but the companies in the Northern fields got out heavy tonnages. The December output is likely to be over 5,000,000 tons, and if the miners do not take a long holiday at Christmas the output, barring interruptions to traffic, may be the largest on record.

Lake navigation has closed, and total receipts at Duluth are far below normal. Some coal will undoubtedly go to the Northwest all rail. At Chicago likewise lake receipts have ended, and anthracite users in surrounding territory will have to depend largely on all-rail shipments during this winter. Along the lower lakes and Canadian territory the trade will benefit by the stopping of shipments to upper lake points. Along the Atlantic seaboard demand is heavy, but probably the only territory that is really badly off is that beyond Cape Cod. Shipments to that territory have been hindered by gales and cold weather, and coastwise freight rates have advanced so much as to render likely an advance in retail prices. At Philadelphia and New York more than enough coal is arriving to supply actual needs. There seems to be trouble at Baltimore and some other points south of Philadelphia, but this is probably due to delay in rail shipments over the Pennsylvania. We quote retail prices as follows: New York, \$7.50@8.90; Boston, \$9@10; Philadelphia, \$8. The wholesale price at New York is nominally \$5 for prepared sizes, f. o. b. loading port.

#### BITUMINOUS.

The Atlantic seaboard soft coal trade has felt the cold weather, but not nearly as much as some men in the trade expected; in fact, many speculators were surprised that prices did not go up. The reasons given for prices remaining at the same figures as a week ago are the high ocean freight rates, and the lack of vessels at loading ports. The heavy gales late last week and early this week disorganized coastwise traffic. A considerable number of barges and schooners were wrecked, others damaged, and many compelled to lie in port several days. Vessel owners and captains do not care to go around Cape Cod, and freights for points in the far East show a big differential compared with rates to Long Island Sound points. As a result of the scoundition of the coastwise vessel market prices for speculative coal at tidewater remain on a basis of \$5.50 for Clearfield grades, f. o. b. New York Harbor loading ports. There is some talk that with this price at New York Harbor and the high freight rates around the Cape some consumers in the far East will find it cheaper to close down than to run their plants on coal that must pay current freights, especially where the consumer has to pay rail freights after the coal has been discharged from the vessel.

Trade in the far East is a little easier than it has been, owing partly to the arrivals of foreign coal being apparently larger than was generally expected. It is known that coal offered below nominal current price has been refused. Deliveries of coal to Long Island Sound points have been delayed by a lack of barges, due to high winds, and consumers in that territory have not received the coal they otherwise would have received. At New York Harbor points deliveries have been hampered by the same lack of vessels. The all-rail trade is still short of coal.

Transportation from the mines to tidewater is irregular and rather slow coal running through in a week and over. Car supply at the mines is 35 to 40 per cent of the demand. In the coastwise vessel market freight rates have advanced greatly, and the market is very strong. We quote current rates from Philadelphia as follows: Providence, New Bedford and Long Island Sound, \$1.25; Boston, Salem and Portland, \$1.75@1.85. From New York Harbor loading port, barge rates, to harbor points, are 45@50c., and to New Haven, \$1.35; vessel rates to Boston are \$2@2.25.

Birmingham. Dec. 8.

(From Our Special Correspondent.)

Many rumors prevail in Alabama looking to a consolidation of smaller mining corporations, and an increase in production throughout the State. There is still much interference because of the scarcity of cars, collieries have been able to work during the past week only a little better than half time.

There are rumors in this State that mines in Walker, Jefferson and Bibb counties are to be purchased and operated by one company. It is announced that new mines are to be opened on the line of the North Alabama Railroad, a branch of the Louisville & Nashville in Jefferson County. The Pratt Coal Company is preparing to open more mines in the western part of Jefferson County.

The annual convention of the United Mine Workers of America, Alabama District No. 20, is now on in Bessemer. This convention will elect officers for the ensuing year, and will fix a differential for coal mining by machinery. It is given out that the Tennessee Coal, Iron and Railroad Company and other corporations in the business are preparing to mine coal with machines. Other business of importance will be transacted. The Alabama Coal Operators' Association will meet this week also, but in Birmingham, and several matters of importance to the business will come up.

There is very little relief in the coke situation. Much of this product is being brought into the State from the Virginias. The Sloss-Sheffield Steel and Iron Company will be able to light up 80 of the 200 ovens being constructed at Flat Top Mountain mines by next week. The balance of the ovens being constructed by the Republic Iron and Steel Company at Thomas, making 910 in all at that point, are being pushed to completion.

Cleveland. Dec. 9.

(From Our Special Correspondent.)

The coal situation in this territory has supplied variety for a good many weeks of dullness earlier in the season. The spurt in the shipment which was started two weeks ago has been continued during the one which has just closed, and the shippers by lake have been rushing all possible material to the Northwest. The result has been that more boats have been chartered than at any time for months. The rates of insurance on the hulls expired with December 5, and the companies refused to renew them, except at exorbitant rates. This left only the unbonded boats to run in the trade, and there have been cargoes for all of these. The dispatch at the loading ports has been magnificent, and were it not for a few delays on the ore piles the ideal dispatch of the year would have been obtained during the past week. The shipment of coal has been very heavy, even with these drawbacks. The present intention is to keep the boats moving until the latter part of this week, to say the least. It is believed this will mark the possible limits of navigation, as the channels between the lakes are already freezing. The rates at which the last cargoes were shipped were \$1 to Milwaukee and Lake Michigan points, and from \$1 to \$1.25 to Lake Superior. The last boat left to-day for Lake Superior. The shortening of the car supply in this territory by the cold snap decreased the shipments into Cleveland considerably while the consumption naturally increased. The result was disastrous to the stocks. The supply now is said to be entirely adequate, however, for any such emergency which has been expected for several weeks.

Pittsburg. Dec. 9.

(From Our Special Correspondent.)

Coal.—The mines in this district are working as steadily as the supply of railroad cars will permit. The Pittsburg Coal Company has been unable to catch up on its Northwestern contracts. The insurance on lake boats expired on December 5, but the company determined to continue shipments at its own risk for another week or 10 days. A better supply of cars has been given it to aid in filling the lake contracts, and a heavy shipment has gone out. At the office of the company it was stated to-day that the shortage on contracts for Northwestern shipment would amount to fully 1,000,000 tons, but that business for as much more could have been obtained had transportation facilities been better. It is estimated that the shipments this season will not be much greater than last year. Another rise in the rivers during the week enabled the Monongahela River Consolidated Coal and Coke Company to get out another large shipment for the Southern markets. About 4,000,000 bush. went out, and a large number of empty coal boats and barges returned. High prices for coal for early delivery continue. During the week several orders were taken by independent companies for run-of-mine coal at \$3.50 a ton at the mine, the circular price being \$1.65.

Connellsville Coke.—There is no improvement in coke shipments, and production is falling off. High prices prevail, furnace coke having sold during the week at above \$6 a ton at the ovens. The Courier

in its last weekly report gave the production for the Connellsville region at 210,958 tons, a decrease of nearly 40,000 tons. Most of the plants in the region operated but five days. The shipments for the week aggregated 10,551 cars, distributed as follows: To Pittsburg and river tipples, 3,620 cars; to points west of Pittsburg, 5,249 cars; to points east of Connellsville, 1,682 cars.

San Francisco. Dec. 6.

(From Our Special Correspondent.)

The latest circular from Mr. J. W. Harrison says: "Since the steamer *Sonoma* left there have been the following deliveries from Australia: *Hovth*, 3,990 tons; *Clydesdale*, 2,720 tons; *Sonoma*, 488 tons; total, 6,868 tons. As this has been all the Colonial coal delivered here since the *Ditton* arrived on October 10 the quantity now in yard is very meager, yet there is no scarcity of other grades, and the market price is not at all affected. The loading list from Australia has been somewhat increased since the last mail, as there are now 12 vessels loading and to load, with a carrying capacity of about 37,000 tons. Of these there are about six already loaded and en route. The recent reported advance in coal freights from Newcastle has caused an advance of fully 50 cents per ton in the asking rates for future deliveries, still buyers are not eager to order, as the asking prices by the Coast collieries remain unchanged for the moment. Sales are being made of household coals at fairly good prices. For other grades fuel oil will permit but a small quantity of coal to be sold, and the prices named are very low. There is a disposition on the part of oil producers to advance their prices. Contracts are now being made for delivery next year at fully 25 per cent advance over prices of three months ago."

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

Foreign Coal Trade. Dec. 10.

Export trade continues very quiet, little or nothing being reported beyond occasional shipments to the West Indies.

It is reported that some controversy has arisen over certain imports of coal from England, the consignees here declining to take the coal at invoiced prices, on account of the large proportion of small coal. It is claimed that this reduced the value of the coal.

Imports of coal into France for the 10 months ending October 31 are reported as follows, in metric tons:

	1901	1902	Changes
Coal .....	10,229,840	9,395,130	D. 834,710
Briquettes .....	.....	395,750	I. 395,750
Totals .....	10,229,840	9,790,880	D. 438,960

Briquettes were not reported separately in 1901. The decrease in imports was almost entirely in English coal, the receipts from Belgium showing only a small falling off, while those from Germany increased.

Messrs. Hull, Blyth & Co., of London and Cardiff, report under date of November 28 that the general tone of the Welsh coal market continues weak and prices remain easy for all descriptions. Quotations: Best Welsh steam coal, \$3.72@3.84; seconds, \$3.60; thirds, \$3.48; dry coals, \$3.60; best Monmouthshire, \$3.36@3.42; seconds, \$3.30; best small steam coal, \$2.16; seconds, \$2.04; other sorts, \$1.92.

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 outward freight market continues quiet and rates remain easy. Some rates quoted from Cardiff are: Marseilles, \$1.50; Genoa, \$1.26; Naples, \$1.20; \$2.52; Las Palmas, \$1.44; St. Vincent, \$1.62; Rio Janeiro, \$2.28; Santos, \$2.52; Buenos Aires, \$2.04.

#### IRON TRADE REVIEW.

New York, Dec. 10.

The comparative dullness usual at the close of the year is beginning to be apparent, so far as new business is concerned. This does not imply any slackening of work at furnaces and mills, as nearly all of them are much behind on contract deliveries, and are doing their best to make up their shortage. Irregular deliveries of coke still interfere with production to a considerable extent, and the delays in transportation have been increased by snow and cold weather. Foreign pig iron and steel billets continue to be offered freely, and this has eased the situation somewhat, manufacturers being able to secure supplies they need.



## Birmingham.

Dec. 8.

(From Our Special Correspondent.)

The condition of the iron market in Alabama shows very little change. The production in this State is strong and the indications are for a steady run. There is no apprehension as to raw material, and the coke supply is the only thing that causes trouble. Much coke is still being brought into the State. Other raw material is secured in the district with more ease, though the transportation companies have to be followed up closely in order to make them supply all wants steadily. The production at furnaces in blast is most satisfactory. A little accident took place during the past week at one of the Bessemer furnaces of the Tennessee Coal, Iron and Railroad Company, but the damage was repaired in quick order. One man was perhaps fatally injured.

There has been no buying to any extent as yet beyond July 1, 1903. While furnacemen in this State anticipate a strong market and are not anxious to sell ahead extensively, there is a rumor that prices are likely to be off for the last half of the year coming. As is known, Alabama iron companies have fixed a price for their product the last half of the coming year, \$18.50 per ton for No. 2 foundry being the basis. No iron as yet has been sold at that figure, the lowest price known at which iron for delivery the latter half of next year has been sold was \$19.50.

Philadelphia parties will most likely during this week purchase Jenifer Furnace, belonging to the Jenifer Furnace Company, which W. H. Weller and associates operate. Mr. J. W. McQueen brought about the negotiations looking to the sale of the property and the final trading is to take place before the middle of the week. It has been rumored that the parties have been making efforts to buy several of the smaller furnaces in this district, but there is no substantiation of this talk. The statement has been made by reliable parties in Birmingham, that Pennsylvania gentlemen will be in the Birmingham District this week investigating the possibility of erecting two or three blast iron furnaces and the developing of coal, ore and limestone lands in this State.

Quotations are holding firm. The following prices are given: No. 1 foundry, \$21@22; No. 2 foundry, \$20@21; No. 3 foundry, \$18.50@19.50; No. 4 foundry, \$16.50@17.50; No. 1 soft, \$21@22; No. 2 soft, \$20@21.

There is no change in the conditions with the steel mart in this district. There is not as much activity noted in the finished iron and steel market hereabouts as a little previous to this, some of the departments in the rolling mills not being rushed. There has been a little decrease in quotations in the finished market.

Foundries and machine shops continue to be busy. Other kindred plants have as much to do as they can attend to.

## Cleveland.

Dec. 9.

(From Our Special Correspondent.)

**Pig Iron.**—The demand for pig iron at present is rather uncertain. It is, however, equal to the supply. A consumer fails to obtain from the furnace, with which he has a contract, the material he needs and seeks to supply himself upon the open market. This is furnishing about all of the new business. The consumers are buying from hand-to-mouth, not caring to collect any stocks until after the invoice season. The bidding for tonnage for the period after January 1 is comparatively heavy. It is evident, however, that the needs of the market are not greater than the curtailed production of the stacks, and it is hardly likely that there will be any further importation of material for the time being. There is, of course, a possibility that new conditions may arise after January 1, which will change the face of things. The coke shortage has been increased by the inability of railroads to meet their engagements because of the cold snap. This is shortening the supply of pig iron. Nominally prices remain as they have been—\$23 for No. 2 Valley furnace for first half delivery, and \$21 for the same material for delivery after July 1; \$20 Birmingham for No. 2 Southern iron; \$23 for bessemer from the non-association furnaces for first half delivery, and \$21 for second half. Basic not quoted.

**Iron Ore.**—The shipments of iron ore during the month of November amounted to 2,708,000 tons. This brought the total up to 26,700,000 tons to Dec. 1, making possible a lake movement of 27,000,000 during the year, including what is being moved in December. This is an increase over last year's figures of about 7,000,000 tons, as the all-rail movement will increase the total by at least 500,000 tons. The last cargoes are now being shipped away from the head of the lakes being hampered somewhat by the ice conditions on Lake Michigan and in the connecting rivers. Escanaba will ship ore for two or three days if weather conditions permit.

**Finished Material.**—Plates have been active both for immediate shipment and for time deliveries. The larger mills are able to work in occasional orders now and then of material upon which those holding contracts have made no specifications. This gives the

market a tone of weakness which really does not exist, although it is true that specifications might be improved. The smaller mills are getting some business, and in a few instances have taken orders into the first half of next year at 2c. The jobbers have about sold out their stocks, but are getting for what yet remains 2.25c. for sheared and 2.50c. for universal mill plates. The larger mills are getting 1.60c., Pittsburg. Structural steel has displayed some of the same conditions.

Orders have been light, and in some instances the smaller mills have needed orders and have reduced prices greatly in order to induce further business. The shipment on contracts has been surprisingly rapid. This is accounted for by the fact that this is the light season. The jobbers are getting 2.50c. to 3c. for their material, while the smaller mills have dropped their price, in many instances to 2c., and some have shaded that. The larger mills command 1.60c., Pittsburg. The sheet trade has been light, and the market weak and declining. Prices are as they were, with some of the mills suspending operations for a short time to relieve the market of any glut. The nominal quotations are: No. 27, out of stock, 3.10c. to 3.25c., with the same out of the mill in car-load lots bringing 2.85c. to 2.95c. Bar iron is down to 1.70c., with that being shaded, and with the understanding that 1.60c. may be made soon and maintained. Bessemer steel bars bring 1.60c., Pittsburg, and open-hearth command 1.70c., Pittsburg. The billet trade is quiet, with but few sales, and those on the old basis of \$30 for the bessemer grade at the Pittsburg mills.

## Philadelphia.

Dec. 10.

(From Our Special Correspondent.)

**Pig Iron.**—The recent rumor concerning a threatened drop in pig iron quotations has no real basis. Foreign iron is arriving freely. The consumption in foundry iron particularly is increasing, with better fuel conditions; in forge iron there is no improvement. There is nothing new in bessemer or basic iron, and the tendency toward stronger prices is still manifest. Quotations are as follows: No. 1 X foundry, outside price, \$26; No. 2, \$24; No. 2 plain, \$23; gray forge, \$21.50; Middlesboro, \$22; Scotch, \$23.50@24.50.

**Billets.**—While there are no transactions in billets to report to-day, there is a marked readiness upon the part of the larger consumers throughout the East to increase their engagements for future delivery. As far as can be learned there is a good deal of uncertainty as to the probable future course of the billet market. This is said to be due to the condition of the foreign billet market. Quotations are as low as \$26.50, and negotiations are for the present held up, and the reason, whatever it is, cannot be had. The working up of billet material goes on as actively as ever, and the indications are that winter consumption will be heavier than the requirements of the past month or two. Foreign steel bars are quoted to-day at \$28.50; American steel ranges from \$32 to \$34.50.

**Bars.**—The only business heard of this week was from stores, and it amounted to trifling lots. Quotations for steel bars are at 2c., though in a large way lower prices are named.

**Tubes.**—The tube market is quite active, but there are no large orders going through.

**Plates.**—While there is a great deal of business in sight only a minimum was transacted during the past week. A good deal of material is awaiting shipment at some mills. Quite a lot is along the road somewhere. Small lots are quoted to-day at 2.15; larger lots, 2.05; small lots of flange are taken at 2.20; all kinds of firebox are very strong at 2.30@2.40c.

**Sheets.**—The market is not particularly strong this week, a number of independent mills being operated on steel obtained at a low price. The leading producer is still quoting black sheets, No. 28 gauge, at 2.75c., but has cut the price of galvanized sheets, which are now quoted at 75, 10 and 2½ per cent off the list.

**Steel Rails.**—The heavy business done in steel rails within the past week or 10 days will probably be duplicated in January. The best information we have is that negotiations will close before the end of the year for a good deal of business on the Pacific Coast.

## Pittsburg.

Dec. 9.

(From Our Special Correspondent.)

This has been the duller week of the year in the iron and steel markets. But little buying is being done except in some lines of finished material, and at prices that are known to be at as low a point as will be reached for several months. The production of pig iron last week was less than the week before, and the United States Steel Corporation was a sufferer, as a number of its blast furnaces operated by the National Steel and other constituent companies, were idle for several days on account of a shortage of coke. But little new business has been accepted by the merchant furnaces, and every effort is being made to catch

up on deliveries. Unless there is a great improvement in conditions the furnaces will have all they can do to fill contracts that have been taken for shipment during the first half. Coke deliveries yesterday were about equal to normal and the production of pig iron in the Mahoning and Shenango valleys was entirely satisfactory, but there are no indications that this state of affairs will continue for any length of time. So far as known no new foreign iron orders have been placed during the week, but deliveries continue to be made on old contracts. With the exception of the Monongahela furnaces of the National Tube Company none of the furnaces in the Pittsburg District has been affected by a lack of coke. One of the two new furnaces of the Edgar Thomson group at Braddock was blown in late last week, and is operating very satisfactorily. The other soon will be ready. Railroads continue to make strenuous efforts to handle all freight offered, and the yards and sidings are much less congested than they were two or three weeks ago. Among the necessary improvements contemplated it has been found that many bridges must be greatly strengthened to accommodate the heavy traffic next year. This will add to the tonnage of finished steel. A representative of one of the principle producing interests who has given the subject considerable attention declared to-day that with the requirements of the railroads and the big business already booked the steel mills will have enough to keep them busy throughout the entire year. The rail tonnage in 1903, it is now estimated, will be greater than any previous year, as the mills probably will be able to roll over 3,200,000 tons. Fully 2,000,000 tons have already been contracted for, and negotiations are on for a heavy tonnage and a number of important orders will be placed before the close of the year. The Kansas City, Mexico & Orient Railroad yesterday placed an order with the United States Steel Corporation for 150,000 tons of rails to be used in the construction of the projected line. The only difficulty is in deliveries, the price for the year having been fixed at \$28.

In finished material the market continues strong. Small lots of structural material still command premiums for early delivery, but not as high as have been offered within the past few weeks. The demand for plates is remarkable, coming principally from car and shipbuilding interests. Iron bars are declining in price, and soon may be on a parity with steel bars. Most of the small independent mills are quoting 1.70c. The Republic Iron and Steel Company, the bar iron combine, continues to quote 1.80c. for early shipment.

The annual inspection of the plants of the United States Steel Corporation will begin in the Pittsburg District to-morrow. The local officers were notified that the chief officials will leave New York to-night. Definite plans will not be arranged until the Eastern people arrive. Most of the time likely will be spent at McKeesport, where it is proposed to spend \$10,000,000 in improvements and enlargements of the works of the National Tube Company and the Wood plant of the American Sheet Steel Company. The new town of Ambridge, about 20 miles below Pittsburg, where the works of the American Bridge Company are being concentrated, also will be visited. The work is progressing favorably. As already noted the new town being established takes its name from an abbreviation of the company, "Am. Bridge."

**Pig Iron.**—The only important transaction noted this week was the sale of 15,000 tons of bessemer for delivery throughout the first half at \$21.25, furnace. Prompt iron can only be obtained by paying an unusually high price. For first quarter delivery bessemer pig iron is quoted at \$22, a decline from quotations of the past few weeks, and for the second quarter \$21 is asked. These prices are for the Valley, the Pittsburg price depending on the new freight rate, which likely will be an advance of 10 or 15c. over the present rate of 75c. Gray forge is quoted at \$21, Pittsburg, and foundry No. 2 at \$22.50@23, Pittsburg.

**Steel.**—Buyers of steel continue to wait, but there are a number of inquiries for prompt bessemer steel billets. The price ranges from \$29 to \$30, Pittsburg. Open-hearth billets are about \$1 a ton higher, and open-hearth sheet bars are quoted at \$32, but there is a poor demand. The pool price of 1.60c. is still quoted for plates for late delivery. A sale of 10,000 tons of open-hearth billets was made to-day at \$31, Pittsburg, for delivery during the first half.

## Cartagena, Spain.

Nov. 22.

(Special Report of Barrington &amp; Holt.)

**Iron and Manganiferous Ores.**—Business has been active. Tonnage is now plentiful and freights rather lower. Shipments have been 4 cargoes dry ore and one of campanile, 16,540 tons in all.

**Mining Tax.**—It has been practically settled between the Government and the Mining Syndicate of this province that from the first of the new year the Syndicate will undertake to collect all the taxes and mining tributes, and although the amount to be paid to the Government is said to be more than 20 per cent higher than previously, and while export is considerably less, nevertheless miners are jubilant, as by dealing with the Syndicate they will avoid the many dif-

difficulties which occur by contributing direct to the State.

Prices are unchanged. Dry ores are quoted from 6s. 9d. to 7s. 9d. per ton, f. o. b. shipping port; specular ore, 58 per cent iron, 9s. 3d.; magnetic ore, 60 per cent, 11s. 9d. for lumps, and 9s. 9d. for fines. Manganiferous ores range from 14s. 6d. for 20 per cent to 9s. 9d. for 12 per cent manganese.

Iron Pyrites.—Quotations for pyrites, 40 per cent iron and 43 per cent sulphur, are 11s. 3d. per ton. Shipments reported are 800 tons to Genoa.

CHEMICALS AND MINERALS.

(See also wholesale price-list on page 806.)

New York, Dec. 10.

The market is generally firmer, especially for raw materials controlled by the combinations. Belief of higher railway freights after January 1 has also stimulated buying, though the shortage of cars is interfering with shipments.

Heavy Chemicals.—This market is strengthening, as sellers have booked nearly all important forward contracts. Occasionally we hear of new caustic soda and bleaching powder contracts at recent low prices; but there is a better undertone, which forecasts a higher market.

We quote domestic chemicals, per 100 lbs., f. o. b. works, as follows: High test alkali, in bags, 80@85c., for prompt shipment, and 77½@82½c. for forward; caustic soda, high-test, \$1.90@1.95 for early delivery, and \$1.65@1.75 for futures; bicarb. soda, ordinary, \$1.25, and extra, \$3; sal soda, 55@60c.; chlorate of potash, \$7.31½@7.87½; for immediate shipment, and \$7@7.12½ for contracts; bleaching powder, next year's delivery, \$1.25. For foreign goods, we quote per 100 lbs. in New York: Alkali, high-test, 90 @92½c.; caustic soda, high-test, \$2.25; sal soda, 67½c.; bicarb. soda, \$1.50@1.60; chlorate of potash, \$7.50@8 for prompt, and \$7@7.25 for forward; bleaching powder, prompt, prime brands, Liverpool, \$1.75, and contracts, \$1.25; Continental, \$1.50@1.62½.

Imports of heavy chemicals into the United States in the 10 months ending October were as follows, the figures in parenthesis being for the corresponding period in 1901: Bleaching powder, 96,787,641 lbs. (95,555,194 lbs. in 1901); caustic soda, 2,918,149 lbs. (3,026,031 lbs.); sal soda, 3,558,594 lbs. (3,839,398 lbs.); soda ash, 23,124,004 lbs. (21,982,461 lbs.); chlorate of potash, 1,015,744 lbs. (660,943 lbs.). Re-exports were: Bleaching powder, 198,191 lbs. (13,916 lbs. in 1901); caustic soda, 1,169,813 lbs. (767,240 lbs.); sal soda, nil (2,170 lbs.); soda ash, 62,553 lbs. (342,664 lbs.); chlorate of potash, 159,550 lbs. (214,400 lbs.).

Acids.—The trade is busy figuring on renewal contracts for next year, and orders already taken are based on quotations below. Blue vitriol is weak, as imports are larger, and competition keen. Foreign blue vitriol is obtainable at \$4.25@4.37½ per 100 lbs., while domestic is quoted at \$4.50.

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:

Table with 2 columns: Item and Price. Items include Blue vitriol, Muriatic 18°, Muriatic 20°, Muriatic 22°, Nitric 36°, Nitric 38°, Nitric 40°, Nitric 42°, Oxalic com'l, Sulphuric 50°, Sulphuric 60°, Sulphuric 60°, Sulphuric 60°, Sulphuric 60°.

Brimstone.—Notwithstanding recent imports of 5,800 tons the market is bare of supplies, as incoming cargoes are being delivered on contracts. We note that 26,808 bags of Japanese sulphur was recently imported at San Francisco. Ocean freights from Sicily to Atlantic ports are easier at 8s. 9d. (\$2.10). Best unmixed seconds on spot have sold around \$24 per ton, arrivals at \$23.50@23.75, and shipments, \$22.50 @23 according to position. Best thirds are about \$1.75 less than seconds.

Pyrites.—Business continues good, and prices firm. Importers now pay 11s. (\$2.64) ocean freight from Huelva, Spain, which is the highest rate this year. A cargo of 3,370 tons Pileys Island pyrites arrived at New York, and 3,325 tons Spanish pyrites at Baltimore this week.

Quotations for pyrites 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@13½c. per unit, New York and other Atlantic ports. Spanish pyrites contain from 46 to 51 per cent of sulphur: American, from 42 to 44 per cent.

Nitrate of Soda.—Prices are firm, and rising. Spot is quoted at \$2.10. Arrivals in the next three months, \$2, and later, \$1.82½@1.85, according to position. Ocean freight rates are unchanged, though as low as 12s. 6d. is reported to have been booked recently. This rate is exceptionally low, and the bottom this year. Generally 17s. 6d. (\$4.20) is the quoted rate, but it appears that some shippers receive a much lower figure confidentially. However the freight market this year

is much below the last two years, and considering the prices received for nitrate, sellers are making satisfactory profits. The European nitrate market is quiet, and prices are unchanged.

Messrs. Mortimer & Wisner's monthly statement of nitrate of soda, dated New York, December 1, gives the following interesting statistics:

Table with 3 columns: 1902 Bags, 1901 Bags, 1900 Bags. Rows include Imported into Atlantic Ports from West Coast S. A. from Jan. 1, 1902, to date, Imported from Europe, Stock in store and afloat Dec. 1, 1902, in New York, Boston, Philadelphia, Baltimore, Norfolk, Va., Savannah, To arrive, due March 15, 1903, Visible supply to March 15, 1903, Stock on hand, Jan. 1, 1902, Deliveries since Jan. 1 to date, Total yearly deliveries, Prices Current, Dec. 1, 1902.

Concerning the Chilean nitrate of soda market, Messrs. Jackson Brothers, of Valparaiso, write us under date of October 31, as follows: Operations in general have been very limited, and only in the last few days has a better demand sprung up for this year's nitrate, exporters offering 6s. 6½d. alongside for 95 per cent, but owing to the small amount disposable, transactions reported are few. For a cargo of the refined quality 6s. 8d. alongside was paid, and for January—March delivery small lots changed hands at 6s. 6½d. Very little interest has been shown by exporters to operate in monthly lots for next year. We quote 95 per cent, November, 6s. 6½d.; December, 6s. 6d.; January, 6s. 5d.; February, 6s. 4½d.; February, 6s. 4d.; and 96 per cent, November—December, 6s. 7½d., all ordinary terms, sellers. The price of 6s. 6½d., with an all-round freight of 17s. 6d., stands in 8s. 1¼d. per cwt., net cash, and freight, without purchasing commission.

Sulphate of Ammonia.—Influenced by the European market prices are firmer at \$3@3.05 per 100 lbs. for gas liquor.

Phosphates.—Preparations are being made for an increased spring trade, and prices are stronger. Export shipments are large, and when the year is completed, they will no doubt show a satisfactory increase over 1901. Recently a trial shipment of 200 tons of Tennessee blue rock was made to Belgium.

Shipments of Florida high-grade rock from Savannah in November were 20,943 tons, of which 11,913 tons, or over one-half, went to Germany direct. In the 11 months this year the exports were 175,757 tons, which compares with 152,408 tons in the corresponding period in 1901; showing an increase of 23,349 tons this year.

The loss by fire on the plant of the Land Pebble Phosphate Company is estimated at \$150,000, of which \$60,000 is covered by insurance. About 2,000 tons of phosphate were on hand at the time of the fire, most of which has likely been saved. It is believed the plant will be rebuilt.

Table with 4 columns: Phosphates, Per ton F. o. b., United Kingdom or European Ports, Unit, Long ton. Rows include Fla. hard rock (78@80%), Fla. land pb. (68@73%), Tenn. (76@82%) export, Tenn. 78% domestic, Tenn. 73@74% domestic, Tenn. 70@72% domestic, Iso. Car. land rock, Iso. Car. river rock, Algerian (63@68%), Algerian (58@63%), Algerian (53@58%), Fernandina, Brunswick or Savannah, Pleasant 20n yeasels, Ashley River.

Liverpool, Nov. 26. (Special Report of Joseph P. Brunner & Co.)

The market for heavy chemicals is dull at the moment, but prices in most cases are well maintained.

Soda ash in tierces may be called as follows: Leblanc ash, 48 per cent, £5 15s.@£6; 58 per cent, £6 2s. 6d.@£6 7s. 6d. per ton, net cash. Ammonia ash, 48 per cent, £4 5s.@£4 10s.; 58 per cent, £4 10s.@£4 15s. per ton, net cash. Bags, 5 per cent under price for tierces. Soda crystals are generally £3 7s. 6d. per ton, less 5 per cent for barrels, or 7s. less for bags, with special quotations for certain export quarters. Caustic soda is in moderate supply and firmly held, as follows: 60 per cent, £8 15s.; 70 per cent, £9 15s.; 74 per cent, £10 5s.; 76 per cent, £10 10s. per ton, net cash. Special quotations for certain export markets. Bleaching powder for hardwood, £6 5s.@£6 10s. per ton, net cash, is about nominal spot range, with special quotations for certain export quarters.

Chlorate of potash is flat at 2½@2¾d. per lb., net cash. Bicarb soda is unchanged at £6 15s. per ton,

less 2½ per cent, for the finest quality in 1 cwt. kegs, with usual allowances for larger packages, also special terms for a few favored quarters.

Sulphate of ammonia is in better demand, and prices have improved, £11 17s. 6d.@£12 per ton, less 2½ per cent, being quoted for good gray 24@25 per cent in double bags, f. o. b. here.

Nitrate of soda is selling to a moderate extent on spot at £9 2s. 6d.@£9 5s. per ton, less 2½ per cent, for double bags, f. o. b. here, as to quality.

METAL MARKET.

New York, Dec. 10.

Gold and Silver Exports and Imports.

At all United States Ports in October and Year.

Table with 5 columns: Metal, 1901, 1902, 1901, Year, 1902. Rows include Gold Exports, Gold Imports, Silver Exports, Silver Imports, Excess I, Excess E.

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 December 10, and for years from January 1:

Table with 5 columns: Period, Gold Exports, Gold Imports, Silver Exports, Silver Imports, Total Excess, Exports or Imports. Rows include Week, 1902, 1901, 1900.

The gold exported went to the West Indies; the silver chiefly to London. Imports were from Central and South America and the West Indies.

Financial Notes of the Week.

Business continues good in general, though something of the usual easing off at the end of the year is apparent. The stock markets are still unsettled, although money for speculative use is rather more plentiful.

Shipments of gold amounting to \$1,000,000 were made from New York last week to Buenos Aires. These exports were made on orders from London, the gold being taken here to meet Argentine bills drawn on foreign houses.

Exports of gold from San Francisco in November were light, the total being \$10,132 to China, all of domestic origin. Exports of silver for the month were as follows:

Table with 4 columns: Country, Domestic, Foreign, Total. Rows include India, China, Totals.

Most of the foreign silver exported was in the form of Mexican dollars.

The statement of the New York banks, including the 59 banks represented in the Clearing House, for the week ending December 6, gives the following totals, comparisons being made with the corresponding weeks of 1901 and 1900:

Table with 3 columns: 1900, 1901, 1902. Rows include Loans and discounts, Deposits, Circulation, Specie, Legal tenders.

Changes for the week, this year, were increases of \$1,611,000 in loans and discounts, and \$73,800 in circulation; decreases of \$4,074,200 in deposits, \$6,219,400 in specie, \$611,700 in legal tenders, and \$5,812,550 in surplus reserve.

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:

Table with 4 columns: 1901, 1902, Gold, Silver. Rows include N. Y. Ass'd., England, France, Germany, Spain, Neth'l's, Belgium, Italy, Russia.



The returns of the Associated Banks of New York are of date December 6, and the others December 4, 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.

Silver, after its heavy fall, has had a slight reaction, and the market is more steady in the neighborhood of 22½, with fair buying for various quarters.

The United States Assay Office in New York reports receipts of 31,000 oz. silver for the week.

Shipments of silver from London to the East for the year up to November 27 are reported by Messrs. Pixley & Abell's circular as follows:

	1901	1902	Changes
India	£6,910,410	£5,844,630	D. £1,065,780
China	900,212	162,500	D. 487,712
The Straits	592,412	756,470	L. 164,058
Totals	£8,103,034	£6,763,600	D. £1,339,434

Receipts this week were £210,000 in bar silver from New York and £15,000 from Australia; total, £225,000. Shipments were £137,400 in bar silver to Bombay and £2,500 to Calcutta; total, £139,900.

Indian exchange continues strong, and is still above the nominal par. The Council bills offered in London were all taken, 60 lakhs being sold at an average of 16.03d. per rupee. Consignments of silver from New York direct to Bombay have apparently satisfied the Indian demand very fully, and there has been no buying in London.

Exports of gold from Australia for the 10 months to the end of October are reported as follows:

	1901.	1902.	Changes.
Melbourne	£3,002,421	£2,931,047	D. £71,374
Sydney	3,287,079	2,694,720	D. 592,359
Western Australia	4,149,171	4,887,932	L. 738,761
Total	£10,438,671	£10,513,699	L. £75,028

The exports this year include £1,744,812 to India, £3,100,000 to South Africa, £1,600,014 to San Francisco, £80,000 to Egypt, £250,000 to Japan, and £219,380 to Hong Kong. The balance went to Great Britain.

The foreign merchandise trade of France for the 10 months ending October 31 is reported by the Ministry of Commerce as below:

	1901.	1902.
Imports	Fr. 3,630,693,000	Fr. 3,626,310,000
Exports	3,294,748,000	3,467,755,000
Excess Imports	Fr. 335,945,000	Fr. 158,555,000

This shows a decrease of 4,383,000 fr. in imports; an increase of 173,007,000 fr. in exports; and a decrease of 177,390,000 fr. in the balance of imports.

**Missouri Ore Market.** Dec. 6.

(From Our Special Correspondent.)

The zinc ore market is still very weak, the highest bid being \$35 for the highest grade. The general assay bars for 60 per cent ore was \$31 per ton. The highest offerings for this week's delivery were \$30 per ton for the standard grade, and some bids were made as low as \$28 per ton, and were accepted. It looks as though the prices had hit the bottom for the present, although some buyers say that still deeper cuts will be made before the new year. The value of zinc and lead sales was less than the previous week by \$18,166. The shipments of both ores were much below the year's average for several weeks past. Following are the shipments of both zinc and lead ores from the various producing camps for the week ending December 6:

	Zinc lbs.	Lead lbs.	Value.
Joplin	3,065,410	354,290	\$57,905
Galena-Elmore	1,232,410	191,130	20,799
Cartersville	1,205,160	456,920	191,130
Aurora	440,820	14,000	5,593
Pronogo	335,730	4,830	5,345
Duenweg	485,340	62,730	9,332
Prosperity	125,040	29,840	2,640
Central City	174,920	.....	1,924
Alba-Neeb	256,150	.....	4,226
Carl Junction	98,680	.....	1,868
Zincote	137,460	.....	1,490
Carthage	114,620	10,360	2,093
Spurgeon	28,330	24,610	762
Fortuna	.....	286,480	7,162
Graveley	372,000	43,000	8,029
District Total	8,226,070	1,479,640	\$159,569
Total 49 weeks	496,599,150	60,390,960	\$8,934,366

Zinc value, week, \$122,699; lead, \$36,890; zinc

value, 49 weeks, \$7,549,306; lead, \$1,385,060.

For the week ending November 31 the total sales of zinc ore were \$9,378,340, and of lead ore, \$881,850. The value of the zinc ore was \$145,702; of lead ore, \$22,033. Total value, \$167,735.

**Prices of Foreign Coins.**

	Bid.	Asked
Mexican dollars	\$ .37	\$ .39½
Peruvian soles and Chilean pesos	.38	.39
Victoria sovereigns	4.85	4.88
Twenty francs	3.86	3.88
Twenty marks	4.74	4.80
Spanish 25 pesetas	4.78	4.82

**OTHER METALS.**

**Daily Prices of Metals in New York.**

December	Silver			Copper			Spelter			
	Sterling Exchange	N. Y. Cts.	London, Cts.	Lake Cts. per lb.	Electrolytic Cts. per lb.	London, £ per ton.	Lead Cts. per lb.	N. Y. Cts. per lb.	S. I. Cts. per lb.	
4	4.87½	47¾	21¾	11½	11½	0%	25	4.05	4.90	4.75
5	4.87½	47¾	22½	11½	11½	30%	25	4.05	4.87½	4.70
6	4.87½	47¾	22½	11½	11½	..	25½	4.05	4.87½	4.70
8	4.87½	47¾	22	11½	11½	50%	25½	4.05	4.87½	4.70
9	4.87½	47¾	22	11½	11½	51	24½	4.05	4.87½	4.70
10	4.87½	47¾	22½	11½	11½	51½	24½	4.05	4.87½	4.70

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 which prevailed last week has continued, and the market has again ruled somewhat higher. A good business has been done for both home trade and export. At the close we quote: Lake copper at 11½@11¾c.; electrolytic, in cakes, ingots and wirebars, at 11½@11¾c.; in cathodes, at 11½@11¾c.; casting copper, at 11½@11¾c.

The foreign market displayed considerable strength. Standard copper, which closed last week at £50 10s., opened on Monday at £50 17s. 6d., and the closing quotations on Wednesday are cabled as £50 15s. @ £50 17s. 6d. for spot, £51@£51 2s. 6d. for three months.

Refined and manufactured sorts we quote: English tough, £53 15s. @ £54; best selected, £55@£55 10s., strong sheets, £67@£68; India sheets, £69@£70; yellow metal, 6½@6¾d.

Exports of copper from Atlantic ports in the week ending December 10 were: Great Britain, 100 tons; Germany, 531; Holland, 942; Belgium, 60; Italy, 10; France, 175; Russia, 70; Sweden, 10; Panama, 58; total, 1,956 tons. Also 9 tons matte to Great Britain, which is the first lot in a long while. Imports were 721 tons copper from Mexico, 100 tons from Holland, and 52 tons from South America; total, 873 tons.

**Chilean Copper Market.**—Messrs. Jackson Brothers report from Valparaiso, Chile, under date of October 31, that sales of bar copper for two months have amounted to 16,018 quintals, at an average of \$31.70, Chilean currency, per quintal. Sales of matte have been 250 tons at \$13.50@£13.60, Chilean, per quintal, on a basis of 50 per cent. No sales of ore reported; nominal quotation, \$1.78, currency, per quintal, on basis of 10 per cent copper.

**Tin** has been very active throughout the week, and if it was not for the uncertainty as to silver, transactions would no doubt have been still larger. There is a very good consumptive demand. At the close we quote: Spot, 24¾@27¾c.; December, 24¾c.; January, 24¾c.

The foreign market, which closed last week at £112 12s. 6d., ruled steady for several days at £113 15s., but declined on Tuesday to £113, and the closing quotations are cabled as £112 2s. 6d. @ £112 5s. for spot, £112@£112 2s. 6d. for three months. It will be noticed that the backwardation has practically entirely disappeared.

**Lead** is quiet but steady. The ruling quotations are 3.97½@4.05c., St. Louis; 4.05@4.10c., New York.

The foreign market is again somewhat better, Spanish lead being quoted at £10 13s. 9d., English lead, 2s. 6d. higher.

**Spanish Lead Market.**—Messrs. Barrington & Holt report from Cartagena, Spain, under date of November 22 that the local quotation for pig lead on wharf has been 57.50 reales per quintal. At the current ex-

change, 33.60 pesetas to £1, this is equivalent to £9 11s. 8d. per ton. Exports have been 305,369 kgs. to Marseilles.

**Spelter** has again been rather dull and depressed, but at the lower values established consumers begin to take more interest in the article. At the close we quote: St. Louis, 4.70c.; New York, 4¾c.

The foreign market continues firm, good ordinaries being quoted at £19 17s. 6d., specials 5s. higher.

**Spanish Zinc Ore Market.**—Messrs. Barrington & Holt report under date of November 22 that ores are in demand. Local prices for both calamine and blende are firm.

**Silesian Spelter Market.**—Herr Paul Speier writes from Breslau under date of November 28 that the firm tendency in the market continues. The demand from Great Britain continues strong, and the London prices are generally good. The current quotation is slightly better than last month, and prices are 19.25@19.50 marks per 50 kgs., f. o. b. cars Breslau. This is equivalent to 4.21c. per lb. The exports from Germany in October included 1,904 metric tons to Great Britain, 1,157 tons to Austria, 736 tons to Russia, 235 tons to France, 228 tons to Sweden, 190 tons to Italy and 161 tons to Holland. Zinc oxide continues unchanged and in steady demand. The total exports from Germany for the 10 months ending with October included 59,086 metric tons of spelter, 14,302 tons of zinc sheets, 1,994 tons of scrap, 16,908 tons of zinc white and zinc dust and 6,921 tons of lithopone. All these items show considerable gains over 1901. Imports of zinc ore into Germany have fallen off, however, the total for the 10 months being 54,785 tons, against 66,638 tons last year.

**Antimony** continues to rule rather dull, and somewhat lower prices have again been accepted. We quote: Cookson's at 9@9½c.; Hallett's, 7¼@7¾c.; Hungarian, Italian, Japanese and United States Star at 6¾@7c.

**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 72½c. per gram.

**Quicksilver.**—Prices continue unchanged. The New York quotation is \$48 per flask for large lots, with a slightly higher price for smaller quantities. The London quotation is £8 15s. per flask, with the same figure named from second hands. In San Francisco, prices continue at \$45.50@£46.50 per flask for domestic orders, while for export \$43.50@£44 is quoted.

Exports of quicksilver from San Francisco during the month of November are reported by the Custom House as follows: Alaska and the Yukon, 1,140 lbs.; Mexico, 21,038 lbs.; Honduras, 2,295 lbs.; Hong Kong, 76,250 lbs.; total, 100,723 lbs., or 13,017 flasks. The exports to China have been considerable this year, although last year there were none made.

**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 (87%)	32c.
No. 2, 90% ingots	31@34c.	Magnesium	.....
Roll'd Sheets	4c. up	Manganese, pure (N.Y.)	82c.
Alum-bronze	20@23c.	Mangan'e Cop. (20% Mn)	82c.
Nickel-alum	33@39c.	Mangan'e Cop. (30% Mn)	85c.
Bismuth	.....	Molybdenum (Best)	1.63
Chromium, pure (N.Y.)	80c.	Phosphorus	.....
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	23.54	26.51	4.000	4.350	4.27	4.18
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	3.96
May	29.85	27.12	4.075	4.350	4.47	4.04
June	29.86	28.00	4.075	4.350	4.96	3.99
July	28.38	27.85	4.075	4.350	5.27	3.98
August	28.23	26.78	4.075	4.350	5.44	3.90
September	28.20	25.31	4.075	4.350	5.49	4.08
October	26.07	26.62	4.075	4.350	5.38	4.23
November	25.08	26.67	4.075	4.350	5.18	4.29
December	.....	24.36	.....	.....	4.158	.....
Year	.....	26.54	.....	.....	.....	.....

Average Prices of Copper.

Table with columns: Month, Electrolytic (1902, 1901), Lake (1902, 1901), London Standard (1902, 1901). Rows: January to December, Year.

New York prices are in cents, per pound; London prices in pounds sterling, per long ton of 2,240 lbs., standard copper. The prices for electrolytic copper are for cakes, ingots or wire bars; prices of cathodes are usually 0.25 cent lower.

Average Prices of Silver, per ounce Troy.

Table with columns: Month, 1902 (London, N.Y. Pence, Cents), 1901 (London, N.Y. Pence, Cents), 1900 (London, N.Y. Pence, Cents). Rows: January to December, Year.

The New York prices are per fine ounce; the London quotation is per standard ounce, .925 fine.

ASSESSMENTS.

Table with columns: Name of Company, Location No., Delinq., Sale, Amt. Rows: Annandale, Aurora, Best & Belcher, Bingham Placer, Bullion, Caledonia, California, Canton Placer, Carbonate & Rattler, Chicago & Bingham, Christmas, Con. Cal. & Va., Ellise, Emerald, Gold Hill, Gould & Curry, Hale & Norcross, Inyo Marble, Justice, Little Chief, New Red Wing, Northern Light, Occidental, Ophir, Purjue-Surprise, Rusby, Savage, Shendoah Con, Showers Con, Silver Bell, Star, Utah Con, Utah-Wyo. Oil & Fuel, Wilson & Barrett.

DIVIDENDS.

Table with columns: Name of Company, Date, Latest Dividend (Per Share, Total), Total to Date. Rows: Ala. & Ga. Iron pf., Bartolome Mill, Cinco Senores, C. K. & N., Crucible Steel, Daly West, Empire State, Esperanza, Greene Con., Maryland Coal, National Lead, Ontario, Pioneer of Nome, San Rafael, Republic Iron & Steel, Shawmut Oil, Silver King, Soledad, Sta Maria de la Paz, Standard Oil, U. S. Steel, Utah, Fish Springs, Va.-Car. Chem.

\*Monthly †Quarterly §Semi-annual.

STOCK QUOTATIONS.

NEW YORK.

Table with columns: Company and Location, par val, Dec. 3, Dec. 4, Dec. 5, Dec. 6, Dec. 8, Dec. 9, Sales. Rows: Acacia, Alice, Amalgamated, Anaconda, Argentium, Best & Belcher, Chrysolite, Comstock, Comst T. Bonds, Con. Cal. & Va., Cons. Imperial, Cripple Creek, Elton, Gold Dollar, Golden Fleece, Greene Con., Hale & Norcross, Isabella, Kim & Pembroke, Leadville, Mexican, Mollie Gibson, Occidental, Ontario, Ophir, Pharmacist, Phoenix, Portland, Potosi, Quicksilver, Savaze, Tenn. C., Union, Union Cop., White Knob.

† Assessment Paid.

Coal, Iron and Industrial Stocks.

Table with columns: Company, par val, Dec. 3, Dec. 4, Dec. 5, Dec. 6, Dec. 8, Dec. 9, Sales. Rows: Atlas-Chalmers, Am. Agr. Chem., Am. Agr. Chem. pf., Am. Sm. & Ref., Am. Sm. & Ref. pf., Col. & H. C. & I., Crucible Steel, Int'l S. Pump, Int'l S. Pump pf., Mong. R. Coal, National Lead, National Lead pf., Phila Nat. Gas, Phila Nat. Gas pf., Pittsburgh Coal, Republic I. & S., Republic I. & S. pf., Sloss-Shef, Sloss-Shef A.I. pf., Standard Oil, Tenn. C. I. & R., U. S. Cast I. Pipe, U. S. C. I. Pipe pf., U. S. Steel Corp., U. S. Steel Corp. pf., Va.-Car Chem., Va.-Car Chem. pf., W. house Elect., W. house Elect. pf.

† Ex Dividend

Total sales, 270,207 shares.

BOSTON, MASS.

Table with columns: Name of Company, par val, Share listed, Dec. 3, Dec. 4, Dec. 5, Dec. 6, Dec. 9, Dec. 10, Sales. Rows: Adventure Con., Allonox, Amalgamated, Am. Gold Dreg., Am. Z. L. & Sm., Anaconda, Arcadian, Arnold, Ashbed, Atlantic, Bingham Con., Bonanza, British Columbia, Cal. & Hecla, Centennial, Central Oil, Cochiti, Con. Mercur, Continental Zinc, Copper Range, Daly-West, Dominion Coal, Dominion Coal pf., Dominion I & S., Elm River, Franklin, Guanajuato, Isle Royale, Mass Con., Mayflower, Michigan, Mohawk, Mont. Coal & Coke, Mont' & Boston, New Idria, Old Colony, Old Dominion, Osceola, Parrot, Phoenix, Rhode Island, Santa Fe, Shannon, Tamarack, Tecumseh, Trimountain, Trinity, United Copper, United States, U. S. Coal & Oil, Utah Con., Victoria, Washington, Winona, Wolverine.

Total sales, 59,230 shares.

PHILADELPHIA, PA.

Table with columns: Name and Location of Company, par val, Dec. 3, Dec. 4, Dec. 5, Dec. 6, Dec. 8, Dec. 9, Sales. Rows: Am. Alkali, Am. Cement, Cambria Iron, Cambria Steel, Penn. Steel, Sloss-Shef, United Gas, Warwick I. & Steel.

§ Reported by Townsend, Whelen & Co., 300 Walnut St., Philadelphia, Pa. Total sales 3,576 shares.



STOCK QUOTATIONS.

COLORADO SPRINGS, COLO.\*

LONDON.

Nov. 26.

Table of stock quotations for Colorado Springs, Colo. listing companies like Acacia, Alamo, Anaconda, etc., with columns for par value, bid/ask prices, and sales.

\*Colo. Springs Mining Stock Exchange. All mines are in Colorado. Total sales 157,850 shares.

COLORADO SPRINGS. (By Telegraph.)

Table of stock quotations for Colorado Springs via telegraph, listing companies like Acacia, Alamo, Anaconda, etc., with columns for par value and bid/ask prices.

PARIS.

Nov. 20.

Table of stock quotations for Paris, listing companies like Acieries de Creusot, Firminy, Huta-Bank, etc., with columns for country, product, capital stock, par value, latest dividends, and prices.

ST. LOUIS, MO.\*

Dec. 6.

TORONTO, ONT.

Dec. 6.

Table of stock quotations for St. Louis, Mo. and Toronto, Ont., listing companies like Nettie, Lead, Central Coal, etc., with columns for shares, par value, bid/ask prices, and sales.

\*From our Special Correspondent.

Total sales, 4,500 shares.

Quotations.

Table of stock quotations for London, listing companies like Alaska-Treadwell, Anaconda, Arizona, etc., with columns for name and country, authorized capital, par value, last dividend, and quotations.

c.—Copper. d.—Diamonds. g.—Gold. l.—Lead. s.—Silver.

MEXICO.

Nov. 28.

Table of stock quotations for Mexico, listing companies like Durango, Ca. Min. de Penoles, Alacran, etc., with columns for name of company, shares, last dividend, and prices.

SALT LAKE CITY.\*

Dec. 5.

Table of stock quotations for Salt Lake City, listing companies like Ajax, Ben Butler, Bullion-Beck, etc., with columns for name of company, shares, par value, high/low prices, and sales.

All mines are in Utah. \*By our Special Correspondent. Total sales, 143,453 shares.

**CHEMICALS, MINERALS, RARE EARTHS, ETC.—CURRENT WHOLESALE PRICES.**  
(See also Market Reviews.)

Commodity	Cust. Meas.	Price	Commodity	Cust. Meas.	Price	Commodity	Cust. Meas.	Price
<b>ABRASIVES—</b>			<b>BARIUM</b>			<b>GRAPHITE—Am. f.o.b. Prov.</b>		
Carborandum, f.o.b. Niagara Falls, Powd., F.F.F.F.F.	lb.	\$0.08	Oxide, Am. hyd. cryst.	lb.	\$0.02%	Idence, R. L., lump	sh. ton	\$8.00
Grains	"	.10	Sulphate (Blanc Fixe)	"	.02	Pulverized	"	30.00
Corundum, N. C.	"	.07@.10	<b>BARYTES—</b>			German, com. pulv.	lb.	.01¼@.01½
Chester, Mass.	"	.04½@.05	Am. Crude, No. 1	sh. ton	9.00	Best pulverized	"	.01¼@.02
Barry's Bay, Ont.	"	.07¼@.09½	Crude, No. 2	"	8.00	Ceylon, common pulv.	"	.02¼@.03¼
Mont. car-lots, f.o.b., Chicago	"	.07@.07½	Crude, No. 3	"	7.75	Best pulverized	"	.04@.08
Crushed Steel, f.o.b. Pittsburg	"	.05¼	German, gray	"	14.50	Italian, pulv.	"	.01¼
Emery, Turkish flour in kegs	"	.08¼	Snow white	"	17.00	<b>GYPSUM—Ground</b>	sh. ton	8.00@8.50
Grains, in kegs	"	.05@.05½	<b>BAUKITE—Ga. or Ala. Mines:</b>			Fertilizer	"	7.00
Naxos flour, in kegs	"	.03½	First Grade	lg. ton	5.50	Rock	lg. ton	4.00
Grains, in kegs	"	.05@.05½	Second grade	"	4.75	English and French	"	14.00@16.00
Chester flour, in kegs	"	.03½	<b>BISMUTH—Subnitrate</b>	lb.	1.40	<b>INFUSORIAL EARTH—Gr'd.</b>		
Grains, in kegs	"	.05@.05½	Subcarbonate	"	1.65	American best	"	20.00
Peekskill, f.o.b. Easton, Pa., flour, in kegs	"	.01¼	<b>BITUMEN—"B"</b>	"	.03¼	French	"	37.50
Grains, in kegs	"	.02¼	"A"	"	.05	German	"	40.00
Crude, ex-ship N. Y.: Abbott (Turkey)	lg. ton	26.50@30.00	<b>BONE ASH</b>	"	.02¼@.02½	<b>IODINE—Crude</b>	100 lbs.	2.45
Kuluk (Turkey)	"	22.00@24.00	<b>BORAX</b>	"	.07¼@.07½	IRON—Muriate	lb.	.05
Naxos (Greek) h. gr.	"	26.00	<b>BROMINE</b>	"	.40	Nitrate, com'l	"	.01¼
Garnet, as per quality	sh. ton	26.00@35.00	<b>CADMIUM—Metallic</b>	"	1.40	True	"	.04
Pumice Stone, Am. powd.	lb.	.01¼@.02	Sulphate	100 lbs.	2.00@2.50	Oxide, pure copperas color	"	.05@.10
Italian, powdered	"	.01¼	<b>CALCIUM—Acetate, gray</b>	"	1.30	Purple-brown	"	.02
Lump, per quality	"	.04@.40	" brown	"	.90	Venetian red	"	.01@.01½
Rottenstone, ground	"	.02¼@.04½	Carbide, ton lots f.o.b. Niagara Falls, N. Y., for Jersey City, N. J.	sh. ton	70.00	Scale	"	.01@.03
Lump, per quality	"	.06@.20	Carbonate, ppt.	lb.	.05	<b>KAOLIN—(See China Clay.)</b>		
Rouge, per quality	"	.10@.50	Chloride	100 lbs.	.70@.90	<b>KRYOLITH—(See Cryolite.)</b>		
Steel Emery, f.o.b. Pittsburg	"	.07	<b>CEMENT—</b>			<b>LEAD—Acetate, white</b>	"	.07¼@.08
<b>ACIDS—</b>			Portland, Am., 400 lbs.	bbl.	1.70@1.90	Brown	"	.06@.06¼
Boracic, crystals	"	.10¼@.11	Foreign	"	1.65@2.25	Nitrate, com'l	"	.08¼
Powdered	"	.11¼@.11½	"Rosendale," 300 lbs.	"	2.75	" gran.	"	.08¼
Carbonic, liquid gas	"	.12¼	Slag cement, imported	"	1.65	<b>LIME—Com., abt. 250 lbs.</b>	bbl.	.80
Chromic, crude	"	.20	<b>CERESINE—</b>			Finishing	"	.90
Hydrofluoric, 30%	"	.08	Orange and Yellow	lb.	.12	<b>MAGNESITE—Greece.</b>		
45%	"	.05	White	"	.13¼	Crude (95%)	lg. ton	6.00@6.50
60%	"	.11	<b>CHALK—Lump, bulk</b>	sh. ton	2.50	Calcined	sh. ton	17.50@18.00
Sulphurous, liquid anhy. f.o.b. Bound Brook, N.J.	"	.06	Ppt. per quality	lb.	.03¼@.06	Bricks	M	170.00
<b>ALCOHOL—Grain</b>	gal.	2.47	<b>CHLORINE—Liquid</b>	"	.30	Am. Bricks, f.o.b. Pittsburg	"	175.00
Refined wood 95@97%	"	.60@.65	Water	"	.10	<b>MAGNESIUM—</b>		
Purified	"	1.20@1.50	<b>CHROME ORE—</b>			Carbonate, light, fine pd.	lb.	.05
<b>ALUM—Lump</b>	100 lbs.	1.75	(50% ch.) ex-ship N. Y.	lg. ton	24.75	Blocks	"	.07@.09
Ground	"	1.80	Bricks f.o.b. Pittsburg	M	175.00	Chloride, com'l	"	.01¼
Powdered	"	3.00	<b>CLAY, CHINA—Am. com., ex-dock, N. Y.</b>	lg. ton	8.00	Fused	"	.20
Chrome, com'l	"	2.75@3.00	Am. best, ex-dock, N. Y.	"	9.00	Nitrate	"	.60
<b>ALUMINUM—</b>			English, common	"	12.00	Sulphate	100 lbs.	.75@.95
Nitrate	lb.	1.50	Best grade	"	17.00	70@75% binoxide	lb.	.01¼@.01½
Oxide, com'l, common	"	.06¼	Fire Clay, ordinary	sh. ton	4.25	75@85% binoxide	"	.01¼@.02¼
Best	"	.20	Best	"	6.00	85@90% binoxide	"	.02¼@.03¼
Pure	"	.80	Slip Clay	"	5.00	90@95% binoxide	"	.03¼@.05¼
Hydrated	100 lbs.	2.60	<b>COAL TAR PITCH</b>	gal.	.08	Carbonate	"	.16@.20
Sulphate, pure	"	1.50@2.00	<b>COBALT—Carbonate</b>	lb.	1.75	Chloride	"	.04
Com'l	"	1.15@2.00	Nitrate	"	1.50	Ore, 50%, Foreign	unit	.18@.19
<b>AMMONIA—</b>			Oxide—Black	"	2.26@2.30	Domestic	"	.30
Aqua, 16°	lb.	.03	Gray	"	2.28@2.40	<b>MARBLE—Flour</b>	sh. ton	6.00@7.00
18°	"	.05¼	Small, blue ordinary	"	.06	<b>MERCURY—Bichloride</b>	lb.	.77
20°	"	.03¼	Best	"	.20	<b>MICA—N. Y. gr'nd, coarse</b>	sh. ton	33.00@38.00
26°	"	.05¼	<b>COPPERAS—in bulk</b>	100 lbs.	.37½	Fine	lb.	.00¼@.02
<b>AMMONIUM—</b>			In bbls.	"	.42¼	Sheets, N. C., 2x4 in.	"	.30
Carbonate, lump	"	.08¼	<b>COPPER—Carbonate</b>	lb.	.18@.19	3x3 in.	"	.80
Powdered	"	.09	Chloride	"	.25	3x4 in.	"	1.50
Marlic, grain	"	.05¼	Nitrate, crystals	"	.25	4x4 in.	"	2.00
Lump	"	.08¼	Oxide, com'l	"	.19	6x6 in.	"	3.00
Nitrate, white, pure (99%)	"	.12	<b>CRYOLITE</b>	"	.06¼	<b>MINERAL WOOL—</b>		
Phosphate, com'l	"	.09	Blasting powder, A	25 lb. keg	.65	Slag, ordinary	sh. ton	19.00
Pure	"	.12	Blasting powder, B	"	1.40	Selected	"	25.00
<b>ANTIMONY—Glass</b>	"	.30@.40	"Rackarock," A	lb.	.25	Rock, ordinary	"	32.00
Needle, lump	"	.05¼@.06	"Rackarock," B	"	.18	Selected	"	40.00
Powdered, ordinary	"	.05¼@.07¼	Judson K.R. powder	"	.10	<b>NICKEL Oxide, No. 1</b>	lb.	1.00
Oxide, com'l white, 95%	"	.09¼	Dynamite (20% nitro-glycerine)	"	.13	No. 2	"	.60
Com'l white, 95%	"	.12	(30% nitro-glycerine)	"	.14	Sulphate	"	.20@.21
Com'l gray	"	.07	(40% nitro-glycerine)	"	.15	<b>OILS—Black, reduced 29 gr.</b>		
Sulphuret, com'l	"	.16	(50% nitro-glycerine)	"	.16¼	25@30, cold test	gal.	.09¼@.10¼
<b>ARSENIC—White powd.</b>	"	.02¼@.03¼	(60% nitro-glycerine)	"	.18	15, cold test	"	.10¼@.11¼
Red	"	.06¼@.07	(75% nitro-glycerine)	"	.21	Zero	"	.11¼@.12¼
<b>ASPHALTUM—</b>			Glycerine for nitro, (82-2-10° Be.)	"	.13%@.13%	Summer	"	.09¼@.09¾
Ventura, Cal.	sh. ton	82.00	<b>FELDSPAR—Ground</b>	sh. ton	8.00@9.00	Cylinder, dark steam ref.	"	.08¼@.10¼
Cuban	lb.	.01¼@.03¼	<b>FLINT PEBBLES—Dan. Best</b>	lg. ton	14.75	Dark, filtered	"	.11¼@.15¼
Egyptian, crude	"	.05¼@.06	French, Best	"	11.75	Light, filtered	"	.14%@.17%
Trinidad, refined	sh. ton	85.00	<b>FLUORSPAR—</b>			Extra cold test	"	.21%@.26%
San Valentino (Italian)	lg. ton	16.00	Am. lump, 1st grade	sh. ton	14.40	Gasoline, 88°@90°	"	.15@.20
Seyssel (French), mastic	sh. ton	21.00	2d grade	"	13.90	Naphtha, crude, 68°@72°	bbl.	9.05
Gilsonite, Utah, ordinary	lb.	.03	Gravel and crushed, 1st gr	"	13.40	"Stove"	gal.	.12
Select	"	.03¼	2d grade	"	12.40	Linseed, domestic raw	"	.44@.46
<b>BARIUM—</b>			Ground, 1st grade	"	17.90	Boiled	"	.48
Carb. Lump, 80@90%	sh. ton	25.00@27.50	Ground, 2d grade	"	16.50	Calcutta, raw	"	.75
92@98%	"	28.00@29.00	Foreign, lump	"	8.00@12.00	<b>OZOKERITE</b>	lb.	.11¼
Powdered, 80@90%	lb.	.01¼@.02	Ground	"	11.50@14.00	<b>PAINTS AND COLORS—</b>		
Chloride, com'l	100 lbs.	1.67¼@1.76	<b>FULLER'S EARTH—Lump</b>	100 lbs.	.75	Chrome green, common	"	.05
Chem. pure cryst.	lb.	.05	Powdered	"	.80	Pure	"	.16
Nitrate, powdered	"	.05¼				Yellow, common	"	.10¼

NOTE.—These quotations are for wholesale lots in New York unless otherwise specified, and are generally subject to the usual trade discounts. Readers of the ENGINEERING AND MINING JOURNAL are requested to report any corrections needed, or to suggest additions which they may consider advisable.