

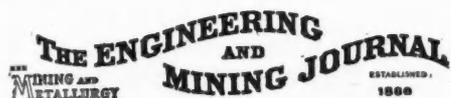
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FREDERICK HOBART Associate Editor
ROSSITER W. RAYMOND, Ph.D., M.E. Special Contributor

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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 ADJOURNMENT of the Anthracite Strike Commission until December 3, with the understanding that some agreement might be reached meantime, apparently changed the situation. The latest news, however, is that the operators have abruptly withdrawn from the negotiations, and that the hearings will continue.



WE REGRET deeply to report the news which the cable brings us of the death, in London, on November 23d, of Sir W. C. Roberts-Austen, who was so widely known from his investigations into the properties of metals and alloys. At the time of his death he was president of the Iron and Steel Institute and honorary secretary of the British Association. He has passed away at the comparatively early age of fifty-eight, in the height of his powers and usefulness.



IN OUR issue of November 1, on page 581, we referred to the new plant of the North American Lead Company, now under construction at Fredricktown, in Missouri. The article described the new and special features of the plant, but did not state its size, leaving the reader to infer that it was small or large, as he saw fit. We wish now to remedy the omission, and to say that the new plant is one of the largest in Missouri. It will be able, when completed, to crush and concentrate from a minimum of 250 tons of ore per day, up to a maximum of 400 tons. It will be, therefore, a plant of the first class, having also the latest improvements.



THE RESIGNATION of Mr. Alfred Walter from the presidency of the Lehigh Valley Company is to be regretted, because it deprives an important company of the services of an executive who is not only a capable railroad man, but is also thoroughly acquainted with the anthracite trade. Beyond this it is much more to be regretted because the time and manner of the resignation gives color to the report—which is generally credited by those who are well informed—that Mr. Walter retires because he has opinions of his own, and is not willing to follow blindly the lead of President Baer, of the Reading Company. Should this be true—and there are many indications that it is true—it would seem that the present controlling interest in the anthracite roads approves of the Baer policy and the Baer management, with all that it implies.

IN A RECENT address Secretary of the Treasury Shaw referred to the future possibility of a reform which has been frequently advocated in the columns of the JOURNAL. This is the adoption of a universal coinage standard by all the civilized nations of the world. We do not mean by this, as we have often explained, that the coinage in all countries should be absolutely uniform. It is quite possible for each nation to retain its peculiar coins and their names; but as we have pointed out these coins could, without great difficulty, be made to bear a uniform value. Thus the American \$5 piece, the British pound sterling, the German 20 marks, the 25 francs of France and the Latin Monetary Union and the 10 rouble piece of Russia could be made of a uniform value by changes so slight in the weight of gold in each that the alteration would hardly exceed the allowance made for wear by the mints in all countries. How great a convenience in international exchange and in merchant and bank accounts this would constitute it is hardly necessary to point out. We trust that Secretary Shaw will follow up the matter to which he alluded in his speech.



THE ARTICLES on Problems of Life and Labor in Anthracite Mining, the first of which was published in our last issue, while the second appears on another page, indicate lines of investigation which the Anthracite Coal Strike Commission should take up, in order to enable its members to render a decision in accordance with facts in the case and with equal justice to both sides. The writer of those articles has had occasion in the course of his professional work to make very close and careful investigations into the conditions of labor and living in various occupations; and he is well fitted by experience to weigh the value of statistics and appreciate the bearing of facts. It is possible that the Commission may hardly be able to secure all the data indicated in as complete a form as proposed; but it can certainly secure enough to be of great value, not only in forming its own conclusions, but also to future investigators. The testimony taken so far has apparently consisted of little but statements of opinions, most of them given under the pressure of sharp cross-examination by the lawyers. It is to be hoped that the opposing parties—and their counsel—will permit the substitution for this exercise of wits of a careful investigation into facts. The Commission, indeed, shows signs of a disposition to insist upon such a course.



As our readers know, the coal and coke business in Germany is pretty thoroughly controlled by several syndicates or associations producers. An important association of this kind is the Coke Syndicate which controls the production of the Ruhr and other districts, the coke of which is largely used in the German blast furnaces. In view of the depressed condition of the iron trade, application was made by a number of furnace owners for a reduc-

tion in prices, but at a recent meeting of the Syndicate it was resolved to leave the price of furnace coke unchanged at 15 marks (\$3.57) per ton at the ovens. A very slight reduction was made in the price of foundry coke, and in that of some inferior grades, but these have no effect upon the greater part of the coke business. The price of furnace coke is still higher than it was during the years 1898 and 1899, when the iron trade was booming, and in view of the fact that prices for pig and finished iron are now from 20 to 30 per cent lower than they were two years ago, the ironmasters demanded a reduction. Great disappointment is felt, and their many remonstrances against this decision of the syndicate, but the majority of its members felt that they still controlled the situation and refused to give way. At the present time there does not seem to be any possibility of breaking the syndicate's control of the market, and the remonstrances of the iron manufacturers will probably amount to nothing in the end.



THE COLORADO FUEL AND IRON COMPANY.

The fight for control of the Colorado Fuel and Iron Company, which has been going on for several months, as a consequence of disagreement between the directors, is a matter of more than local interest; nevertheless, while the onlooker in New York keeps his eye on the fluctuations in the shares consequent upon this contest for supremacy between rival factions, the community in which the industrial activity of the company is exercised regards the result with anxiety. The Colorado Fuel and Iron Company employs 15,000 workmen; it has an average monthly payroll of about \$750,000; its iron mines, coal mines and steel works have built up several large towns in various parts of Colorado, Wyoming and New Mexico. It is no wonder therefore that the people of this region fear the merging of the company's property into the larger consolidations which have been formed to control the eastern steel trade; they anticipate the possibility of this local industry becoming a pawn in a larger game which might include among its opening moves the closing of the works and mines of the Colorado Fuel and Iron Company. Beyond this selfish interest in the outcome of the present contest there is a sentiment of peculiarly strong loyalty and good-will toward the men who, bit by bit, built up the splendid superstructure of a local coal and iron business of noble dimensions upon natural resources which they themselves developed and, by their skilful management, for the past 20 years, have administered in a manner very beneficial to Colorado and the adjacent regions. Whatever be the outcome of stock manipulations we trust it will be in no way prejudicial to the capable staff of highly trained technical men connected with the present directorate.



THE FALL IN SILVER

The steady and persistent fall in the price of silver, which has now been going on for over a year, still continues, and there is apparently nothing to stop it. Silver has sold down this week nearly to 48 cents an ounce in New York, and every indication is that it must go lower still. In fact, some who are

familiar with the conditions do not hesitate to say that 40 cents an ounce is in sight, unless something now entirely unexpected should happen to change the course of the metal. Such a price would have been thought impossible only a few years ago, but now it seems not only possible, but probable.

We have from time to time referred to the causes of the fall, and a brief recapitulation will be sufficient. Chief among these is the diminished demand from the East, which has absorbed nearly half the world's output for many years past. By the East is meant India, China and Japan chiefly, the Dutch East Indies being included only as a smaller buyer, whose demand adds little to the total. Of the three countries named, Japan has ceased to be a factor in the silver market, leaving China and India as the great buyers.

But India—in which is included the Malay Peninsula—has had three years of famine and plague which have largely diminished both its ability and disposition to buy. In India proper there has been a degree of poverty which prevented investment of savings in the time-honored way; and probably it will take several years for the country to recover. Even the low price now prevailing has failed to tempt buying for the bazars; and this is a thing unheard of heretofore. The demand from the Malay Peninsula has diminished in spite of the high price and large production of tin; a fact which is accounted for by the increased proportion of that metal handled by English companies, which sell on a gold basis.

In China, which is usually second only to India as a buyer of silver, trade was thoroughly disorganized by the Boxer rebellion and the subsequent war. Under the operation of the indemnity payments exacted by the Powers, China is for the time a seller rather than a buyer of silver; while the Australian silver product, a large part of which was usually shipped to China, now goes to London, still further increasing the supplies there.

Meantime the production of silver does not decrease to any considerable extent, and the reason for this is clear. In the United States, at the present time, silver is almost exclusively a by-product. It is produced in connection with copper and lead; and with gold also, though to a very much smaller extent. This is the case also in Australia, and in some degree in Mexico, though the last named country has more mines from which silver alone is drawn than any other country. As long as there is a demand for copper and lead, silver will continue to be produced in quantity approximating the present output, so that relief from the present situation must come from larger demand, and not from diminishing supplies.

It is possible that the low price may result in some increase in the consumption of the metal in the arts and industries. At present prices, for instance, solid silver ware for household purposes ought not to cost more than the higher grades of plated ware, and its possession is more satisfactory for many reasons. This demand, however, is comparatively small, and by itself would not be sufficient to help materially in any reaction.

A singular fact in connection with the present situation is that the fall has attracted very little attention. It seems to have been accepted as inevitable and very little has been said outside of those who are especially interested; and most of them are not inclined to talk about it.

THE TRAGEDY AT TELLURIDE.

Just after going to press last week our correspondent in Colorado telegraphed that Mr. A. L. Collins, the manager of the Smuggler Union Mine, at Telluride, had been shot in his house, with results that were fatal within 36 hours. The act was that of an assassin who had fired buck-shot through the window of the library in which Mr. Collins sat with two or three friends.

Throughout the membership of that profession which Arthur Collins adorned by his high intelligence and earnest work, this sad news will provoke a feeling of great pity that a useful and honorable career should be terminated in such a tragic manner, and to this pity will be added the bitterness of resentment that an unoffending man of high character should be sacrificed to the spirit of lawlessness which has prevailed at Telluride for the past two years, and of which this tragedy is the logical outcome. Our readers will remember that in July, 1901, there was a strike among the workmen at the Smuggler Union Mine, consequent upon the introduction of the contract system; they will also recall the fact of a murderous attack made by a body of strikers, in the course of which the latter shot indiscriminately into the dwellings and office buildings at the mine, killing eight men and severely wounding many more. Nothing whatever was done by the county or the State to punish this outrage, and not a single individual has ever suffered any punishment for this act of cowardly ruffianism. In July of the present year a marble monument was erected to the memory of the single member of the attacking party who was killed in that assault, and at the unveiling of this monument to the murderer a number of flowery orations were spouted by local politicians. Amid these happenings, Mr. Collins, as manager of the mine, stood up fearlessly for the maintenance of law and order, and when the Sixteen-to-One Miners' Union, of Telluride, sent him a list of "scabs," or non-union men, warning him not to give them employment, he immediately inserted a paid advertisement in each of the local newspapers promising work to any man on that list so long as he was manager of the properties then under his control. In speaking of this incident he would explain, with indignation, that the names on that list "could be pronounced!" That is, they were men of American and English extraction in contrast to the bulk of the miners in the district who are Austrians, Slavs, Italians, etc., with enough hot-headed ag'in-the-government Irish to lead these foreigners into devilry.

Throughout these troubles the local and State authorities have been shamelessly negligent of their duty to the community in the enforcement of the law. The present Governor of Colorado is an ordinary political accident, and has permitted the exigencies of corrupt politics to tie his hands. It may be necessary to explain that the Miners' Union is influential in politics, not only locally, but also through its affiliations with similar organizations throughout the State, and the members as a body belong to the political party which of late has been dominant in Colorado on account of the socialistic and anarchistic tendencies developed by the agitation following the fall in silver. The Smuggler Union Mine is owned

by Boston capitalists, who are likely to cease operations at the mine and keep it shut down until there is better evidence of protection to life and property in this particular district; they will doubtless be glad to meet the heavy expenses of a thorough investigation, and will spare no effort toward the arrest of the criminal, even though the county and State prove as supine as heretofore. Whether this culminating tragedy will arouse the State authorities to action we do not know, but if it does not it appears to us that it is high time for the civic spirit of Colorado to awaken and to see to it that punishment awaits the perpetrators of this and other crimes committed at Telluride.

From considerations such as these one turns again sadly enough to the realization of the cost of all this frontier lawlessness and political expediency. Arthur Collins was a member of an old Cornish mining family. He was barely 40 years of age, with a young wife and two lovely children. He was well-traveled and extremely well-informed in technical matters. A few years ago he had been adviser in mining to the Ameer of Afghanistan, and had been placed amid surroundings requiring a high type of courage. As manager of mines first at Central City and then at Telluride he had evinced great energy and capacity. He seemed destined to occupy a very honorable place in the profession, and he could look forward to a career of domestic happiness and professional distinction. This—citizenship of the very best—is suddenly and without warning wantonly destroyed because local politics have made it inexpedient to enforce the administration of the law.



MARKET CONDITIONS.

Iron and Steel.—The iron and steel markets continue to be seriously disturbed by the conditions of transportation. Some improvement is noted in the Pittsburg District, where the railroads have partially succeeded in breaking the freight blockade, but the deliveries of coke and other raw material to the furnaces are still very slow and promise to reduce seriously the output notwithstanding the sharp demand. There is little to be reported about new contracts, and many people seem to be inclined to wait for the clearing up of the present situation, before making new engagements ahead.

Copper.—The copper market continues rather quiet, the unfavorable influence exercised by the Wall Street situation and by the high interest rates for money still affecting the position. Consumption, however, continues large and steady, and there seems little doubt that an improvement must be recorded before long.

Other Metals.—Tin continues somewhat weak, with rather a downward tendency in prices. Spot supplies are good, and the foreign market is still somewhat depressed. In London there is no change to be reported either in prices or in the steady demand from consumers.

Spelter is again somewhat weaker, although demand from galvanizers and other users of the metal, remains fair.

The depression in silver continues, and a still lower range of prices is reported. The cause for this and the prospects about the metal are fully discussed in another column.

Coal.—The Western coal markets show little or no improvement. Transportation continues generally very poor. The season for Lake shipments will soon be at an end, but it is now beyond question that the northwestern supply for the winter will be considerably below the normal figure, and already questions of all-rail freight rates begin to be discussed. Supplies at the large cities are somewhat better, but there is a rush for winter stocks, which will not be satisfied for some time to come.

The seaboard bituminous coal trade shows no change of importance. Complaints still continue in this trade also of the slow deliveries by the railroads.

The anthracite trade is still very far from assuming its normal condition, and it will be some months yet before supply and demand begin to adjust themselves.



THE ANTHRACITE COAL STRIKE COMMISSION.

Following the examination and cross-examination of Mr. Mitchell, which was referred to in our columns last week, some other witnesses were put on the stand. The most important of these was Rev. Peter L. Roberts, who wrote a book on the Anthracite Mining Industry some time ago. It cannot be said, however, that the examination of these witnesses brought out anything new.

On Friday, November 21, it was reported that propositions had been made by representatives of both parties which might lead to a settlement of the difficulties outside of the action of the Commission. It was said that the compromise suggested to form the basis of negotiations was a 10 per cent increase in wages, a nine-hour work day, and trade agreements between the miners and the company by whom they are employed. The only one of the four demands not touched upon was that of weighing coal by the legal ton.

At any rate, the matter had progressed so far that it was agreed to ask the Commission to take a recess, pending the negotiations between the parties. The suggestion was made at the meeting of the Commission on November 21, and after hearing it Judge Gray, the chairman, made the following announcement, which had been agreed upon by the members:

"According to the suggestion just made by counsel that an interval of time be taken for the preparation of the documentary evidence and for a possible agreement as to certain facts and figures which would forward the work of the Commission, the Commission desires to express the hope that an effort will be made by the parties to come to an agreement upon nearly all, if not all, the matters now in controversy, and that they will adopt the suggestion heretofore made by the Commission to counsel on both sides; that we aid them in such an effort by our conciliatory offices. It seems to us that many of the conditions complained of, and which have been the subject and study of our examination, might be better remedied by the parties to the controversy approaching the subject in a proper spirit and with the purpose of fairly adjusting them. We hope, gentlemen, that the interval of time to be granted may be availed of with this end in view. Of course, in the meantime, we shall proceed with the work before us as we have begun it."

On November 22 the Commission adjourned, to meet again in Scranton on December 3. Before adjourning a substitute or conciliation committee was appointed in order that the wishes of the Commission may be officially voiced with regard to any matter that might arise in the interval. The Commissioners wished it understood that they have the last say in the adjustment of

the differences; that they will carry the full responsibility for whatever award, if any, they may make, and that whatever is agreed upon must have their full approval before the agreement can be put in operation.

The committee, which is made up of Commissioners Watkins, Parker and Clark, on the same day called into conference as many attorneys representing all the parties before the Commission as could be gathered on short notice, and stated to them the attitude of the Commission. After the meeting a statement was given out in order that the general public might know the position of the arbitrators regarding the new turn affairs had taken. This statement, in full, is as follows:

"It appears that there is some misunderstanding, or some lack of understanding in connection with the recess taken by the Commission, and the suggestion in that connection that possibly the contestants might be able to agree upon some of the important points involved.

"The recess was desired by counsel for both sides because authoritative statements of hours and wages which are being prepared are not as yet ready.

"The suggestion was made that perhaps some agreement might be reached between the principals which would simplify the problem and assist in reaching proper conclusions. The chairman, speaking for the Commission, stated that the Commission would gladly co-operate, as far as could consistently be done, in furthering an effort to reach an understanding through conciliatory means and methods.

"The idea has gone out in some quarters that the matter is to be settled without further effort or responsibility on the part of the Commission. The idea is entirely wrong. The Commission will, as announced, cheerfully encourage conciliatory spirit and action between the parties to the controversy, but the Commission has not surrendered, and will not surrender, jurisdiction of any of the matters which have been referred to it, nor responsibility for the conclusion reached. No adjustment can be made which does not, by its terms, commend itself strongly enough to secure the approval of the Commission and its incorporation in the award.

"With a view and for the purpose of removing any misunderstanding which might exist, the subcommittee of the Commission invited such of the counsel representing the several interests involved as could be reached to meet this afternoon."

Mr. Wayne McVeagh, who had been prominent as counsel in the proceedings before the Commission, made public on November 23, through the *Philadelphia Ledger*, the following statement, which is of interest:

"I fully appreciate a desire that there should be some statement for the general public of what has recently occurred in the matter of an attempted adjustment of the demands of Mr. Mitchell on behalf of the miners he represents by amicable arrangement.

"The parties on both sides were contesting every inch of ground when the great railway corporations volunteered an advance of 10 per cent of the wages of their employees, and their employees are popularly supposed to be exceptionally well paid and well treated, having regular employment, large relief funds, and in some instances pensions.

"As soon as such advance was announced, it seemed to be taken for granted that, notwithstanding the advance two years ago, a like increase would be now granted the miners, and, the question of wages being out of the way, there was a general feeling in favor of trying to adjust the other differences.

"The first move in that direction was made by the Delaware & Hudson Company. Mr. Wilcox,

its vice-president, and also its general counsel, drafted an agreement which his company was prepared to accept; but it did not prove satisfactory to the other companies.

"While I was still cross-examining Mr. Mitchell, I was asked to meet him and his counsel in conference to make an effort to reach some adjustment of an amicable nature. We discussed the matter in dispute on different occasions, and at great length, and at last, by the invaluable assistance of Mr. E. B. Thomas, the president of the two companies I represent, the basis, as he thought, of a possible adjustment was reached, and when it was submitted to the other gentlemen, who, with Mr. Thomas, had signed the letter requesting the appointment of the Commission, they all concurred with Mr. Thomas in approving it as a basis of negotiations.

"Personally, I earnestly hope such negotiations will result in amicable agreements between the different companies and their employees, for I believe such agreements will be more likely to inaugurate an era of industrial peace throughout the region than a decision by the Commission, but if agreements cannot be framed the Commission stands to decide all matters the parties cannot adjust between themselves."

The representatives of the individual operators—that is, the firms and companies operating collieries outside of those owned or controlled by the transportation companies—held a meeting in Scranton on November 22, and appointed a committee to confer with the large companies. The object is to define the part which these operators shall take in any settlement which may be made, and also to endeavor to obtain some concessions as to transportation rates. This would probably take the place of the existing arrangement under which operators are allowed a fixed proportion of the tidewater selling price on all coal which they deliver to the railroads. They claim that in case of an increase in wages brought about by the action of the transportation companies, they are entitled to some compensation for the increased cost of mining.

THE CALIFORNIA STATE MINERS' ASSOCIATION.

The annual convention of the California Miners' Association was held in San Francisco, November 17, 18 and 19. This year, instead of a representation of one in each ten of membership of respective county miner's association, every member of any county association was entitled to a seat as a delegate. However, this arrangement did not bring out so large a representation at the convention as was expected. In fact the attendance was much smaller than has been usual when the number of delegates was restricted to one in ten from each county association. The reason for this was probably that there was no business of especial importance coming before the convention. That is, no business affecting the general mining industry of the state such as the hydraulic mining question, mineral lands on railroad grants, etc.

However, an innovation was made in the general order of the convention in the direction of reading of technical papers by members. Among these were Compressed-Air Machine Drilling, by Harry P. Stow, superintendent of the Gold Bank Mining Company, Forbestown, Butte County; Petroleum Oil Fields of California, by Dr. C. T. Deane, secretary of the Petroleum Miners' Association; Petroleum as Fuel, by Alfred Von Der Ropp, manager of the Selby Smelting and Lead Company; Use of Crude Oil as Compared with Coal, by A. M. Hunt, general manager of the Electric Light and Power Company of San Francisco; Electric Power for General Purposes in Mining and Milling, by John R. Tregloan, superintendent of the Consolidated South Spring Hill Mining Company, Alador City, Amador County; Construction of Flumes, by William C. Ralston, ex-president of the California Miners' Association and general manager of the Melones Min-

ing Company, Calaveras County; The Preservation of Forests, by A. DeWint Foote, superintendent North Star Mining Company, Grass Valley; Application of Impulse Water Wheels to Mining, by J. G. Henry.

President Wheeler, of the University of California, addressed the convention, and invited the members to attend the exercises at Berkeley, in laying the corner-stone of the Hearst Memorial Mining Building, which invitation was accepted.

The new officers of the association for the ensuing year are: C. M. Belshaw, President; Fred Zeiller, First Vice-President; Louis E. Aubury, Second Vice-President; W. E. Dittmar, Third Vice-President; Edward H. Benjamin, Secretary; Samuel J. Hendy, Treasurer.

Of the papers mentioned, and a few others read by title, 500 copies each are to be printed by the association for distribution.

FRIEDRICH ALFRED KRUPP

Friedrich Alfred Krupp, head of the greatest iron and steel making concern in the world, outside of the United States, and probably the richest man in Germany, died suddenly on November 22, at his villa at Huegel. His health had been poor for some time, but the immediate cause of his death was an attack of apoplexy. The attack is said to have been brought on by distress at a scandalous personal attack made upon him by a Socialist paper in Berlin.

The story of the development of the great Krupp works at Essen has frequently been told. This began under Alfred Krupp, who inherited a small forge from his father, and who at first increased the business to a considerable degree and then, by his discoveries and improvements in the making and working of steel, established a high reputation, and succeeded in securing contracts for work on an extensive scale. His first great success was at the London Exposition of 1851, where he exhibited steel castings and forgings of sizes before deemed impossible. Alfred Krupp was a man of genius, and he brought up his son Friedrich Alfred, with the greatest care to be his successor. From an early age the young man was constantly in the works, and became familiar with every detail of administration and with all his father's discoveries and investigations. After his father's death in 1887 he came into full control of the works. In his management he was highly successful; the growth and development of the business has been uninterrupted. The Krupp Works now include, besides the foundries, forges and steel plants at Essen, coal mines, iron ore mines and other subsidiary enterprises. They employ some 60,000 men in all. While the greatest fame which has come to them has resulted from the manufacture of guns and armor plate, the quantity of general commercial work turned out was enormous.

Although somewhat overshadowed by the fame of his father, Friedrich A. Krupp was one of the foremost living authorities on the science of steel making. He was an ardent experimenter, and indefatigable in pursuing investigations for the purpose of simplifying the processes of manufacture. One of his latest searches in this direction was an attempt to produce a better article of its class than Harveyized steel for armor plate, in which he met a large measure of success. In the spring of this year, at the annual meeting in London of the Iron and Steel Institute, the Bessemer gold medal for scientific research was awarded to Herr Krupp for his discoveries in the manufacture of armor plate.

Herr Krupp was much interested in the welfare of his employees, and did much for their comfort by building houses, establishing beneficial and pension funds, and in other ways. He was personally very popular among them.

While the administration of the works was assigned to twelve directors or managers, each

of whom had his special department, Herr Krupp maintained a strict personal supervision of all, and the work which he himself performed was very great. Notwithstanding this, he found time to take some part in politics. As the richest man and largest manufacturer in Germany, he was naturally a prominent figure in political and social circles, and he was a personal friend of the Emperor. Like his father, however, he steadily refused to accept a title of nobility, which was offered him several times.

SOME BELGIAN COAL STATISTICS.

From reports recently published full statistics of the coal trade of Belgium are attainable up to the close of last year. It appears from these that the coal consumption has been as follows for two years past, in metric tons:

	1900.	1901.	Changes.
Coal mined	23,462,817	22,213,414	D. 1,249,403
Imports	3,702,251	3,156,267	D. 545,984
Total supplies	27,165,068	25,369,681	D. 1,795,387
Exports	7,265,641	6,591,773	D. 673,868
Consumption	19,899,427	18,777,908	D. 1,121,519

In the figures given coke and briquettes are included, being reduced to their equivalents in raw coal. For coke a yield of 73.5 per cent is taken as the average; for briquettes, 90 per cent. The decrease in consumption was chiefly due to a smaller demand from the iron and steel industries.

The average thickness of the coal seams now worked is given at 0.67 meter, or 26.5 inches. The average depth of workings last year was 434 meters, or 1,424 feet.

The year 1900 showed the highest figures ever reported, both for production and consumption. The quantity of coal mined in 1901 exceeded that reported for any year prior to 1901; but owing to smaller imports the figure for consumption was exceeded in 1899.

The average amount per ton received at the colliery and the average cost of production per ton have been as follows for three years past:

	1899.	1900.	1901.
Price per ton at colliery	\$2.40	\$3.36	\$2.95
Cost of coal per ton	2.18	2.65	2.49
Average profit	\$0.22	\$0.71	\$0.46

The average price realized last year, though 41 cents below that obtained during the boom of 1900, was still 55 cents above that of 1899. The cost of production has been increasing for several years, owing to higher wages, to increasing depth of mines and to the working in many collieries of their seams formerly neglected. The reduction in cost last year was secured chiefly by reductions in wages, which have continued this year, and are now causing strikes and labor troubles.

The Belgian coal operators do not concede that the coal measures are approaching exhaustions, or have passed the point of maximum production. During the past two years boring operations have been carried on in various parts of the country. Several of these have been abandoned after reaching depths varying from 700 to 900 meters; but several others have been successful in finding coal at depths varying from 400 to 600 meters. Preparations are being made in several places to exploit the coal seams thus discovered.

TEMPERATURE IN DEEP MINES.—The temperature in the New Chum Railway Quartz Mine at Bendigo, one of the deepest mines in Victoria, was found to be 106.95° Fahr. at a depth of 3,645 feet. The Government metallurgist, who has been collecting data for some time past in reference to rock temperature, reports that it may now be definitely stated that the increment of temperature with increasing depth at Bendigo is at the rate of 1° F. in about 80 feet from the surface to a depth of at least 3,700 feet. The probable error is about 0.5 per cent.

NOTES FROM THE ATLIN DISTRICT, BRITISH COLUMBIA.

By W. M. Brook.

I left Atlin, British Columbia, October 3; navigation closed this year on the lakes and on the Upper Yukon about November 3. The Atlin District produced this past (mining) season over \$500,000 in coarse gold. There have not been more than 800 miners employed.

The official statement will be ready for publication possibly by another month. The increased (gold) production this year was due to

while I was in Atlin, Mr. Melwin, the superintendent of the above-named mine, delivered in Atlin, from his weekly clean-ups, gold dust which gave the mine an average of over \$1,000 per day. This demonstrated the accuracy of De Lamare's estimates furnished one year ago. Superintendent Melwin tells me that their operations have been greatly retarded by the tailings from individual miners above them. About 150 miners have been engaged in hand-slucing on Upper Boulder Creek.

The Pine Creek Power Company, under the management of F. T. Blunck, of Davenport,

Steam hoists and centrifugal pumps are being used successfully, and several more will be shipped in next year.

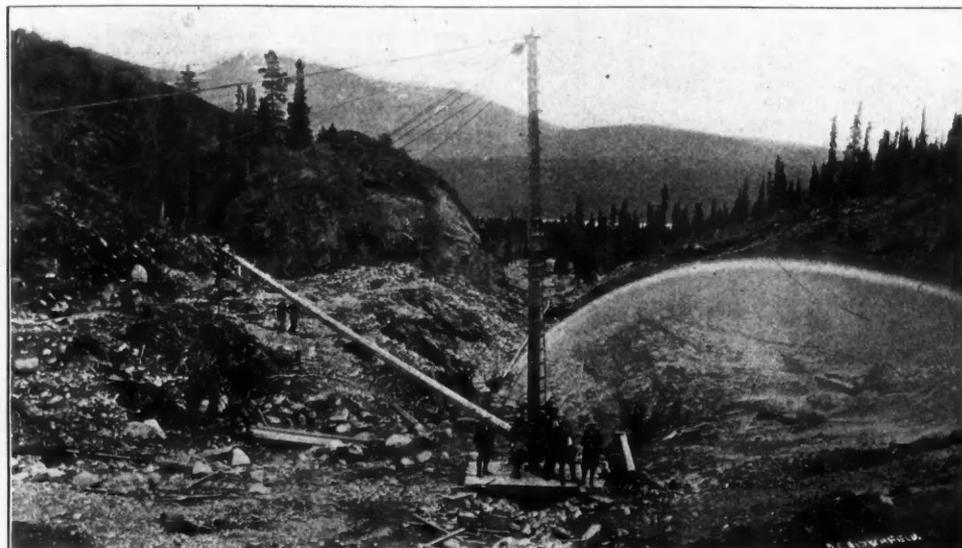
J. F. Deeks, of Toronto, has a large tract of rich placer ground on Pine just above the extensive properties under control of the Pine Creek Power Company. Mr. Deeks has made some big clean-ups this year. In September he had a large force of men at work constructing a ditch conveying about 1,500 miners' inches of water from Surprise Lake, the source of Pine, along the benches of the stream, which is for the purpose of supplying the Gold Run miners and his own claims. The ditch will be about 4 miles long.

R. D. Featherstonhaugh, general manager of the Nimrod Syndicate, of London, England, in which company Lord Ernest Hamilton is heavily interested, has hydraulic mines on McKee Creek. Mr. Brewer has given the JOURNAL a very good description of this mine in a former article. This season's work has yielded the company over \$40,000, giving them very good profits, especially when it is to be considered that the mine was just started last year.

Messrs. Christopher & Hawkins have a large area of rich placer ground on McKee Creek, just below and on both sides, joining the property of the Nimrod Syndicate, which will be worked next year.

Some hand sluicing was done on McKee above and near discovery claim. The miners have made very good wages. A half ounce to 2 ounces per day to the man was not an uncommon thing.

In speaking of McKee Creek, I find from investigation that the main pay streak where the heaviest gold is found, runs through and under the bench claims, this being shown by prospects in a tunnel running in 100 feet under the bench from the creek; and when those benches running parallel with the creek are fully developed and worked an output of gold far in excess of anything produced in the present workings of the creek will be realized. This property for over 3 miles is owned by Christopher & Hawkins, who have a plant now on the ground ready to be installed



DE LAMARE'S HYDRAULIC MINE, BOULDER CREEK, ATLIN, B. C.

the hydraulic mines on Boulder, Pine and McKee creeks. Last year companies operating on these streams were installing their improvements and opening up their mines.

The statement given below from Count E. Janne De Lamare, of Paris, France, general manager of the Societe Miniere de la Colombie Britannique, De Lamare Syndicate, on Boulder Creek, Atlin, B. C., was furnished me one year ago, when I visited this valuable property and saw their immense pay streak exposed.

"The bed rock had been struck September 25 last on the hydraulic property of the De Lamare Syndicate, at a depth of 45 feet. The season was too late and the water supply too low to realize on the excellent prospects. But there is satisfaction in knowing exactly upon what the company will begin operations next spring.

"The pay on bed rock from panning goes as high as \$5 to the pan, and the gold is very coarse. The bed rock layer of the pay gravel taken from a shaft of 18 feet deep sunk in a tunnel 50 feet west of the flume, and in the supposed center of the creek channel gave from \$40 to \$50 to the cubic yard. The 12-foot thickness of pay gravel is therefore estimated to yield not less than \$15 to the cubic yard, a figure that promises to place this proposition among the first rank once the point is reached, from which the whole pay streak can be piped into the sluice-boxes.

"The intention of the company is to sink to bed rock in the channel some 500 feet lower down stream than the face of the present workings.

"From this point of commencement drift will be run to work out the intervening pay, the grade at its disposal not permitting this initial portion of the ground to be otherwise worked.

"These operations will commence now and go on all winter.

"The season work of this property has been largely of a preparatory nature, the results from which have proved highly satisfactory the successful development of the proposition along the lines adopted this year being assured."

During the month of September, this season,

Iowa, has made a very good showing this year from their hydraulic mines on Pine. From 30 to 50 men were employed by this company all season. They are using 3,000 miners' inches of water under 140 to 60 feet of fall for pressure.

There are very few individual miners left on Pine Creek. On Willow and Gold Run, both



FLUME FOR CONSOLIDATED SPRUCE CREEK PLACERS, ATLIN DISTRICT, B. C.

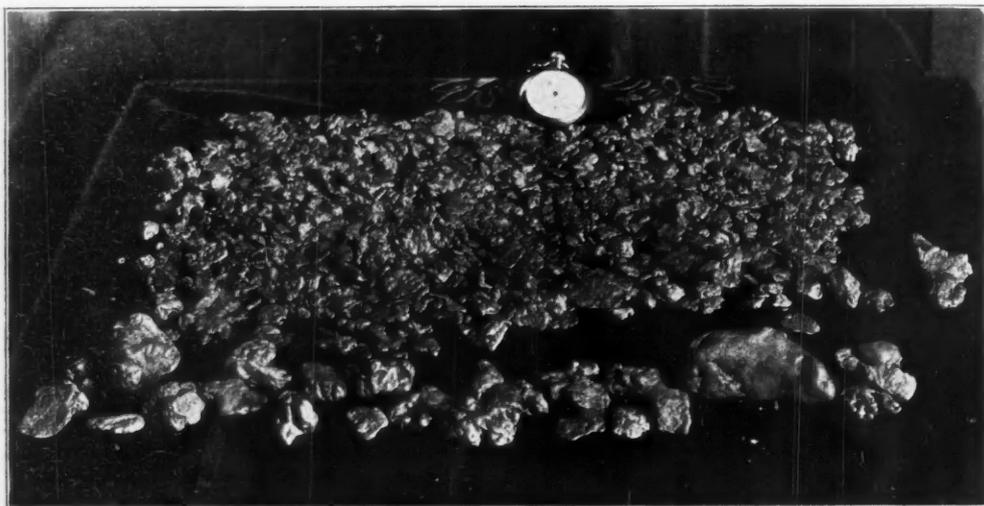
parallel channels, forming part of the Pine pay streak, there are a number of miners engaged in hand sluicing. On the latter channel it is from 30 to 35 feet to bed rock. The miners have experienced considerable difficulty in working this ground, because of water leaking into their shafts.

early in the spring, soon enough to catch the first early water, they having already graded their supply flume, which will enable them to make quick work for spring. This will add another valuable producing mine to our district.

The most extensive area of rich placer ground

in the Atlin District may be found on Spruce Creek. There has been a great deal of development work done on this stream during the past season, covering a distance of 12 miles, with very satisfactory results.

The Columbia Hydraulic Mining Company is operating on Spruce above Discovery claim. Their improvements have cost \$75,000. This is a Chicago company. Senator Mason is president and A. A. Johnson general manager. They have completed the installation of a modern hydraulic plant, and the manager reports that the mine is



SOME SPECIMENS OF ATLIN GOLD.

now on a paying basis. Their main pipe line from pressure box is 30-inch heavy steel, with 40-inch intake and 200 feet of fall for pressure.

On this part of the creek referred to where the company began to operate there was a large mass of huge boulders. In order to get a good dump and start the bed rock flume on sufficient grade the boulders had to be removed. The Columbia Company has had in operation all season one of the largest derricks in the North. It is manufactured by Hendee, of San Francisco. Capacity, 10 tons. The derrick has given perfect satisfaction; it is operated by a 3-foot hurdy-gurdy waterwheel, using 40 miners' inches of water under pressure. When in use boulders weighing from 1 to 8 tons were moved with a 66-foot boom every three minutes.

Below Discovery claim on Spruce the Consolidated Spruce Creek Placers, Limited, Seattle, Wash., has control of 4 miles of the creek, where most of the gold from the stream has that far been taken. Charles L. Denny, of Seattle, is president of this corporation, and W. M. Brook is the general manager. This company has been acquiring more rights on the creek this year, and preparations are being made for the construction of a modern hydraulic plant giving the mine a capacity of 3,000 to 4,000 cubic yards per day. The average length of the mining season is 140 days.

Mr. J. H. Brownlee has incorporated a company with \$100,000 capital to work Otter Creek ground. Some \$10,000 worth of mining machinery has been secured, and it is being moved on the property. Next season this new company will have a hydraulic plant in operation, using 12-inch, 14-inch and 16-inch pipe under 200 or more feet of pressure, piping down gravel banks where several thousand in coarse gold has been washed, averaging better than \$1 per cubic yard.

Mr. Switzer, manager of the British American Dredging Company, has formed his company in Philadelphia with \$2,000,000 capital with the intention of operating machinery on their Pine Creek Placer ground. Mr. Robinson, representing the Eastern stockholders, was in Atlin this year looking over the property with the engineer. He expressed himself as being highly pleased with their prospects.

Considerable attention has been given to the development of quartz claims in our district. On Pine Creek J. M. Ruffner has had under bond this year the Rock of Ages from Dr. H. B. Runnals, of Skaguay, Alaska, and associates. Thirty tons milled from a 60-foot shaft on this claim averaged over \$12 per ton.

Mr. Ruffner and partner, E. N. Banon, are doing development work on the Yellow Jacket claim just above the Rock of Ages, preparatory to the erection of a stamp mill next year.

Herbert P. Pearse, late general manager of

this mine has been held by citizens of Skaguay, Alaska.

Mr. J. A. Fraser, the New Gold Commissioner, is proving himself to be well qualified to fill the position. In order to promote the general welfare of the miners and encourage legitimate mining, protecting the titles of those who have rights granted by the Government, Mr. Fraser is sparing neither time nor energy. In the long run, this policy will insure to the Provincial Government the largest revenue.

The White Pass & Yukon Railway has given the Atlin miners very good service this year. The fare to Skaguay has been reduced to \$20, with an occasional excursion rate of \$12. The fare from Seattle to Skaguay, Alaska, is \$30 first-class, including board and stateroom on all the steamship lines. Freight rates on mining machinery from Seattle to Atlin, \$60 per ton by weight.

There was a scarcity of miners in Atlin this last year. Wages range from \$3 to \$5 per day and board.

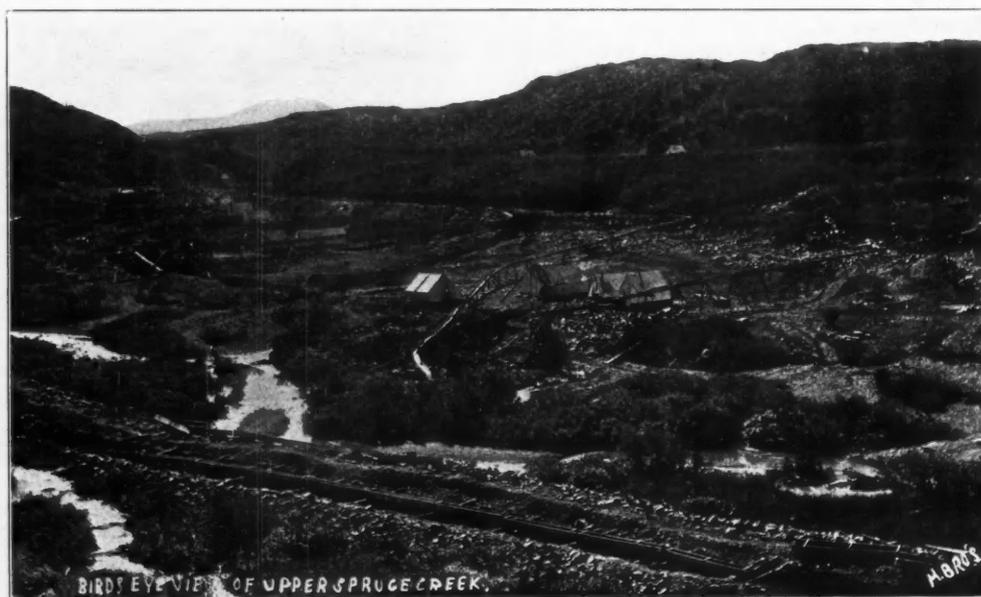
Because of sharp competition between the Atlin Lake Lumber Company and Dr. Troughten's mill rough lumber was sold this season for \$20 and \$25 per thousand. This reduction has been of great service to the miners of the district.

Mr. McGee, discoverer of McKee Creek, has made a new discovery some 40 miles or more distant from Atlin eastward on a stream flowing into the Taku. This creek has been described to me by one of the party as being as large as Pine. Prospects from \$3 to \$5 to the pan have been already found. Mr. McGee had 3 tons of provisions moved over half-way to the new strike when I left in October. No locations had been recorded, and only a few had knowledge of the discovery. It is quite possible that Juneau, Alaska, will profit by this discovery because the Taku route can compete with the White Pass for the business of the new district.

CONDITION OF METALS IN LEAD SLAGS.—Dr. M. W. Iles, in his treatise on Lead Smelting, page 32, states that experiments with slags from the lead blast furnace led to the conclusion that zinc ex-

the Pilbarra Gold-fields, Limited, Western Australia, is manager of the Imperial Mines in Atlin on Munro Mountain. I was in their 600 feet of tunnel and cross-cuts, and saw veins of free milling quartz exposed. Mr. Pearse has a 5-stamp mill located nearby to prospect the mine. He states that the quartz averages about \$10 per ton. He seems to be well satisfied that they have a sufficient body of pay quartz to justify the erection of a 10-stamp mill. He will want this machinery next year.

On the Engineer Group of mines, 20 miles dis-



VIEW ON UPPER SPRUCE CREEK, ATLIN DISTRICT, B. C.

tant from Atlin southwest on Taku Arm, a 10-stamp mill is being put up. W. B. King, assistant auditor, White Pass Railroad, is president; Mr. Gard, secretary. There is a big vein of ore exposed by the tunnels and cross-cuts. I have seen the assay receipts from several tons of ore treated, and from these returns I am satisfied that this is the most valuable quartz property being worked in Atlin. A majority of the stock in

ists in them chiefly as silicate, a small percentage occurring as sulphide, partly free and partly combined with other sulphides. Lead occurs as metal, as silicate and as sulphide. Oxidation of the sulphide produces some sulphate, which gives rise to the white fume so commonly noticed. Silver exists in the slag as a constituent of entrained matte. Numerous experiments showed that silver cannot exist in slag in the form of silicate.

PROBLEMS OF LABOR AND LIFE IN ANTHRACITE MINING.

BY FREDERICK L. HOFFMAN.

II. Social and Economic Conditions.

An accurate view of the conditions of life in the anthracite coal-fields can be obtained by various methods of inquiry, but the most useful yet devised is the family budget. Through a special blank sent to a large number of heads of families the essential facts of family life are brought into comparison or contrast. This method has been successfully made use of in numerous investigations, but to special advantage in the *Sixth and Seventh Annual Reports* of the United States Commissioner of Labor on the Cost of Production. In this investigation family budgets were collected for 5,284 families of persons employed in the textile and glass industries, and for 1,244 families of persons employed in the iron, steel and bituminous coal industries. On the basis of facts thus brought together it is possible to prove, with reasonable accuracy, the actual status and reward of labor in the various industries, and similar facts should be collected for labor in anthracite mining to determine whether "the annual earnings of the mine workmen are insufficient to maintain the American standard of life."

It is primarily the purpose of such investigations to determine the *total family income* and the *various items of family expenditures*. Nominal wages do not represent the family income, for in industries in which wages are low the income is usually materially increased by the labor of women and children. The problem is complicated by the varying conditions of family life, for a family without children may live in comfort at wages which prove insufficient for one in which children are quite numerous. Nativity is another factor of material importance, since the personal requirements for food, clothing, intoxicating liquors, etc., vary considerably with different nationalities, and this factor was duly taken into account in the investigation of the United States Bureau of Labor Statistics.

On the outset of any investigation into the social and economic condition of labor in anthracite mining it will therefore be necessary to ascertain *the elementary facts of female life*. The unit of investigations of this kind is the family, and it is necessary to ascertain the present age of the head of the family, the number of years at work, the duration of present employment, the present occupation, the present state of health, the conjugal state, and if married, the number of children, their ages, and whether at home, at school or at work. In addition, it is necessary to know the nativity, and if of foreign birth, whether a citizen, a declared citizen, and whether able to speak and read English. Most of these facts are known for other industries, and this information should be available for anthracite labor.

The *average annual family income* as determined by means of a special inquiry shows how far the actual needs of family life are met by supplementary earnings of women and children. It is shown, for example, by the *Seventh Annual Report* of the United States Commissioner of Labor that while the average income of the head of the family was \$400 in the textile industry the actual average income of the family was \$658. In the glass industry, however, the average income of the head of the family was \$778, while the average income of the family was \$860. What the corresponding facts are for the anthracite mining industry we at present do not know, but it is evident that the average family earnings are a far more determining factor than the average earnings of the head of the family only.

The *size of the family* and the family income bear a very definite relation to each other. The *Seventh Annual Report* of the Commissioner of Labor exhaustively considers this point, and shows conclusively how intimately the elementary facts of family life are related to family earnings

and the resulting economic conditions. While in the textile industry, in which most of the workmen are foreign-born, the average size of the family was 5.5, in the glass industry, where most of the workmen are native-born, the average was only 4.8. The effect of this difference is set forth by the statement that the amount of income per individual to be provided for with food, shelter, etc., was only \$120 in the textile industry as compared with \$178 in the glass industry.

Evidence of Economic Well-being.—Of the many elements by which it is possible to determine the economic status of labor, house-ownership is perhaps the one usually most relied upon as proof that the reward of labor has been adequate. For the glass industry it has been shown that almost 27 per cent of the families owned their homes against 16 per cent for the textile industry. With regard to those who rented their homes, it was shown that the larger families of textile workers occupy, on an average, 4.9 living rooms, with 4.8 for the smaller families of glassworkers, hence the actual amount of house room was less for the former than for the latter. The average rent paid by textile workers was \$78 per annum against \$110 paid by glassworkers. This evidence of the superior economic conditions in the glass industry is quite conclusive, and seems to prove that where the earnings of the husband have to be supplemented by the wages of women and children the resulting economic condition is not as satisfactory as where the main reliance is the income of the head of the family. In this respect it is probably true, as has often been asserted, that woman and child labor is rather the cause of low wages than the effect. It would be of the greatest value to have corresponding data for the anthracite industry.

Contrasted Incomes and Family Expenditures.—If we contrast the total family income with the total family expenditure as determined by means of family budgets we arrive at the margin or surplus earnings representing the savings or investments by means of which a higher degree of economic security can, in course of time, be attained. In the *Seventh Annual Report* of the Commissioner of Labor a tabular statement is given, showing for a number of industries the surplus remaining of the total family income after the payment of expenditures for all purposes. In the glass industry this margin is represented by \$90.58, in the woolen industry by \$69.04, in the cotton industry by \$47.15, and in the bituminous coal industry by only \$25.59. This statement of fact determined by means of a very careful inquiry is one which would seem to conclusively prove that the economic condition of labor in bituminous mines is far from being as satisfactory as the conditions in the textile and glass industries. For the purpose of proving whether anthracite labor is really in an inferior economic position it is absolutely necessary that similar evidence should be collected and brought into comparison or contrast with the established facts regarding other industries.

Family Expenditures.—The average annual family income having been determined, it is not difficult to arrive at the principal items of family expenditure. Generally speaking, five principal items are considered, namely, rent, food, fuel and light, clothing, and all other purposes. A more detailed analysis was made in the *Seventh Annual Report* of the Commissioner of Labor, and also in the *Thirty-second Report* of the Massachusetts Bureau of Labor Statistics. The essential facts are set forth in tabular form, which shows for three principal industries the actual amounts expended per annum for various items.

This table is readily understood, and, on the whole, represents present conditions with approximate accuracy. It is shown that the difference in economic status is rather in the amount of family expenses for other purposes than the absolute necessities of life, in that actually and

proportionately more is spent for amusement and vacation, labor organizations, liquor and tobacco, etc., among those who have large incomes than among those who have small ones. But even for rent and food the differences are quite marked,

Average Annual Family Expenditures.
(Seventh Annual Report of the U. S. Commissioner of Labor.)

Expenditures,	Families of Persons Employed in		
	Industry	Coal Min.	Bitum.
Rent	\$109.57	\$72.58	\$61.19
Food	294.75	287.06	237.44
Fuel and Light	31.58	40.95	19.99
Clothing	134.20	107.40	112.10
Taxes	10.36	5.43	5.19
Insurance, Property	6.97	6.47	3.66
Insurance, Life	20.25	20.22	15.45
Organizations, Labor	20.47	6.06	5.24
Organizations, Other	8.95	6.60	8.07
Intoxicating Liquors	54.84	15.98	18.09
Tobacco	12.86	10.48	9.30
Religion and Charity	16.90	13.09	11.35
Books and Papers	9.14	5.35	5.30
Amusement and Vacation	28.66	9.36	10.68

and conclusive evidence of the inferior social and economic status of the bituminous coal miners when compared with glassworkers or persons employed in the cotton industry. The actual and relative *normal family expenditures* under reasonably satisfactory conditions are set forth in the following table, which has been abstracted from the *Thirty-second Annual Report* of the Massachusetts Bureau of Labor Statistics:

Normal Family Expenditures in Massachusetts.
(Average Annual Family Income \$847.)

	Amount.	Per cent.
Food	\$469.32	55.4
Clothing	108.48	12.8
Rent	105.22	12.4
Fuel and Light	48.13	5.7
Care of Health and Insurance	40.11	4.7
Education, Religion, Societies	35.82	4.3
Sundry Expenses	39.75	4.7
Total	\$846.83	100.0

This table is derived from 152 family budgets of workingmen's families representing different industries in Massachusetts. It may safely be accepted as indicative of the American "standard of life," and in just so much as the actual conditions of labor in other industries fall below this standard the status must be considered unsatisfactory and defective. Of course, due allowance must be made, and generally is made, in comparisons of this kind for the difference in cost of living in different sections of the country, as, for example, in the cost of fuel and light, which is almost \$50 for Massachusetts families against \$20 per annum for bituminous coal miners. Generally speaking, however, this table will serve as a standard by which the relative conditions of family life in the anthracite region may be properly determined.

The Cost of Living, while, in a measure, indicated by the above table is, however, a very complex matter demanding special consideration. Of course, this factor is duly considered in the family budgets, and it is shown just how much is expended for each item. In this manner the local variations in the cost of food, fuel, etc., are accurately set forth, and due allowance can readily be made for a lower wage scale as influenced by a lower cost of primary family needs.

The Quality of Food and Its Nutritive Value.—It is only in recent years that efforts have been made to really determine what is meant by the so-called "American standard of life." This standard can only be determined by means of family budgets analyzed in a thoroughly scientific and consequently more satisfactory manner. It is manifestly not so much a question of actual food consumption and its cost, as of the proper nutritive value of the food consumed, and its equivalent in fuel energy. It cannot be too emphatically stated that only by means of family budgets giving actual items of food consumption and its cost can the real standard of life be determined. All other methods, of crude analysis, are merely guesswork, and very often radically misleading. Such an investigation as is here suggested for anthracite coal miners and their families has been made for negroes in Alabama, for Chinese of New York and San Francisco, and for the poor

of many large cities. These investigations have been conducted under the direction of Prof. Atwater, through the office of Experiment Stations connected with the Department of Agriculture. It would seem only proper that such an investigation should be made as to the dietaries of families who derive their living from the anthracite industry, and in this manner it could be ascertained whether the standard of life is really as has been claimed, below the average, and un-American.

The most accurate method of stating the amount of food required is in terms of protein and potential energy. Numerous investigations have been made by Prof. Atwater and others to determine just how much food is required under different conditions of industry, and for men at heavy labor the standard is set at 4,500 calories. European standards are below the American in this respect for, as Prof. Atwater points out, "to make the most out of a man, to bring him up to the desired level of productive capacity, to enable him to live as a man ought to live, he must be better fed than he would be by these (European) standards. . . . The principle (he adds) is one that reaches very deep into the philosophy of human living." This, then, is the standard of American life, and accordingly a man of heavy labor requires each day food equivalent to 4,500 calories of fuel energy. The proportionate amount of food required for other members of the family, for women and children at work, etc., is arrived at by the means of equivalents adjusted to age, sex and personal condition. In this manner it is shown after a careful analysis of the food consumed whether the nutritive value of the same is sufficient for individual needs. By means of such an investigation and analysis it was shown by Mr. Rowntree, for the city of York, England, that the food for the laboring classes of that city was "seriously inadequate," and that "indeed the laboring class receive upon the average 25 per cent less food than has been proven to be necessary for the maintenance of physical efficiency." In fact, it was proven that in most cases the honest poor received less in nutriment than the idle paupers.

Aside from information to be obtained through family budgets, data of considerable value are furnished by the general statistics of economic progress, which are more readily available. Thus, for example, the statistics of savings banks in the anthracite region would, without doubt, furnish some evidence as to whether the material progress of anthracite cities has been more or less than that of cities in other parts of the State of Pennsylvania. To illustrate, nine savings banks in Scranton, Wilkes-Barre and Pittston have increased their deposits by a little more than \$9,000,000 during the nine years (1892-1901), a growth equal to 85 per cent, which compares favorably with the increase in the population of Scranton of 34 per cent, and of Wilkes-Barre of 37 per cent during the 10 years, 1890-1900. We do not know how much of this accumulation belongs to anthracite labor nor to labor in general, since savings banks are quite frequently made the depositories of the well-to-do. Special inquiry would be necessary to ascertain, through the courtesy of the bank officials, the occupations of the depositors, particularly of persons employed in or about the mines.

Another evidence of progress in material well-being is furnished by the statistics of building and loan associations. The remarks regarding savings bank deposits apply equally to this method of thrift, and it would be necessary, of course, to ascertain the occupations of the borrowers and investors to determine how far anthracite labor has shared in the probably considerable progress which has been made by these institutions during the past 10 years.

The mortgage indebtedness and the number of chattel mortgages recorded during a period of years would be a useful addition to a collection of

facts regarding the social and economic condition of anthracite labor, but past experience has proven it a rather difficult task to obtain this information except at considerable expense due to the necessity of transcribing the original records. The statement frequently made as to home ownership is subject to the criticism that it is not known how far the homes are actually owned or represent mere nominal possession, since the mortgage on the property may cover most of the value of the house and lot. Thus the statement that 1,890 of the employees of the Lackawanna Company own their houses, and that the combined value of their property, free from the charge of mortgages, is \$802,400, remains to be qualified by further evidence as to the actual amount of mortgage indebtedness remaining. As the statement stands, the average value of the homes thus owned, free of incumbrance, is \$425. It is therefore probable that the average mortgage indebtedness is not less than \$500 to a house.

The progress of fraternal benefit organizations and life insurance companies might also be advantageously taken into account. It was shown by the Sixth and Seventh Annual Reports of the United States Commissioner of Labor, that of the families of bituminous coal miners, only 3.3 per cent paid life insurance premiums, while of the families of glassworkers 30.3 per cent paid for this method of family protection. Bar iron workers paid \$24.70 per annum for life insurance premiums, while bituminous coal miners paid only \$15.45. In other words, it would be interesting to learn how anthracite miners compare with bituminous miners and persons employed in the iron and steel, textile and glass industries. It would, perhaps, be somewhat difficult to obtain information as to the membership of fraternal organizations and of the actual extent of life insurance, since reports to the Insurance Department are not for the State as a whole. In addition, inquiry might be made as to employee's insurance funds, pensions and employee's savings funds which have been established by some of the coal mining companies.

Indirect evidence of the social and economic condition of labor in the anthracite region is available through the published statistics of cities, to be supplemented by a more detailed inquiry. Thus the frequent charge of lawlessness and violence during the labor disturbances in the anthracite region should, in a measure, be confirmed or disproven by the evidence available regarding conditions during normal periods. It is of interest to note from the annual statistics of cities, published under the direction of the Commissioners of Labor, that the per capita annual cost of the police department, including police jails, workhouses, reformatories, etc., was \$3.20 for Philadelphia and only 70 cents for Wilkes-Barre and 60 cents for Scranton. In contrast, the per capita expenditure was \$2.49 for Philadelphia, \$2.77 for Wilkes-Barre and \$3.06 for Scranton. Corresponding data regarding pauperism are at present not available; nor are the statistics readily at hand as to the annual number of arrests and convictions for drunkenness, for crimes against the person, etc., but such data should be collected with special reference to the occupation and nationality of the offender to ascertain whether crime and violence during normal periods is more common in the anthracite regions than in other sections of the State of Pennsylvania. The extent of pauperism in the anthracite regions is at present unknown. Annually a large number of fatal accidents and serious injuries deprive miners' families of their support and men of their livelihood. It would be of value to know how far the public burdens are thus increased, and to what extent public support is necessary to provide for the needs of surviving widows and children. Information should be collected as to children in orphan homes or other institutions supported by the State, whose fathers were killed through min-

ing casualties. In about 48 per cent of the fatal accidents in anthracite mining a widow is left with an average of three children. During the 16 years ending with 1899, according to Mr. Roberts, fatal accidents in anthracite mining caused the death of 3,032 married men, leaving that many widows with 8,902 children to provide for. It would be of value to know what provision has been made for these widows and children, and how many of these unfortunates have become public charges. Since the average age of the killed is only 32 years, most of the women become widows at an age when the children are mere infants and their proper support must needs be a difficult problem. At present we know practically nothing as to this, the most tragic aspect of life in anthracite mining.

Evidence should also be collected as to the number of paupers in almshouses, by age, occupation and nationality, to ascertain whether the rewards of labor in anthracite mining are sufficient to prevent the necessity of public support in old age. Such information would go far to set at rest doubtful points of controversy and determine whether the earnings are really sufficient to provide for proper maintenance of the family and support during illness and in old age.

Finally, the problem of child labor should be thoroughly investigated. It has properly been said that the children form the most valuable asset of the State. It will not be at all difficult to arrive at the facts by means of carefully made measurements of the height and weight and other bodily proportions of the children at work. While this would only establish one set of facts, it would go far to determine by comparison with the established standards, whether as the result of labor in the breakers and otherwise the children of anthracite miners are really injured in bodily development and physical well-being by being put to work at an early age. Evidence as to the age of such children is generally misleading, but a qualified physician would not have much difficulty in determining whether a child presents evidences of inferior bodily development resulting from the occupation. This question has never been scientifically investigated, much as has been written on the subject from sentimental points of view. There can be no question but that during the period of physical growth a child should not be kept at work more than a few hours per day, and with sufficient interruptions to avoid the depressing effects of monotonous toil. It is conclusively proven that occupations are unhealthful, and that men are short lived almost in exact proportions as they commenced factory work at too early a period of life. Most of the arguments against child labor are based on the highest considerations of good citizenship and the future of the race. Children deprived of light and air, exposed to dust, and at work underground, must needs suffer bodily injury if such work is carried to excess.

MINING IN TURKEY.—A company has just been formed in Venice, Italy, with a capital of \$300,000 to carry on mining in Turkey.

MINERAL IMPORTS AND EXPORTS OF SPAIN.—The imports of fuel into Spain for the nine months ending September 30 included 1,581,414 tons of coal and 126,814 tons of coke. Exports of minerals are reported by the *Revista Minera* as below, in metric tons:

	1901.	1902.	Changes.
Iron ore	5,064,980	5,540,545	I. 475,565
Copper ore	778,970	737,025	D. 41,945
Zinc ore	54,620	61,548	I. 6,928
Lead ore	2,554	2,493	D. 61
Pyrites	305,071	336,377	I. 31,306
Salt	240,701	207,983	D. 32,718

Exports of metals included 30,543 tons pig iron, against 20,282 tons in 1901; 15,545 tons copper, against 12,603 tons; 1,494 tons spelter, against 1,818 tons; 127,445 tons lead, against 106,017 tons last year.

HOISTING FROM GREAT DEPTHS—I.*

By HENNER JENNINGS.

The gold on the Witwatersrand is contained in beds of conglomerate composed for the most part of quartz or siliceous rounded material. There are several series of beds, but the one in which most gold occurs is known as the Main Reef Series, which is divided into several bands. This series, as worked, shows on an average two beds justifying exploitation. Their distance apart varies from a few feet to 200 feet. The thickness of a payable reef varies from a few inches up to 12 feet. As an average, it may be considered that the two reefs will give a width justifying stoping of, say, 8 feet.

These beds have been traced for a great lateral extent, the distance from Randfontein to Modderfontein along the line of strike being 53 miles. The section which is considered most reliable, and in which one profitable mine follows another almost without a break, is between the Lang-

the Central Section alone a profit of \$4.20 per ton.

Working at great depths is handicapped by the following:

1. The great length of time necessary to make the ore deposit interest producing.
2. The liability of encountering temperatures detrimental to economical working.
3. The danger of encountering great quantities of water, and the extra cost of pumping.
4. The extra cost of hoisting ore, men and materials.

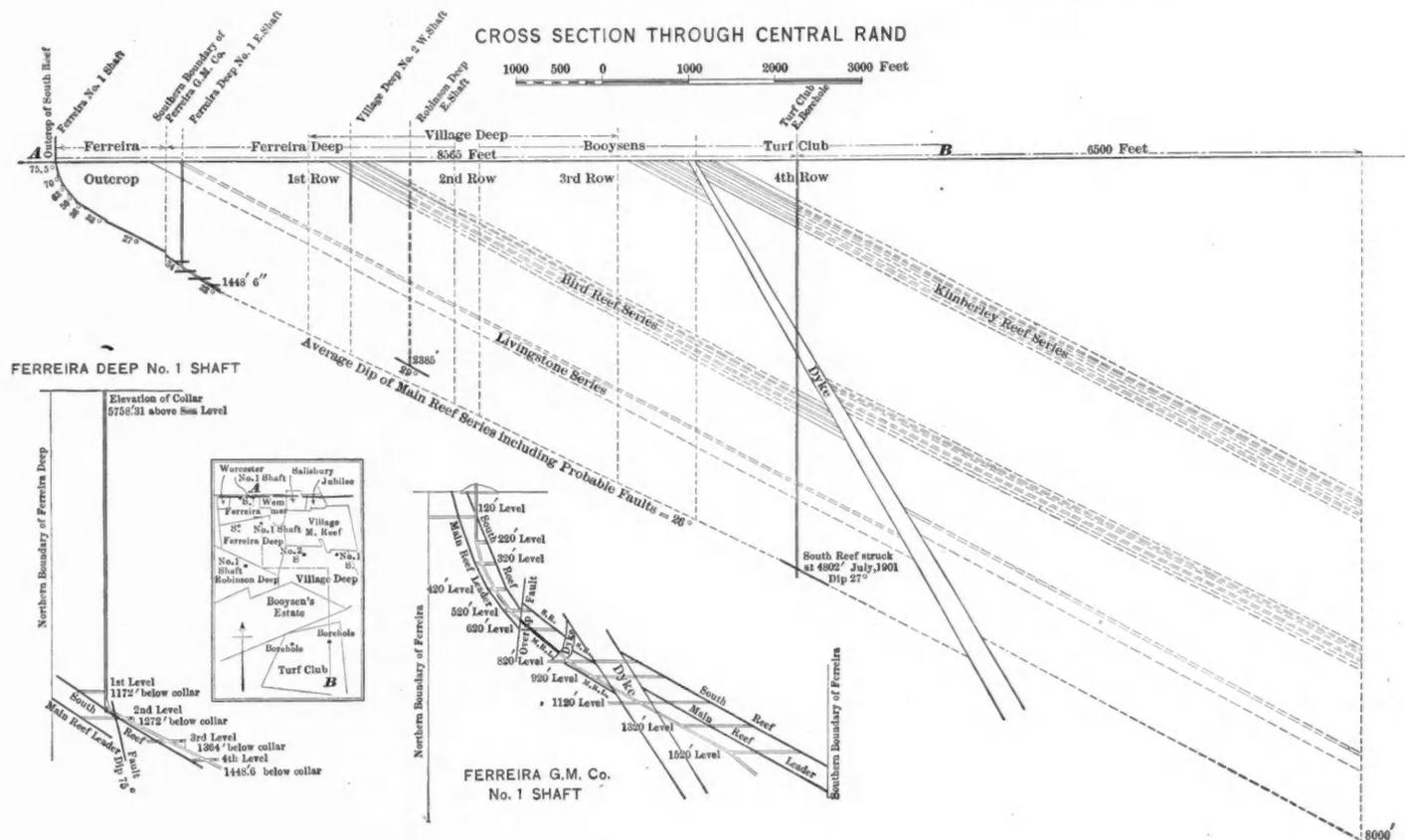
The first factor is pertinent to this discussion; it is clear that no delay must occur from inefficiency of the winding plant, and that a system of sinking must be adopted which will insure the greatest speed; for it must be remembered that the sooner the treasury is unlocked and made interest producing, the more valuable will it be, and thus, even at the expense of greater cost, every possible effort should be made to reach the reefs as soon as possible.

ing plant in an emergency. Certainly, the two-stage system of hoisting is very deficient in dealing with this problem, which makes it almost imperative to use the single stage where possible.

It is self-evident that the sinking of large deep-level shafts and equipping them with the necessary pumping, hoisting, air and electric power require very large outlays, and that the fewer such shafts a company possesses—the company at the same time commanding the working of extensive areas—the more profitable will be the venture.

By examining a plan of the Witwatersrand Gold-fields, it will be seen that the average companies have a claim area of about 185 for parent or outcrop companies; 216 claims for the first row of levels, and 291 for the second row.

The tonnage that a claim will produce is not dependent on its area of 60,000 Cape square feet, but also on the dip of the reef, its width, and its freedom from dikes, faults and barren ground. We shall assume, for an average milling



laagte Estate on the West and the New Comet on the East, a distance of 15 miles.

The total amount of gold produced from the start of the Fields up to the outbreak of the war, from the Main Reef series alone, can be estimated at \$340,725,000 (out of a grand total for the fields of \$388,500,000), of which 80 per cent can be taken as from the Central Section above mentioned. The average yield is shown at \$10 per ton. The total amount paid in dividends is \$86,233,000 (of which the Central Section has produced 91 per cent) equal to \$2.52 per ton; the Central Section alone, however, shows \$3.06 per ton paid in dividends.

Working expenses in the early history of the fields were very much higher than they should be in the future, the earlier accounts showing expenses as high as \$12 to \$15, whereas the monthly returns given by 56 companies for 1899 indicate an average working cost of \$6.50 per ton. Consequently, judging from the past, and assuming an equal yield for the future, a deep-level proposition would have as a basis for estimation, for moderate depths, a deposit capable of yielding an average return in profit of, say, \$3.50 per ton. For

Factor No. 2 has no direct, but an indirect, bearing on the subject of winding plants, through ventilation. It is, of course, desirable to minimize the temperature underground by bringing large quantities of cooler air from the surface. This factor would thus enter into the proportion and size of the shafts to be adopted in connection with deep winding, and it is obvious that the system of winding which least impedes ventilation will be desirable; also the necessity of having very large chimneys (shafts) to insure ventilation will give greater latitude in planning the number and size of engines to be employed.

Factor 3 has a most decided and vital bearing on the designing of hoisting plants; it is considered by many competent engineers that a well-balanced hoisting engine can raise water through a straight shaft from great depths at almost as low cost as any pumping plant that has been designed. It is also most vital for these fields on account of the existence of acid water—some mines—such as the Robinson—have suffered such inconvenience on this account, by corrosion of pump valves, chambers and pipes, that they, even now, are making preparations to handle their water in this manner. It is also an enormous advantage, in connection with the sudden inflow of water, to have a system which will aid the pump-

basis, \$30,000 tons per claim, allowance being made for sorting, faults, barren ground, etc., and a dip of 26°.

A typical section of reef in the central portion of the Rand shows that the existence of the reef has been tested by the Turf Club borehole to a depth of nearly 5,000 feet; that the horizontal distance from the outcrop to this borehole is 8,565 feet, and that the average dip of the reef from the apex to the point where it is intersected by the borehole is 29°, but estimating the dip from lowest workings shown in the Ferreira Deep shaft to the bottom of the borehole, the inclination of reef is seen to be about 26°.

With these facts before us, the question to be settled are what is the most advantageous area for a very deep level company, and what demands will be made on hoisting engines which are designed to exploit it, that is the output required from them.

The first condition for a very deep level company is that it should have shafts capable of exploiting and ventilating its mining area, and thus be self-contained, and that it should make the maximum use of its costly vertical shafts. Thus we will assume two shafts, and state that it is practicable to join them expeditiously when 3,000 feet apart. Approximately 600 claims cover the

* 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.

dimensions of a block of ground which the writer considers desirable and feasible to work by two deep shaft levels of a maximum depth, say, 5,500 feet, and large permanent inclines extended on the average dip of the reef, but not following its faults and sinuosities. In connection with these main inclines it will also be necessary to have three subsidiary inclines, which need only be equipped with light hoisting machinery to command a depth of, say, 500 to 1,000 feet, as at each 1,000 feet the engines can be lowered. Trimming to the main incline shafts from the subsidiaries can also be done mechanically. The subsidiary inclines would be flexible, and could be placed to the best advantage in accordance with the mining conditions met with.

The system of subsidiary inclines has the advantage in contradistinction to a greater number of shafts connected with the surface, in the fact that they can be made to conform to faults and disturbances met with, which could not be calculated upon in starting work from the surface.

connected, and the establishment of ample winzes.

When the connection has been made and thorough ventilation established, a second hoisting engine can command these two extra compartments if the mine requirements justify it, and, even if the compartments are not required for further hoisting, they will aid natural ventilation, which is most important, by giving greater area to the two main ventilating chimneys (shafts), which have to supply air for the requirements of 3,000 to 4,000 men, only half of whom are underground at one time, and also circulate large volumes of air from the surface, to reduce the temperatures attendant upon great depths.

With the thin reef the question arises: How many stamps can all these points of development employ, and when can they be started?

With good fortune the vertical shaft might be sunk and the necessary development work accomplished to start 100 stamps in, say, 7 years, 200 in 8 years, 300 in 9 years and 500 or 600 stamps

area of 600 claims by the equipment cost per claim, and the cost of opening and equipment would be \$8,281,860, and if \$20,627 be taken and multiplied by 400, almost the same figure is arrived at, \$8,150,820; showing that 600 claims for 400 stamps is the ratio in practical operation with the subsidiary companies of the Rand Mines, Limited, at the present time.

The fact, however, that with only 400 stamps the life of the mine from the commencement of milling would be some 36 years, shows that, if possible, we should attempt to increase the output, to make use of the reserve compartments, and to run 500 or 600 stamps.

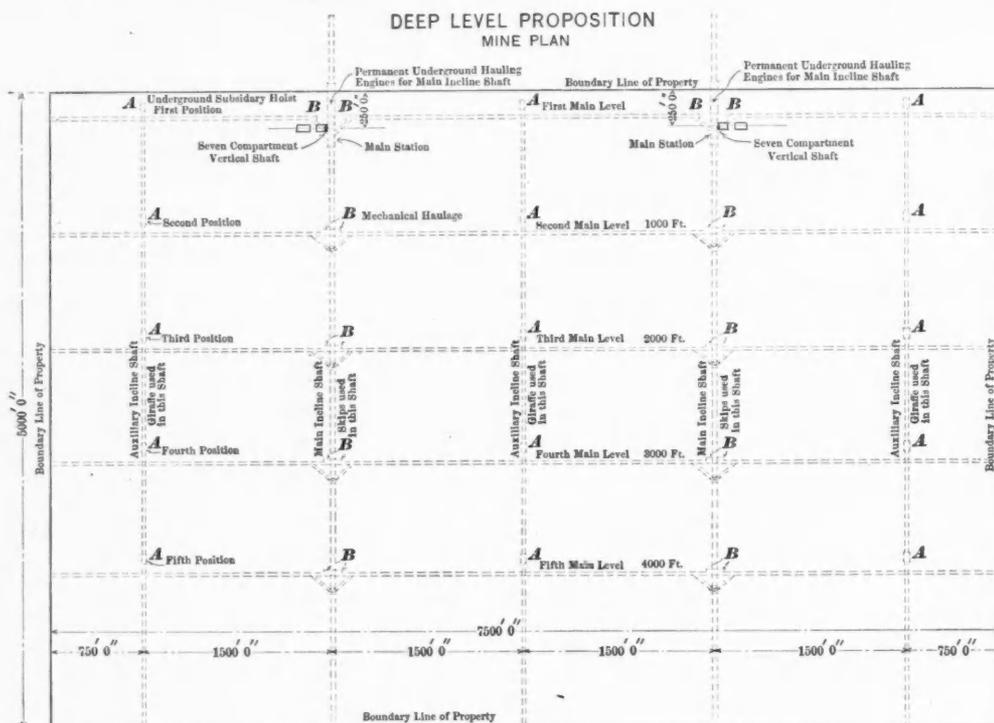
The writer agrees with Mr. Behr that, after reaching the reef, the only method to adopt is an independent equipment underground. The main incline shafts must have the same capacity for output as the vertical shafts; but, on an angle of 27° a load of 17,621 pounds can be hauled with the same power as 8,000 pounds in the vertical shaft. The weight of rope is also taken up by pulleys on the incline, so that in the distance proposed—5,350 feet—the incline hoisting engines would only need to have power equivalent to hoisting 2,429 feet in the vertical shaft with the same factor of safety. The arrangement for transferring ore from the incline to the vertical are indicated in the drawing. The main vertical shaft is proposed to be crosswise to the formation. This allows of the most advantageous planning of the underground work when independent hoists are used, and the most disadvantageous methods if it is desired to continue sinking from the surface on the incline, as well as from the vertical shafts, which system can only be advocated for moderate depths, and is utterly out of the question at 5,500 feet. By sinking crosswise, or on the dip of the formation, many miners on these fields believe that better progress can be made than when the shaft is parallel to the strike.

It will be apparent that, if a depth of, say, 5,500 feet can be reached in one stage, mining could be conducted to a depth of, say, 8,000 feet by two sets of hoisting engines, one on the surface to the reef, and the other underground, hoisting on the incline. Mr. Behr's recommendations would require two hoists on the surface for the vertical, and one underground for the incline.

A depth of 8,000 feet is also enough to plan for, taking into account the moderate profit per ton to be expected, the possibilities of increase of temperature, the encountering of water, and increased costs of sinking, equipments, hauling, etc.

Another great objection, in addition to the first cost of the extra winding engines, and the numerous extra attendants, is that, by any system of stage winding, it would be necessary to transship the timbers, men and supplies as well as water and ore, and would involve costly stations, extra labor, extra time and increased danger. Certainly the one stage in the vertical has distinct advantages if it can be safely accomplished, and this will be the next subject of our investigation.

In dealing with our hoisting problem the first consideration to be taken into account is the safety of the men. From the statistics of the Rand Mines, Limited, we find that, for a 200-stamp mill proposition, 7 Kafirs and 0.7 white men are sent underground per stamp per diem. For a 400-stamp proposition this would mean the sending down of about 3,000 men or 1,500 per shaft in 24 hours. If we assume 24 men are lowered at a trip, we can estimate our live load at, say, 4,000 pounds, and the weight of the cage 4,600 pounds. If we assume a maximum speed, say, of 1,500 feet per minute for hoisting and allow, say, 6 minutes for each trip, including loading, we should have to make 62 trips down and 62 trips up with men, say about 80 double trips in all, equal to 480 minutes, equal to 8 hours. If this engine also sends down all timbers and supplies, takes up drills, etc., it will be kept busy, and no aid must be expected from it for hoist-



INDEX:
A Subsidiary Hoists for Auxiliary Incline Shafts, supplying Mech. Haulages, to be used in Consecutive Positions noted, as Development of Mine proceeds.
B Mechanical Haulages for Drives, supplying Main Incline Shafts and Vertical Shafts.
 Total Claim Area = 586 Claims.

Regarding the claim area, its large lateral extent, connected with only two vertical shafts, is an insurance against the risk of encountering serious faults, dikes, disturbances and barren zones, which, if the company had limited lateral claim area, in connection with shafts closer together, might spell ruin to a company so formed.

The proposed main shafts from the surface have 7 compartments, and are 42 feet by 6 feet 6 inches in the clear. Shafts of this size are suggested for the following reasons:

A large compartment is required for the necessary ladder ways, air pipes, electrical cables, etc.

1. Two hoistways will be necessary for the lowering of men and material, and two hoists will be necessary for the winding of ore and water.

3. The remaining two compartments are suggested (a) with the object of improving the ventilation, and (b) as a reserve in case it might be advisable to employ another winding engine either for water, ore, or both. These reserve hoist-ways can at first be bratticed, and in connection therewith an exhaust fan can be installed. The artificial ventilation thus introduced will greatly aid the speedy connection of the two main shafts and improve the ventilation of the whole development work prior to the two shafts being

between 11 and 12 years after work was first started.

Let us assume that one hoisting engine at each shaft could deal with the ore problem up to 300 or 400 stamps, and we find that 300 of the most improved stamps as now run will require as a maximum 42,500 tons of rock per month, the weight of stamp being 1,250 pounds. If the ore is subjected to a sorting of 25 per cent on the surface we should have to take from the mine 14,166 additional tons of rock. In addition it will be necessary to hoist waste or rock in connection with development work, but as this will be mostly milled if taken from drives on the reef, a safe allowance would probably be, say, 300 tons a day. We have thus a total of, say, 2,480 tons of rock to be hoisted from two shafts each working day, or 26 days per month; consequently each engine must have capacity to raise 1,240 tons in 24 hours. Even with 400 stamps, the total amount of rock would be only 1,650 tons for each engine.

In this connection it is interesting to note some statistics of the Rand Mines, Limited, showing the total cost of opening and equipping their properties. On a claim basis the average cost for 9 companies is shown at \$13,803 per claim, and on a stamp basis \$20,627 per stamp. Multiply the

ing work; these two departments can therefore be kept separate.

The ropes for the men's winder should be the same size as those for rock, and the new ropes should always be used first on the men's engine.

Let us now see to what depth it is feasible to use a parallel rope. Rope-makers are now making ropes which they guarantee to have a breaking strength of 127 tons per square inch. It is possible, by the employment of nickel steel, to obtain a still greater strength, but this has not yet been practically demonstrated. To be on the safe side a breaking strength of 120 tons per square inch will be assumed, and with this basis the following tables have been calculated by Mr. Smart for rope of 6 strands, 19 wires each, and hemp main core. The first table shows the length in feet of rope, the weight of which, under static conditions and with no bend in rope, will equal the greatest permissible stress with factors of safety n:

Factor of Safety n	Length in ft. of rope
10	5,700.24
9	6,333.6
8	7,125.3
7	8,143.2
6	9,500.4
5	11,400.48
4	14,250.6

The second table shows diameters of rope required for hoisting a net load of 8,000 pounds and skip weighing 5,000 pounds, with factors of safety of 4, 5, 6 and 7, from depths of 3,000 to 8,000 feet.

Factors of Safety.

Depths, ft.	4	5	6	7
3,000	0.8498	0.9835	1.1180	1.2569
4,000	0.8903	1.0478	1.2154	1.4004
5,000	0.9372	1.1267	1.3437	1.6077
6,000	0.9923	1.2266	1.5236	1.9471
7,000	1.0886	1.2810	1.9438	2.0317
8,000	1.1401	1.5458	2.3270	2.5327

The third table shows net loads of rock which can be hoisted from depths of 3,000 to 8,000 feet, with factors of safety varying between 4 and 7, with a rope of 1.3485 inches diameter, the weight of skip or cage being taken at five-eighths of the net load:

Factors of Safety.

Depths, ft.	4	5	6	7
3,000	19994	14929.0	11553.0	9140.6
4,000	18218	13154.0	9775.5	7363.4
5,000	16440	11375.0	7998.2	5886.2
6,000	14663	9597.8	6221.0	3809.0
7,000	12886	7281.0	443.8	2031.7
8,000	11109	6043.4	2666.5	254.5

Table 1 shows the absurdity of requiring too high a factor of safety, for, with a factor of safety of 10, ropes or parallel strands of any diameter would be considered unsafe if only suspended beyond 5,700 feet. It shows also the limits to which winding is possible with factors between 10 and 4, and with minimum loads.

Table 2 shows that if a factor of safety of 6 be used, a rope of 1.3437 inches diameter can safely be used to raise a load of 4 tons from a depth of 5,000 feet, and a rope of 1.5236 inches diameter from a depth of 6,000 feet.

Table 3 shows that, with a load of men of 4,000 pounds in a cage of 2,500 pounds weight, men could be hoisted from a depth of 5,500 feet with a rope of 1.3435 inches diameter and factor of safety 7. The cage is, however, 4,600 pounds, and we will thus take as our standard a rope of 1.5 inches diameter, and obtain for the hoisting of men a factor of safety of over 7, and for rock of over 6, for 2 tons weight of men, and 4 tons weight of ore, hoisted from a depth of 5,500 feet.

Regarding taper ropes, Mr. Behr instances in his paper only two places where they have been extensively used; one at Przibram, Austria, then at a depth of only 3,000 feet; and the other at the Comstock, where he admits they were not warranted, as the depth was only 1,400 feet vertical and 1,400 feet on an incline of 37°. The writer has no knowledge of their adoption in any other districts, and the ropes in the Lake Superior district are all parallel.

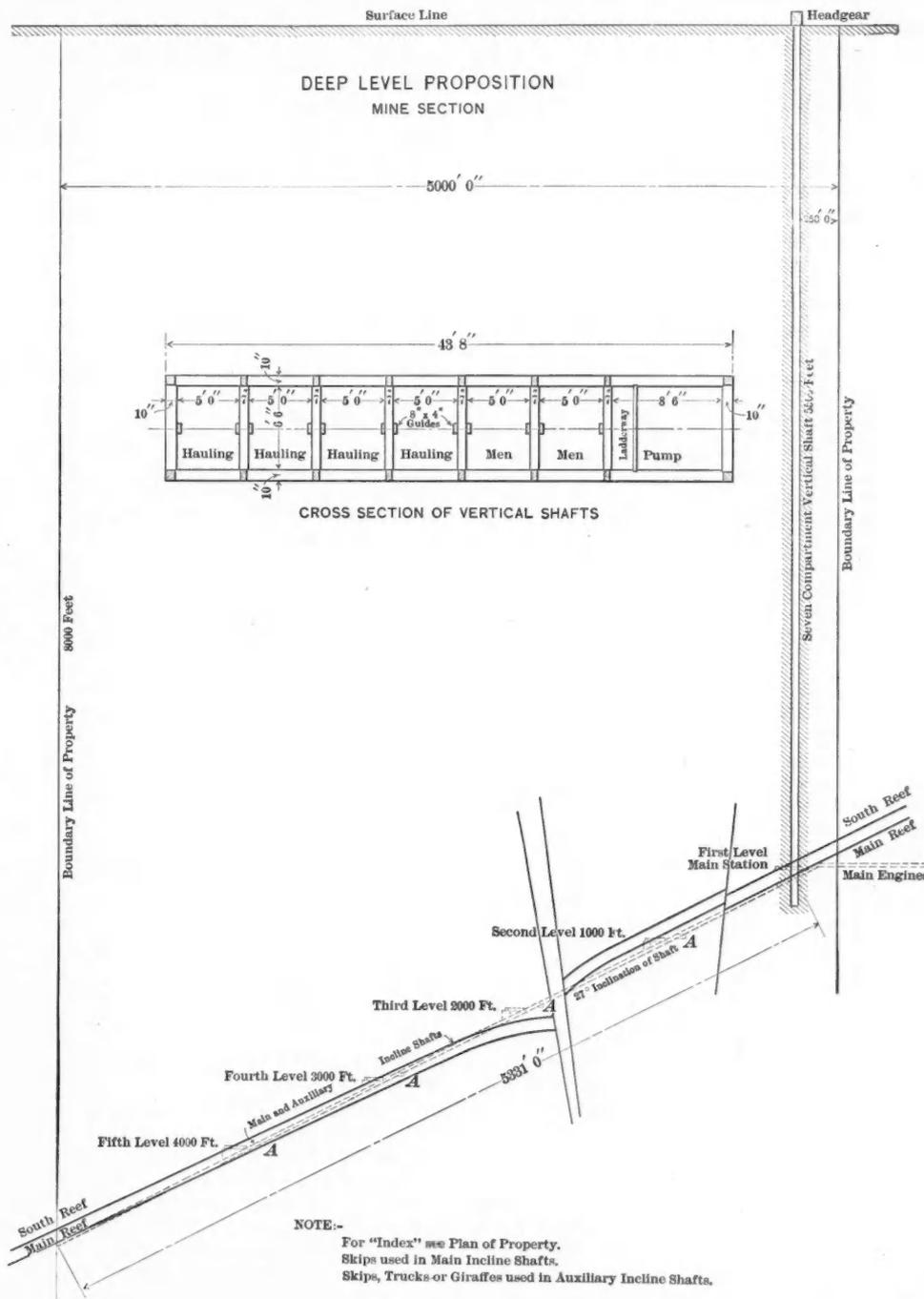
As a matter of fact, the deepest shaft in the

world is the Red Jacket shaft at the Calumet & Hecla, in the Houghton District, of Michigan. This shaft has a depth of 4,900 feet, and in September, 1900, Mr. Robeson himself saw the Whiting system at work, and that too—which it is unwise to recommend—without the use of a tail-rope. The rope in use was 1 3/4 inches diameter and parallel, and the load hoisted was 8,000 pounds.

IRON ORE DEPOSITS IN INDIANA.

Prof. W. S. Blatchley, State Geologist of Indiana, writes to the *Cleveland Iron Trade Review* on certain reports of the discovery of rich de-

bog iron ore has the widest distribution in the State, being found in large quantities in Greene, Martin, Monroe and Perry counties in the south, and in Lake, Porter, St. Joseph, Starke and Noble in the north. In general, this limonite is too siliceous to compete with the richer hematite ores of the Lake Superior, Tennessee, Missouri and Alabama iron regions. As a proof of this, it is only necessary to state that in the past 14 blast furnaces have been erected in Indiana to use this bog and other iron ores. Of these furnaces, not one is in operation at the present time. Most of them have long since gone to ruin, and of those still standing the last one went out of blast in



posits of iron ore in that State, which have been recently circulated in the newspapers. His statement is, in substance, reproduced below:

The Department of Geology has made no investigation of these reports, because it had no data as to just where these deposits are supposed to be located and because it does not believe that such deposits exist, else their presence would have been discovered years ago in the numerous bores and shafts which have been sunk for coal in the different counties in which the iron ore is alleged to be found.

Limonite, brown hematite and siderite are the ores of iron occurring in Indiana. Limonite or

1893. Two of these furnaces were located in the northwestern part of the State, near Mishawaka, St. Joseph County. The others were scattered throughout the southern half in Vermillion, Vigo, Clay, Greene, Monroe and Martin counties.

In addition to the limonite or bog iron ore, they used siderite or carbonate of iron. This iron is found abundantly associated with the overlying shales in most of the coal bearing counties. In western Vigo and Vermillion counties it is especially common in the shales overlying coal VII. Large quantities were formerly used in the blast furnaces at Terre Haute and in the old Indiana Furnace on Brouillette's Creek, about 8 miles to

the northwest. The furnace at Terre Haute was one of the last in operation. The ore which is used for the last 10 years of its existence was shipped in from Iron Mountain and other points in Missouri. A considerable amount of siderite was hauled by farmers in wagons from the beds before mentioned in Vigo and Vermillion counties, and was mixed with the Missouri hematite.

The richest ores of iron in the State which are known to this Department are located about three miles east of Bloomfield, Greene County. The veins are from 5 to 8 feet in thickness, and cover a known area of more than 1,500 acres. The ore appears to be a mixture of limonite and brown hematite. An analysis of this ore from picked samples was made at one time by Dr. Robert Lyons, professor of chemistry at Indiana University, and the results are as follows: Metallic iron, 55.09; phosphorus, 0.60; free silica, 11.66 per cent. Average samples were afterwards analyzed by Dr. W. A. Noyes, the chemist of this department, who found that they contained 47.25 per cent metallic iron.

The old Richland Furnace, which was located 2 miles southeast of Bloomfield, was used in reducing this Greene County ore between the years 1841 and 1858. About 9 tons of pig iron were produced daily by this furnace. The closing down of the old Wabash & Erie Canal left the furnace 30 miles from the nearest transportation point. This was the main cause of its final abandonment. Semi-block coal of good quality is found in veins 2 to 2½ feet thick in the immediate vicinity of this iron ore. The Bloomfield branch of the Monon Railway is distant to the southwest about 2 miles.

Recent reports in the newspapers alleged also the discovery of beds of coal "which is an almost pure charcoal, and which experts say can be used for smelting purposes without coking, thus causing a large saving in the manufacture of iron and giving the manufacturers special advantages over those in other sections of the country where expensive coking ovens must be maintained." This refers to the well-known beds of the so-called Brazil block coal, which have been known for 50 years, and of which millions of tons have been mined. This coal was used in many of the blast furnaces formerly in operation in this State, and, as stated, it was used without coking. It is a remarkably pure form of bituminous coal.

This block coal exists in southern Parke and Clay and northwestern Owen counties. Very pure limestone suitable for fluxing is found in abundance in a number of the counties of southern Indiana.

SOME RAILROAD FIGURES.

The advance sheets of the introduction to *Poor's Manual* for 1902 contain valuable statistics of the railroads of the United States for the year ending December 31, 1901.

The length of railroads completed on that date was 198,787 miles, and the net increase of mileage in the year was 4,453.

The operations of the roads reporting full statistics for the year, less than 4,000 miles not reporting, show the 600,485,790 passengers were carried, and 1,084,066,451 tons of freight were moved, making 148,959,303,492 tons of freight moved 1 mile.

The gross earnings from traffic were \$1,612,448,826; operating expenses, \$1,092,154,099; net earnings, \$520,294,727, which with other receipts amounting to \$68,368,814, give a total available revenue of \$588,663,541.

The payments from available revenue, including interest on bonds, \$215,191,176; other interest, \$7,327,334; dividends, \$132,162,935; rentals, \$86,438,505; miscellaneous, \$36,235,397, show a surplus of \$111,308,194 over fixed charges and miscellaneous payments.

There were 195,887 miles of road at the close of the fiscal years covered by the reports made,

which with 70,105 miles of second track, sidings, etc., make a total trackage of 265,992. Of this there were 246,811 miles of steel rails and 19,181 miles of iron rails.

The equipment included 39,729 locomotives and 1,445,283 cars, of which 27,144 were passenger, 8,667 baggage, mail, etc., and 1,409,472 freight.

Liabilities were: Capital stock, \$5,978,796,249; bonded debt, \$6,035,469,741; unfunded debt, \$312,225,536; current accounts, \$456,798,012; sinking and other funds, \$143,670,983; total, \$12,926,960,521.

BRIQUETTING AND PEAT FUEL.

By R. SCHORR.

The statistics of the peat-fuel industry are not reliable, as it is still left to a large extent, to the individual enterprise, mostly in rural districts of Germany, Scandinavia, Ireland and Russia.

Leaving out of consideration the utilization of peat for hygienic purposes, and for the manufacture of paper, cardboard, felt, alcohol, etc., there are four distinct classifications possible, viz.:

1. The Burning of Peat in Gas-Generators or Producers.—This is done very successfully in a large number of German iron, glass and china-ware works, especially in Hanover and Oldenburg. As peat gases are very clean (almost free from arsenides and sulphur), and as the temperature of the flame is very high the results obtained are extremely satisfactory. The Neustadt-Hutte (Hanover) and the Oldenburg Iron Works have used peat for refining iron and for the generation of steam over 15 years. Other large consumers of peat are the Cast-Steel Works of Schulze, Simon & Co., and the glass plants at Schneidemuhl, Wilze and Stolzenburg.

2. The cleanness of the gas insures a long lifetime to fire-boxes and tubes, and makes it very desirable for refining processes. In fact, the most economic utilization of peat is in the gas generators; and taken a good German peat containing 54 per cent C, 5 per cent H, 30 per cent O, and 8 per cent ashes, and feeding it in an air-dried condition into a furnace, evaporation results of 1 to 5 and 1 to 6 are quite frequent. The best Irish peat (Kilbeggan) contains 61 per cent C, 6.67 H, 30.46 O, and 1.3 ashes, representing a heating value of about 5,200 calories, or 9,160 B. T. U. Peat of high ash contents is found at Sindelfingen (18 to 23 per cent), Kashmir in India (33 per cent) and in Russia, while the best peats are found in Ireland, in the Harz and near Bremen. Peat gases for illuminating purposes were often advocated, but I do not think that this is practiced to any extent.

2. Manufacture of Peat Coke.—All attempts to make this a success have failed so far. The coke is too fragile, and it becomes crushed to powder under the burden of ore charges, thus choking the blast.

3. Manufacture of Peat Slabs, Termed Machine Peat.—This was practiced in a crude way over 100 years ago in the north of Germany and in Holland by peasants, who desired to obtain a cheaper and more efficient fuel than wood. Since about 1850 more intelligent elements have taken hold of this industry, and it is due to the efforts of C. Schlickeysen, A. Vogel, Exeter, Hebert and others that to-day the problems of cheap production on a very large scale is solved and machine peat manufactured which stands transporting and the influences of weather and which in many localities competes with coal.

The Mecke-Sander system (Oldenburg) is mostly used, and the machinery carefully designed for each individual case as the physical properties of peat and its occurrence in peat bogs are extremely different and varied. The heating value of 100 kilograms of medium grade coal is equal to about 160 kilograms of machine peat, or to 222 kilograms of raw peat; but the great drawback is that raw peat needs about 3½ times more storage space than coal.

The Mecke-Sander system is entirely automatic, all necessary machinery for cutting the peat, elevating it to the press and conveying the slabs to the drying-grounds being mounted on a truck which travels under its own steam into the bog. This machine is made for 50 to 80-ton capacity in 24 hours, and costs \$4,000 to \$6,000 at the factory. While the raw peat contains, as a rule, between 80 and 90 per cent of moisture, the air-dried slabs have seldom more than 30 to 35 per cent. To effect a more thorough drying large hot-air chambers and used in some locations.

4. Manufacture of Solid, Carbonized Peat Briquettes.—The problem of producing from a very poor grade of fuel, containing sometimes over 90 per cent of moisture, a briquette to compete with coal or to make up deficiencies in the fuel supply is a very serious one. Huge masses of raw material have to be handled and cleaned from foreign matter and tons of water have to be expelled to obtain a limited quantity of valuable fuel. Many processes have been tried and abandoned as they proved to be too expensive. There are a few plants in Germany and Holland working on very similar lines as applied to brown coal (lignite) briquetting, but a large portion of the water is expelled mechanically before drying by heat. The usual fibrous nature of the peat makes the use of centrifugals and filter presses rather inefficient, and its low conductivity and charring point makes drying very slow and expensive, as the temperature employed should not exceed 250° F., otherwise the composition of the peat would suffer. The operation of drying is less serious if the peat bog can be properly drained, and if the peat is brought in an air-dried condition to the drier, preferably of the Schultze or Schorr type (United States patent No. 655,418).

In recent years the experimental plants at Trebbin and Ostrach, utilizing the Stauber patents, have been watched with great interest and according to quite recent publications the experience is so satisfactory that a very large plant is under construction at Koenigsberg in Germany. The Schuelke and the Schoenning-Fritz processes are very promising also, and there are a number of works in course of erection which will employ their patents.

In my opinion the problem is not solved as yet, and great efforts are made in Germany, England, Sweden, Russia and Canada to establish the manufacture of solid peat briquettes as a permanent commercial industry. I trust that this will be accomplished and that the treasure, which Nature has endowed so many countries with, will be used to the benefit of mankind.

AMERICAN BLOWING ENGINE ABROAD.—

The London *Engineer* says: "The Barrow Hematite Steel Company has officially announced the erection of new blast engines for their furnaces. They will be of the vertical type from the latest American patterns and improvements, but they will be made by an English firm."

IRON AND COAL INDUSTRIES IN RUS-

SIA.—Under date of October 17, 1902, United States Consul Samuel Smith, of Moscow, reports that according to a statement lately published by the Statistical Bureau of the Mining Department, the production of coal and iron for the first six months of this year, compared with the corresponding six months, of 1901, was, in tons:

	1901.	1902.	Changes.
Coal	6,000,000	5,166,666	D. 833,334
Coke	1,050,000	966,666	D. 83,334
Pig iron	748,332	741,666	D. 6,666
Finished iron	633,333	583,333	D. 50,000

Out of 18 iron works, there are only 14 in operation, with 56 blast furnaces. There are about 20,000 men unemployed in the coal mines and iron works. In consequence of the stagnation in all branches of industries in Russia, several companies have been obliged to suspend.

RECENT DECISIONS AFFECTING THE MINING INDUSTRY.

SPECIALY REPORTED.

LIABILITY OF MINING COMPANY FOR DANGEROUS CONDITION OF ITS PREMISES.—A mining company, which erects dwelling houses on a tract of land owned by it, and operated for mining purposes, extends an implied invitation to the public to treat the tract as a residence tract, and to enter and depart from same for all proper purposes incident to its use as such, and must therefore exercise reasonable care to have the premises in safe condition; and where it omits to open streets or highways, but requires persons desiring to visit the residences to cross the tract "at any point most convenient," and leaves unguarded a deep and abandoned shaft alongside of one of the paths leading to the residences, into which a person returning from a residence falls and is injured, it is guilty of negligence; the injured party not being in such case a mere trespasser.—*Foster v. Portland Gold Mining Company* (114 *Federal Reporter*); United States Circuit Court of Appeals.

ABSTRACTS OF OFFICIAL REPORTS.

Norfolk & Western Railway Company.

The report of this company for the year ending June 30, 1902, gives interesting particulars regarding the movement of coal and other mineral, which constitutes a large part of the traffic of the line.

The total freight carried was 12,268,100 tons; the ton-miles were 3,151,911,924, the average haul being 256.92 miles. The average freight train load was 476 tons, and the average rate per ton-mile, 0.463 cent. The expenses were 0.271 cent.

The tonnage of coal and other minerals reported was 8,758,475, or 71.4 per cent of the total freight carried. The items of this freight were as follows, in tons:

	1901.	1902.	Changes.
Coal	5,125,966	5,571,068	I. 445,102
Coke	1,390,815	1,485,653	I. 94,838
Iron ore	626,730	868,058	I. 241,328
Limestone	337,599	378,494	I. 40,895
Pig iron	427,438	458,202	I. 30,764

The details of the coal and coke traffic last year were as follows:

	Coal.	Coke.
Received from:		
Pocahontas	5,002,794	1,210,459
Clinch Valley	538,615	261,983
Tug River	135,544	2,073
Thacker	605,418	.....
Kenova	67,631	.....
Other N. & W.	28,160	.....
Connecting lines ..	74,537	14,469
Total	6,452,699	1,488,984
Delivered to:		
Points on line	968,602	833,739
Tidewater	2,546,369	92,461
Connecting lines ..	1,865,778	544,199
Used by N. & W. R. R.	997,413	4,116
Coal from con. lines ..	74,537	14,469
Total	6,452,699	1,488,984

Concerning the company's coal business, the report says: "The past year was one of exceptional activity in the coal fields contiguous to your line; lands were purchased, new mines opened, and more attention given to the coal territory tributary to your lines than ever before. This was especially the case in the Pocahontas coal-fields, and was doubtless due to the increasing demand for coal and coke consequent upon the continued growth of the iron and steel industry, as well as to the fact that the superior quality of Pocahontas coal, not only for the manufacture of coke, but for making steam and for domestic purposes, is now generally recognized.

"The coal and coke traffic of your company during the past year amounted to 7,056,721 tons, of which 5,572,642 tons were produced from the Pocahontas Coal-fields. The Pocahontas Coal & Coke Company having purchased approximately 295,000 acres of the lands in the Pocahontas field,

your directors deemed it necessary for the protection of the interests of your company to purchase all the capital stock of the Pocahontas Coal & Coke Company (except qualifying shares held by the directors of the company), and joined with that company in the issue of \$20,000,000 in 4 per cent purchase-money mortgage bonds, due December 1, 1941, in settlement for the purchase from the Coal & Coke Company of its lands and interests in lands.

"It was agreed between your company and the Pocahontas Coal & Coke Company that as between them and on their behalf the Pocahontas Company should pay the principal and interest to become due upon the joint bonds, but this agreement does not affect the liability of the two companies, or either of them, to the holders of the bonds, the Railway Company and the Pocahontas Company being each jointly and severally liable thereon. Beginning with the year 1906, a sinking fund of 2½ cents per ton of coal mined is to be set aside and used by the trustee in the redemption of the bonds at not exceeding 105 per cent, and the right is reserved to the company at any interest period to call in and retire at 105 per cent all or any portion of the outstanding bonds.

"The property belonging to the Pocahontas Coal & Coke Company comprises about four-fifths of the Pocahontas Coal-field, and is about midway between the tidewater terminal of your railway at Norfolk, Va., and the Ohio termini of the company at Cincinnati and Columbus; and throughout the greater part of its area the No. 3, or Pocahontas, seam of coal is above the water level, persistent and uniform in character and thickness, and at a convenient height above the railway tracks, permitting self-draining mines of great extent and economical working.

"The Pocahontas Coal & Coke Company does not engage in the mining or buying or selling of coal or coke, its principal purpose being to make leases on royalties to operating companies; and on leases now made the royalties are 10 cents per ton on coal and 15 cents per ton on coke. At the time of the acquisition of the property, about 34,350 acres of land were under lease to 25 mining companies in active operation; and from these lands during the 12 months ending December 31, 1901, there were produced 2,645,682 gross tons of coal and 677,190 tons of coke, and the royalties therefrom amounted to \$358,575; in addition to which 5,447 acres were under lease to six mining companies who were engaged in opening mines and building ovens, but shipments from these leased lands did not begin until after January 1, 1902.

"On December 31, 1901, a lease of 50,000 acres additional was made by the Pocahontas Coal & Coke Company to the Illinois Steel Company, to be assigned to the United States Coal & Coke Company, the coal and coke therefrom to be used in furnaces and works owned or controlled by the United States Steel Corporation. This lease provides for the erection of not less than 1,000 coke ovens on or before December 31, 1902, an additional 1,000 ovens on or before December 31, 1903, and a further additional 1,000 ovens on or before December 31, 1904, and also provides for the payment of minimum royalties, and its performance by the lessees is guaranteed by the United States Steel Corporation.

"Until the plants contemplated in these new leases are completed and in operation, the net income of the Pocahontas Coal & Coke Company will be less than the interest on the joint bonds, but this temporary deficiency has been provided for through an agreement between your company and the Pennsylvania lines west of Pittsburg, by which these lines will co-operate with your company in the transportation of coal and coke from the Pocahontas Field, furnishing their proportion of the cars required for such traffic and joining with your company in loaning to the Pocahontas

Company, without interest, in the proportion of two-thirds by your company, and one-third by the Pennsylvania lines, such amounts as may be necessary to meet such deficiency, the amounts so advanced to be repaid *pro rata* when the net receipts exceed the amount required for interest payments and sinking fund.

"When these new mines are opened and ovens completed the royalties received from the 89,797 acres of land now under lease will, it is believed, be more than sufficient to meet the interest on the bonds. The net income of the Pocahontas Coal & Coke Company for the 6 months ending June 30, 1902, was \$247,505."

White Pass & Yukon Railway Company.

This company owns the railroad from Skaguay, Alaska, to White Horse, in the Yukon, and controls a steamboat line on the Yukon River from White Horse to Dawson. Its road lies further north than any other railroad in the world. It is, of course, entirely dependent on mining operations in the Yukon for its traffic.

The report for the year 1901 shows that the total earnings of the railroad were \$1,758,065, of which \$252,933 were from passengers, \$1,443,713 from freight, and the balance from other sources. Operating and general expenses were \$893,060, leaving the net earnings \$865,005. The steamboat line earned \$850,079, while the expenses, including depreciation of boats, were \$710,244, leaving a balance of \$139,835. The total net earnings of transportation lines were therefore \$1,004,840; from which interest on mortgages took \$235,406, leaving a surplus of \$769,434.

The report of S. H. Graves, president of the local companies, says: "So far as the railway portion of the route was concerned the year was uneventful, except for the flood in the Skaguay River, which occurred on October 12 and washed out nearly 2 miles of main and side track, besides doing a great deal of damage at the shops and yards, necessitating heavy expenditure for repairs to track, etc., also to the river banks, and involving a week's loss of traffic. During the year the railway carried 16,472 passengers and 33,471 tons of revenue freight. The average haul was 92.71 miles per passenger and 105.72 miles per ton, and the average load per car was 11.21 tons. The road bed, equipment, rolling stock, bridges, buildings, wharves and everything in connection with the road have been kept up in first-class condition and repair.

"The chief event that marked the year was the acquisition of the fleet of the Canadian Development Company and the inauguration of our own service on the river. We had already acquired the line of steamers running to Atlin, so that the River Division of the White Pass & Yukon Route now covers upwards of 533 miles of river and lake navigation on its regular voyages, and in addition makes special voyages as occasion demands to places beyond the limits of the regular itinerary. In this way a service was inaugurated last year to Mason's Landing on the Hootalinqua River for the Big Salmon country, which service will probably be made permanent this season, as the development of that district seems likely to require and support a permanent service. Some of our steamers have also been employed in the transport of United States troops between White Horse and American points below the boundary on the Yukon River. Besides the fleets of the Canadian Development Company and of the John Irving Navigation Company we built three new boats in the spring of 1901 at White Horse, and during the summer we rebuilt another boat, which we had bought cheaply, and which is now one of the most efficient of the fleet. We owned and operated or held in reserve last year 19 steamers and carried in them 7,893 passengers and 16,392 tons of freight. The fleet steamed 106,703 miles

during the season. The earning and carrying capacity, speed, efficiency and economy of the fleet has been greatly increased since we acquired it, the new boats built by us quite eclipsing the performances of the older ones, while the latter in turn have been so improved as in every case to beat their own best previous records. The season of navigation being short, and the navigation difficult, it is essential to maintain the fleet in the highest possible state of efficiency, and this has been done. The benefits of owning and controlling the entire service north of Skaguay were not over-estimated, and it is difficult to see how we could otherwise have maintained our through service to Atlin, Dawson and elsewhere, and met the competition via St. Michaels satisfactorily.

"Besides the large system of summer navigation on the river and lakes, we had to inaugurate a winter mail service in order to carry out the mail contracts which we took over from the Canadian Development Company, and which comprised mail routes covering 2,397 miles, and extending from Atlin on the east to St. Michaels and Nome on the west. This service was carried on partly by dog sledges and partly by a regular four-horse stage line service between White Horse and Dawson. Stations and rest houses, with sleeping and cooking accommodation, stables, blacksmith shops, housekeepers, cooks, stablemen, etc., had to be established and maintained with relays of horses and drivers, and supplies of provisions for the passengers and fodder for the horses. The difficulties of carrying on such an extended service almost within the Arctic Circle, and during the Arctic winter, need not be enlarged upon, and it is satisfactory to note that it was accomplished with perfect regularity and without the loss of a single letter or injury to passengers or employees. A satisfactory profit resulted which, however, does not come into the 1901 accounts. It has been decided to drop the service beyond Dawson for the future, as it is outside our regular sphere of operation, besides being very expensive.

"The development of the country tributary to our route has been steady and satisfactory and new mining districts, notably in the Big Salmon country and on the Stewart River, have been opened up. The fact that the traffic is handled this year at much lower rates reduces the earnings, but it is hoped that this will eventually be offset by increased traffic consequent on the more rapid development of the country under the stimulus of lower transportation rates aided by the reduction of the Government royalty on the gold output from 5 per cent to 2½ per cent, thus enabling much ground to be worked at profit which could not be worked under former conditions."

The report of the London company, which owns all the stocks of the American and Canadian companies, says: "The profit and loss account of this company, after providing for debenture stock and debenture interest and all charges, shows a net profit for the year of £136,967, to which has to be added the sum of £14,373 carried forward from last year, making a total of £151,340 of profit up to June 30 last. Out of this sum a dividend of 10s. per share, or 5 per cent on the share capital, was paid December 12 last. This absorbed a sum of £68,750, leaving a balance on hand at June 30, 1902, of £82,590. During the year the directors resolved to create a sinking fund to provide for the repayment of the £750,000 debenture stock, which will fall due on December 31, 1930. To insure such repayment on a basis of 3 per cent per annum compound interest, a deed of trust has been entered into with the trustees of the debenture stock, the Railway Share Trust & Agency Company, Limited, which provides that a sum of £16,586 be set aside out of the profits each year and invested, or an equivalent amount of debenture stock of the company be transferred into the joint names of the company and the trustees."

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.

Practical Gold Mining. Its Commercial Aspects. By William S. Welton. London, England; W. R. Russell & Company, Limited. Pages, 208.

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

The Salmon and Salmon Fisheries of Alaska. By Commander Jefferson F. Moser, U. S. N. Washington; Government Printing Office. Pages, 128; illustrated.

The Battle With the Slum. By Jacob A. Riis. New York; the Macmillan Company. London; Macmillan & Company, Limited. Pages, 466; illustrated. Price, \$2.

United States Fish Commission. Notes on Fishing Methods in the South Sea Islands. By A. B. Alexander. Washington; Government Printing Office. Pages, 88; illustrated.

Mysore Geological Department. Report of the Chief Inspector of Mines for the Year 1901. W. F. Smeeth, Chief Inspector, Bangalore, India; printed for the Geological Department. Pages, 24; with tables and maps.

The Diamond Mines of South Africa. Some Account of Their Rise and Development. By Gardner F. Williams. New York; The Macmillan Company. London; Macmillan & Company, Limited. Pages, 700; with maps and many illustrations. Price, \$10.

BOOKS REVIEWED.

To the End of the Trail. By Frank L. Nason. Boston, Mass.; Houghton, Mifflin & Company. Pages 224. Price, \$1.50.

Mr. Nason, who is well known as a mining engineer, and as a very acceptable writer on geological and mining topics, has struck out in this volume into an entirely new line. He has given us a strong and attractive story of life in a Western mining camp. If the end is a melancholy one, and not the happy conclusion of the conventional novel, it is because the development of his story led of necessity to such a termination. The trail is followed to its inevitable end. Reviewing fiction does not usually come in our line, and we do not intend to analyze the book from the usual literary point of view. We may say, however, that the book maintains its interest throughout, and the reader will not willingly leave it until he has finished it. Moreover, it is a relief to have a mining story by a writer whose experience has made him thoroughly familiar with what he is writing about, and who does not fall into the absurdities common in too many so-called books of Western life. In brief, the story is so good that we hope the author's professional labors will leave him time to write another.

United States Geological Survey. Mineral Resources of the United States. 1901. Prepared under direction of Dr. David T. Day, Chief of Division of Mining and Mineral Resources. Washington; Government Printing Office. Pages, 996.

The Department of Mining and Mineral Resources of the United States Geological Survey is to be congratulated on the early appearance of its eighteenth annual volume, *The Mineral Resources*, which is published earlier in the year than ever before—a result to be commended, since apart from accuracy, which is the prime requisite of statistical information, much of the value depends upon its timely appearance. The continuation of the volume in octavo size is another commendable feature which renders the work more convenient for reference use. The quarto size used for several years, which contains no larger amount of printed matter on a page, was

very bulky and unwieldy, and the return to the smaller size last year will be fully appreciated by the many who have frequent occasion to refer to the book.

The present volume is arranged on a plan similar to its predecessors, being comprised of various sections, each devoted to a branch of the mineral or metal industry of the United States. In many instances, statistics of production in foreign countries also are included. These individual sections have been published separately, earlier in the year as soon as they were compiled, which is a most excellent feature, as thereby the information is given to the public promptly, and not withheld until the completion of the entire book as a whole.

In brief outline the principal sections and their authors are: Iron Ores and Manganese Ores, by John Birkinbine; American Iron Trade During 1901, by James M. Swank; Gold and Silver, by Geo. E. Roberts, Director of the United States Mint; Copper, Lead and Zinc, by Charles Kirchhoff, editor of the *Iron Age*; Coal and Coke, by Edward W. Parker, late managing editor of the ENGINEERING AND MINING JOURNAL; Petroleum and Natural Gas, by E. H. Oliphant; Aluminum, Antimony, Arsenic, Asphaltum and Bituminous Rock, Bauxite, Borax, Bromine, Graphite, Gypsum, Magnesite, Mineral Paints, Platinum and Iridium, Phosphate Rock, Quicksilver, Salt, Sulphur and Pyrite, by Dr. Joseph Struthers, editor of *The Mineral Industry*; Lithium, Nickel and Cobalt, Tungsten, Molybdenum, Uranium and Vanadium, Talc and Soapstone, Abrasive Materials, Mica, Asbestos, Barytes and Monazite, by Dr. Joseph Hyde Pratt; Titanium Ores, by W. O. Snelling; Precious Stones, by George F. Kunz, the gem expert of Tiffany & Company, of New York; Greensand Marl, by A. L. Parsons; Flint and Feldspar, by Prof. Heinrich Ries, of Cornell University; Clay Working Industries, by Jefferson Middleton; and Stone, Cement, Fullers Earth and Mineral Waters, unsigned. The new subjects which are taken up this year for the first time are Arsenic, Bismuth, Borax and Bromine, by Dr. Joseph Struthers, and Lithium, by Dr. Joseph Hyde Pratt.

From a bookmaking point of view, two criticisms are to be mentioned, one the lack of a systematic arrangement of the sections (which would be of readier reference, if arranged in alphabetical sequence), and the second, the frequent occurrence of a blank page between chapters when the preceding one contains an odd number of printed pages. This latter criticism, however, is of minor importance, and has resulted from the previous appearance of each section of the work in the form of a separate pamphlet.

The magnitude of the work of collecting the statistical data for this volume may be appreciated from the sum total of values of the mineral and metal production for the year 1901, which amounted to \$1,086,529,521, divided into \$567,261,144 for the non-metallic mineral products, \$518,268,377 for the metallic products, and \$1,000,000 for unspecified mineral products.

The book may be obtained by written application to the Hon. Charles D. Walcott, Director of the United States Geological Survey at Washington.

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.

Methods for Assaying Cyanide Solutions for Gold.

Sir: That was rather an amusing article on the above subject by Mr. T. Lane Carter, particularly where he objects to getting up at 5.30 on a cold morning. Do they bring assayers their breakfast in bed on the Rand? What is the matter with evaporating solutions in the evening or any more convenient time than 5.30 a. m.? There

is generally enough waste heat somewhere round a mine or mill at any time for evaporation purposes. I used a method of my own which consisted in taking any quantity from 100 c.c. to 1 liter of auriferous solution, acidifying with hydrochloric acid, adding about 1 or 2 grams (according to amount of liquid) of a soluble lead salt, nitrate or acetate, and passing H_2S through it till complete precipitation ensued. The finely divided gold sulphide came down with the lead sulphide. Filter, dry, precipitate and assay for gold in the ordinary way in crucible. Copper sulphate may be used instead of a lead salt, but is not so convenient, as copper is reduced with the lead from litharge added.

Mr. Carter should not assume that assayers on the Rand use the crucible method of assaying "from force of habit" only. Any assayer almost knows that the crucible assay is safest where any volatile compounds are being treated. Modern assayers use their brains, and are not moved by mere force of habit. Mr. Carter ought to read up the advantages and disadvantages of both methods, the crucible and scorifier. "If it's a cold morning do not use No. 1 method, unless you can chase your assistant out of bed to do it." That is certainly all right! How about Cape Nome and the Klondike when they start cyaniding there?

H. W.

Niagara Falls, N. Y., Nov. 20, 1902.

The First Recognition of the Bendigo Saddles.

Sir: A friend of mine writes to me from New South Wales, inclosing a newspaper reference to the question of the first recognition of the true anticlinal character of the Bendigo saddle reefs, and the claims for priority of discovery supposed to have been presented by Messrs. William Nicholas, E. J. Dunn and myself. I presumed the matter had been cleared up, and for this reason I did not reply to the letters of my friends, Messrs. Halse and Danvers Power, who commented on the matter in your issues of June 28 and July 5 last.

As I understand the facts, Mr. Nicholas was the first who described the saddles as anticlines, in articles published in the *London Mining Journal* in 1884, but I never saw these articles of Mr. Nicholas', nor did I prior to 1894 encounter any reference to them in any later description of the Bendigo District. This, I believe, holds good with regard to Mr. Dunn also. In 1890 I visited the district and recognized the anticlinal structure and studied it very carefully in preparation for the paper published in the *Transactions* of the American Institute of Mining Engineers in 1891. Before I left Bendigo, but subsequent to my diagnosis of the structure of the reefs, my attention was directed by Mr. Dunn himself to a brief note in a government quarterly report for December, 1889, which referred correctly to the character of the geological conditions. I acknowledged the fact (in my paper to the Institute) that Mr. Dunn's description ante-dated mine, but pointed out that my conclusions had been reached, and stated to the mine managers at Bendigo before I was made aware of his having written concerning the matter. I might add that Mr. Dunn's official report on Bendigo appeared in 1893.

In 1894 an anonymous correspondent of the *London Mining Journal* brought a charge of plagiarism against Mr. Dunn in behalf of Mr. Nicholas. I took pleasure in defending a distinguished friend who was too far away to put in a reply. The summary of the matter is one which should commend itself to students of geology, namely, that Mr. Nicholas, Mr. Dunn and I each and separately and in the order named discovered the true structure of the Bendigo reef.

T. A. RICKARD.

New York, Nov. 15, 1902.

QUESTIONS AND ANSWERS.

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

Magnesite.—Can you give me the names of parties supplying Magnesite? According to *The Mineral Industry* most of that mined in the United States comes from California. Do you know of any deposit in the Western States?—J. R. M.

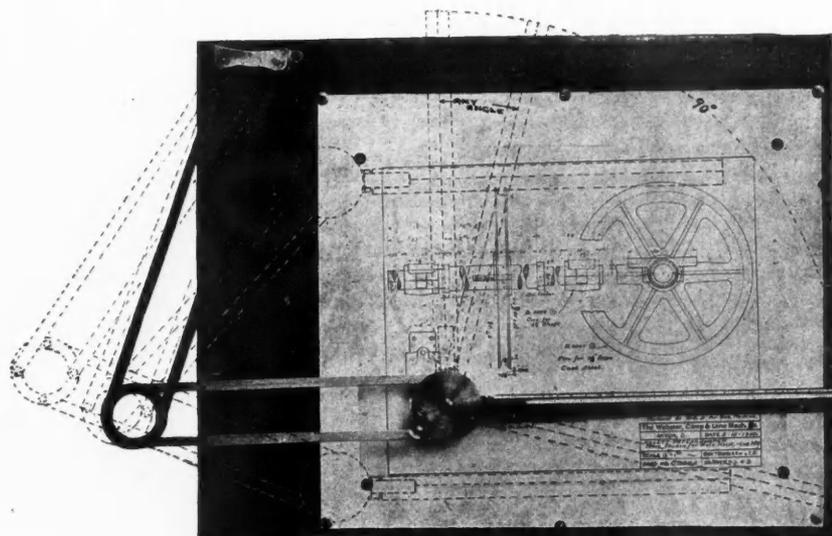
Answer.—The magnesite mined in California is all used there, chiefly for lining furnaces. The magnesite used in the East is imported, chiefly from Greece. The largest importer is Mr. Solon J. Vlasto, of 4 Stone street, New York. Deposits of magnesite have been reported in Western North Carolina, in Texas and in Arizona; but none of them has been worked to any extent.

Practice in Stadia Work.—Will you kindly inform me through the columns of your journal which is considered the best practice among leading engineers in Stadia Work. 1st, to hold the rod vertical; 2d, to incline the rod so that it is perpendicular to the

A RAPID SKETCHING DEVICE.

The accompanying illustration shows a device which will be found exceedingly convenient for engineers, draftsmen and others who have to make drawings and sketches in connection with their work. It can be used for plotting and other office work in connection with surveys, and for making mine maps and plans, as well as for mechanical drafting work. This device is being introduced by the Universal Drafting Machine Company, of Cleveland, Ohio. Its construction will be readily understood from the engraving.

The rapid sketching device consists of a scale joined to a protractor which is anchored to the upper left hand corner of the board by means of an arm made up of two pivoted parallelograms. The scale has a free motion of 90° between two stops, and it comes against either one or the other, depending upon whether a horizontal line or a vertical line is desired. These two stops are fastened to a protractor and may be turned to any angle with the horizontal or vertical, thus permitting the scale to come against a stop at the desired angle and also at right angles to it. The lower part of the protractor always lies in the same direction no matter where it is moved about the board, and hence when the protractor is once set at any desired angle the scale will give paral-



THE RAPID SKETCHING DEVICE.

lel lines anywhere on the drawing. This is accomplished by the two parallelograms which act similarly to a parallel ruler. The protractor may be clamped at any angle by means of the thumb screw B. A spring stop A is provided for the 0° , 30° , 45° , 60° and 90° angles, and is operated by merely raising it and allowing it to drop into the hole for the angle desired. The screw C is for adjusting the right angle stops.

The general use of this device is exactly the same as one would use a scale without any attachment. Either a triangular or flat scale may be used. The scales chuck into place and may be turned so that any edge may be used. The triangular scale has the advantage of giving a larger variety of graduations on one piece, while the flat scale has the advantage of giving a better ruling edge. The makers are prepared to furnish either kind of scales in any graduations desired.

After experimenting with different materials for the joints, the makers have adopted a hardened and ground joint, and with the very slight pressure and speed required, they believe it will last a lifetime. The pin for the stops is made conical, compensating for wear. All parts are finished in dull nickel, with the exception of the rods, which are coppered and oxidized. The instrument is well proportioned, is well finished and has a very neat appearance.

Chrome Brick.—Will you please give me some information as to the manufacture of chrome brick, including machinery required?—J. A. H.

Answer.—We do not know of any special process or machinery for the manufacture of chrome bricks. Chrome ore has been used in lining steel and other furnaces, but it is usually built into the furnace, not made into bricks. The process of lining a furnace was described in a paper by Mr. William Glenn, published in the *ENGINEERING AND MINING JOURNAL*, November 16, 1901. Presumably, if bricks were made the processes would be similar to those used in making magnetic bricks and other refractory bricks.

CONCRETE IN MINES.—At the Kohlwald Colliery, in the Saar District, Germany, in a cross-cut, which owing to very great pressure had to be lined with masonry for a length of 20 meters, concrete has been used with success.

THE STURTEVANT CENTRIFUGAL CRUSHING ROLLS.

The 36-inch centrifugal rolls here illustrated, are the largest made by the Sturtevant Mill Company, of Boston. The tires are $4\frac{1}{2}$ inches thick, are of high carbon steel, and have 16 tons pressure at ordinary speeds. They can be run as fast, or as slow, as required, and attain greatly increased pressures when fast running brings in the rapidly augmenting centrifugal forces. These rolls have none of the destructive vibrations noticed in all other rolls, for their shafts are fixed. They turn easily with one belt. The bearings are dust-proof, and the side adjustments simple and durable; the tires may be removed in a few minutes. It is only necessary to turn in set screws in the head peripheries, these press back the tire spring weights; then the tire is released, and may be slipped off easily. When tires are replaced the set screws are taken out, and the tires at once secure themselves.

The manufacturers argue briefly the questions of large and small roll constructions in the following way:

"Since rolls crush by the pressures of their revolving tire surfaces, it is plain that if the tire widths and pressures are the same the output of all rolls will be in exact proportion to tire velocities, regardless of diameters. A small roll, therefore, may do as much as a large one, if the tires can attain the same speed. That they can do this in centrifugal rolls is beyond doubt, for they run easily at almost any speeds, high or low; and the tire surfaces of the smallest centrifugal rolls can equal the travel of the largest roll tires that can be constructed; and do as much work for the same width of tire.

"What, then, is the advantage of the large, expensive common roll? The large common roll has greater grasp, and can seize and break large rock. It is a coarse crusher, the small centrifugal roll, on the other hand, is a finisher. The large rolls, however, pay dearly for this single point of advantage, and the work they do can be much more cheaply done in a roll jaw fine crusher. Large rolls cost

more to buy, to transport, and to run. The shocks of crushing on their heavy backward and forward moving parts are destructive; repairs are expensive, and their big tires are not taken off, or replaced easily. Centrifugal rolls run with nearly the quietness of dynamos on finishing work. They can easily surpass, in any size, common roll velocities; and just here is met a consideration of practical importance.

"In roll crushing, there is found for each ore, a tire speed that gives the largest output per pound of tire wear. This can only be determined by exper-

ience. In most cases this economical speed is found to be far above the turning ability of common rolls. Any centrifugal roll can run to that speed, no other rolls can. The wear of a small tire surface, even when running at the tire speeds of the largest rolls, is no greater than that of a large tire having the same velocity. In both cases the same amount of metal is exposed to wear in the same time. The smallest rolls, however, must not be used as coarse crushers, although in everything else they are superior. Large centrifugal rolls can run even on large rock at much

pleted July 1 of this year. The additional properties are located near the present operations of the company.

As the Refractories Company now stands it owns and operates 29 plants, of which the Harbison-Walker Company has 14. These plants are those of the Harbison-Walker Company in Pittsburg, Hay Station and Cambria and Clearfield counties; the Harbison-Walker Company, of Kentucky, at Ashland, Ky.; Clearfield Fire Brick Company, Clearfield, Pa.; Phillipsburg Fire Brick

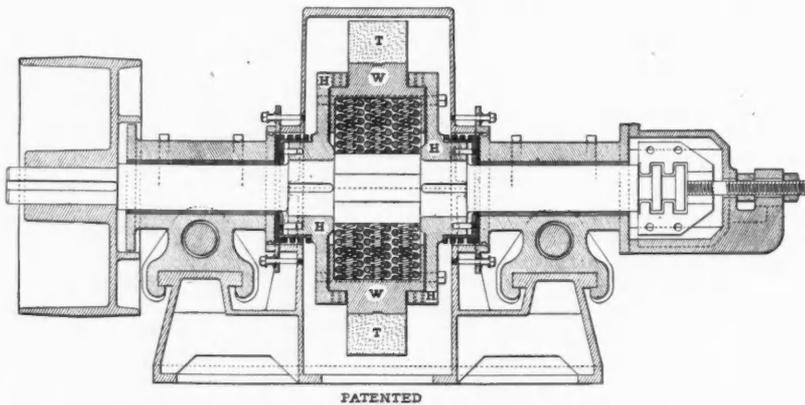


FIG. 2.—STURTEVANT CENTRIFUGAL CRUSHING ROLL.

higher speeds than common rolls, and are well suited to either coarse or finishing work. In most cases centrifugals do three times as much as common rolls of equal size."

THE REFRACTORY BRICK COMBINATION.

At a special meeting of the stockholders of the Harbison-Walker Refractories Company, held in Pittsburg recently, it was decided to increase the capital stock from \$25,350,000 to \$27,600,000, the proceeds of the new issue to be devoted to buying of several fire-brick concerns. The present

Company, Phillipsburg, Pa.; Basic Brick Company, Johnstown, Pa.; American Fire Brick Company, Clinton County Fire Brick Company and Fredericks, Munroe & Co., at Lock Haven, Pa.; Isaac Reese & Sons Company, Manorville, Pa.; Mallaceton Fire Brick Company, Mallaceton, Pa.

The officers of the company are S. C. Walker, president; H. W. Croft, first vice-president; F. H. Wigton, second vice-president; J. B. Cullum, third vice-president; George W. Reese, fourth vice-president; Hamilton Stewart, secretary and treasurer. The main office is in Pittsburg.

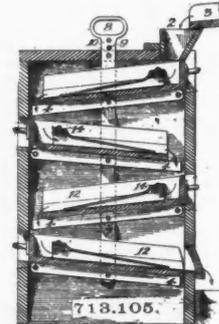
PATENTS RELATING TO MINING AND METALLURGY.

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 11, 1902.

713,105. GOLD-SEPARATOR.—Frederick M. Johnson, San Francisco, Cal., assignor to Rose Gold Reclamation Company, San Francisco. In combination, a suitable casing, a plurality of arms pivoted to each side of the casing, the arms of each being pivoted alternately at opposite ends, a vertical adjusting-bar arranged centrally on each side con-



nected to all of the arms on its respective side and midway of the length of the arms, and removable trays inserted through openings in the casing and supported on said arms, each tray having a gold-retaining bottom surface, and a cross-bar near its initial end with a flexible apron connected to said cross-bar.

713,110. MANUFACTURED PEAT FUEL.—Robert A. Kel-lond, Chicago, Ill., assignor to Charles Carroll Bartlett, Chicago, Ill. A block of peat fuel composed of a body or core of natural or raw peat reduced to finely-divided but unimpaired condition and embodying a proportion of moisture exceeding the atmospheric degree, and an outer coating, envelop or crust formed by the fracture and carbonization of a portion of the natural fiber and liberation of indigenous tarry and oily constituents of the material, the whole block being condensed into solid form by pressure

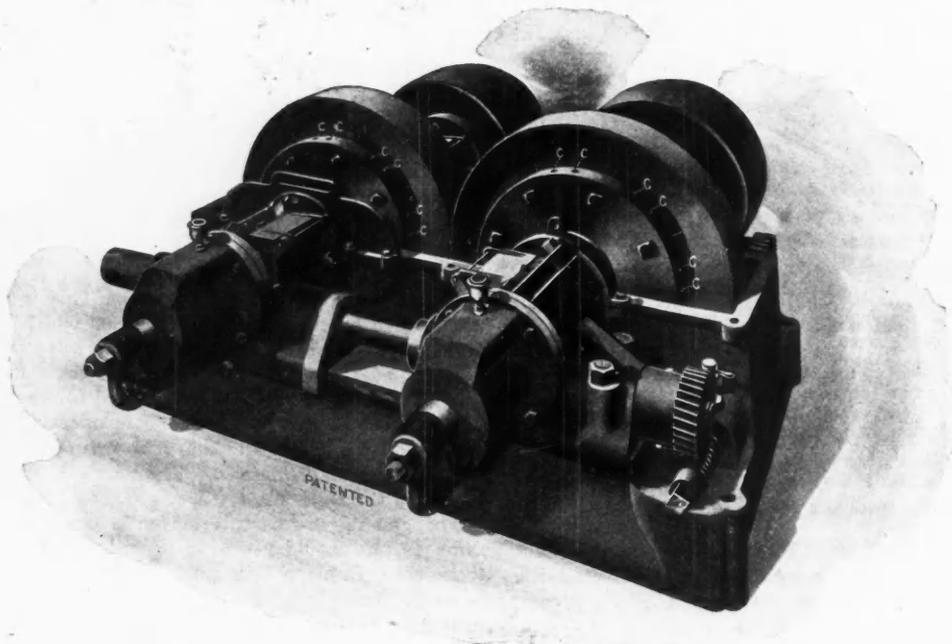


FIG. 1.—STURTEVANT CENTRIFUGAL CRUSHING ROLL.

more to buy, to transport, and to run. The shocks of crushing on their heavy backward and forward moving parts are destructive; repairs are expensive, and their big tires are not taken off, or replaced easily. Centrifugal rolls run with nearly the quietness of dynamos on finishing work. They can easily surpass, in any size, common roll velocities; and just here is met a consideration of practical importance.

"In roll crushing, there is found for each ore, a tire speed that gives the largest output per pound of tire wear. This can only be determined by exper-

output of the different plants of the Harbison-Walker Refractories Company is about 240,000,000 bricks annually, and if certain other plants are taken over this output will be increased to about 285,000,000.

The deal for the acquisition of additional properties will not affect the organization of the company at present. The properties to be taken over are some of those which it was planned to absorb when the merger of the Harbison-Walker Company and smaller manufacturers was com-

while the raw material is at a medium temperature, and the coating, envelop or crust being formed upon the exterior thereof by the application of intense heat.

713,128. PEAT-DRIER.—William A. Milne, Brown's Corners, Canada. In a device of the class described, the combination with a cylindrical casing suitably rotated and journaled, of the beaters comprising arms secured to the shaft and longitudinal plates secured to the ends of the arms and having outwardly-projecting fingers or blades carried by the same and set so as to be parallel at their outer ends to the ends of the cylinder.

713,129. PEAT-COLLECTING MACHINE.—William A. Milne, Brown's Corners, Canada. In combination, a supporting-car a fan-casing carried thereby having a suitably-driven fan, a suction-tube connected to said casing and having a flexible portion and a downwardly-turned outer end, and means for adjusting said suction-tube as to its radial and vertical position.

713,155. PROCESS OF MAKING WHITE LEAD.—Wilson H. Rowley, St. Louis, Mo. In the manufacture of white lead, atomizing the lead in an inverted air-tight chamber from which the air is excluded.

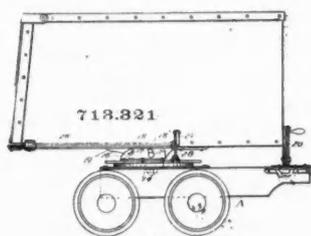
713,165. METHOD OF SOLIDIFYING AND EXCAVATING THE SOIL AND CONSTRUCTING TUNNELS.—Charles SooySmith, New York, N. Y. A method of solidifying the ground which consists in sinking a plurality of pipes containing small pipes, intersecting the same by one or more pilot-tunnels, and circulating a medium of cold in the pipes from the pilot-tunnel.

713,181. MINE TRAP-DOOR.—John Wack, Canton, Ohio. The combination with a mine trap-door; of an actuating-bar operatively connected to said door to open the same, said bar having one end arranged closer to a track-rail than its other end, spring-controlled means permitting that end of the bar which is closer to the rail to move laterally relative to the rail, and means operatively mounting the opposite end of the bar to move laterally and downwardly toward the rail when the bar is depressed.

713,260. ROD AND TUBE ELEVATING AND PUMPING APPARATUS FOR OIL-WELLS.—William J. Wright, Pittsburg, Pa., assignor of three-sixteenths to J. W. Lee and Fred J. Galloway, Pittsburg, Pa. In a mechanism for oil wells the combination with the band-wheel-driving devices of the engine-shaft, a pulley is loosely mounted thereon, gear connections and clutch mechanism for shifting the said connections into an operative position.

713,277. ELECTROLYTIC REFINING OF LEAD AND LEAD ALLOYS.—Anson G. Betts, Lansingburg, N. Y. The process of electrodepositing lead consisting in subjecting to electrolysis an electrolyte containing in solution a lead compound and a reducing agent capable of restraining the crystallization of the lead deposit.

713,321. ORE-CAR.—Walter C. Matteson, Stockton, Cal., assignor of one-half to Don C. Matteson, Stockton, Cal. An ore-car consisting in the combination of a truck-frame



a car-body, rocker-hinges secured to said body and upon which the latter is tiltable, a door hinged at one end of said car-body, sleeved pivots upon which the hinges of said door are turnable, and locking mechanism including a rock-shaft by which said door is automatically locked or released according as the car is tilted.

713,397. OIL-BURNER.—William E. Chandler, Elcampo, Tex. In a burner, the combination with a boiler and a fire-pan therebelow, said boiler having steam-domes, of steam-supply pipes leading from the domes through the boiler to the fire-pan, an oil-tank and an oil-supply pipe leading from the oil-tank through the boiler to the fire-pan.

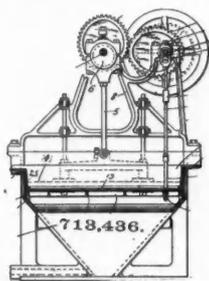
713,413. CHARGING DEVICE FOR COKE-OVENS.—Alfred Ernst, Cleveland, Ohio, assignor to the Wellman-Seaver-Morgan Engineering Company, Cleveland, Ohio. The combination in a charging-hopper for coke-oven-charging machines, of sides movable from and toward each other, a longitudinally-movable bottom, and means whereby said longitudinal movement of the bottom is caused to effect expansion or contraction of the sides of the hopper.

713,419. CRUDE-OIL BURNER.—Louis S. Flatau, St. Louis, Mo. In an oil-burner, the combination with a casing open at the top and constructed to form a fire-pan, a hollow converter mounted in said casing above said pan with intervening spaces, a trough inclosed in said converter, and an oil-receiving pan connected to said trough.

713,421. BLOWPIPE.—Edmond Fouché, Paris, France, assignor to Compagnie Française de l'Acétylène Dissous, Paris, France. In blowpipes intended for burning explosive gaseous mixtures, a nozzle having a central passage in form of two cones connected at their bases, gas-supply

pipes leading to the said nozzle, and chambers containing and closely filled with porous substances, interposed between each gas-supply pipe and the nozzle, said chambers opening in the central passage of the nozzle by small branch pipes.

713,436. JIG FOR MINERAL OR ORE WASHING.—Charles J. Hodge, Houghton, Mich. A jig for mineral or ore washing, comprising in combination a tank, one end wall of which is lower than its other walls and provided with an outwardly-projecting lip, a screen-frame supported in said tank, means for vibrating the said screen-frame, one end wall of which screen-frame is in a plane below its other

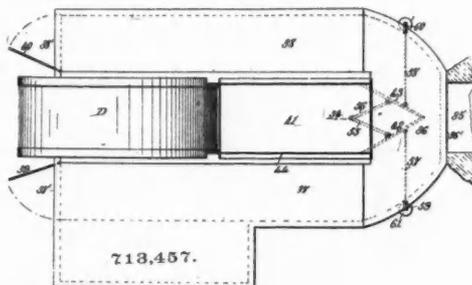


walls, but in a plane above the lower end wall of the tank, and is provided with an overflow-lip projecting from the tank-lip in a plane differing therefrom in pitch, whereby a clearance is provided for the oscillation of the screen-frame end walls, the screen and the screen-supporting frame, and the contents of the screen-frame is prevented from overflowing its sides and one end.

713,440. PROCESS OF TREATING METAL PLATE.—Jenkin Howell and Samuel J. Drew, Joliet, Ill. In the process of treating metal plates in the manufacture of tin-plate, first subjecting the plates to the usual pickling-bath, then washing the plates in a weak solution of muriatic acid and water, then washing the plates in a solution of lime and water, and then subjecting them to hot air.

713,451. BLOWPIPE.—Mathew M. Kerr, Detroit, Mich. In a blowpipe, the combination of an air-tube, a gas-tube, a passage leading to the gas-tube, a passage leading to the air-tube, the bores of said passage having different heights of cross-section, a cock adapted to adjust the opening in each of said passages, and means for connecting the spindles of said cocks together so that they shall turn in unison at peripheral velocities proportional to the heights of cross-section of the passages which they control.

713,457. APPARATUS FOR VENTILATING MINES.—Charles Kuderer, Allegheny, Pa. A housing having a fan, passages at opposite sides of the fan each one communicating with a fan-intake, the airway of a mine, and the at-



mosphering on said housing, a central passage between said other passages adapted to communicate with said airway and with the fan, a chimney opening into said central passage, doors hinged approximately at the junction of the central passage and chimney at opposite sides thereof, said doors being arranged to be alined with each other to close the chimney, a third door adapted to co-operate with one of the other doors to bridge central passage, and means independent of said doors for opening or closing the central passage.

713,464. ELECTRIC LOCOMOTIVE.—Ellwood C. Lindsay, Philadelphia, Pa., assignor to Burnham Williams & Company, Philadelphia, Pa. The combination of a frame having bearings, an axle mounted in said bearings having traction-wheels and a gear-wheel, an intermediate shaft also mounted in bearings in the frame and having a gear-wheel meshing with the gear on the axle, a motor hung to said intermediate shaft and provided with a gear-wheel meshing with said gear-wheel on the intermediate shaft.

713,475. PROCESS OF REFINING ASPHALTIC MINERAL OILS.—John C. Mims, New Orleans, La., assignor of one-half to Quitman Kohnke, New Orleans, La. A process of removing asphaltum from mineral oils containing a high percentage of asphaltum which consists in adding to the oil a mixture of about 5 parts by weight of potassium bichromate to 95 parts of sulphuric acid in quantity equal to 1 to 10 per cent. of the oil, allowing the asphaltum and associated impurities to settle and then washing the oil with an aqueous solution containing about 5 per cent. of sodium hydroxide and 5 per cent. of sodium carbonate and then separating the purified oil from the sedimentary matter.

713,485. WELL-TUBE LIFTER.—Joseph Neumeier, La Crosse, Wis. The combination with a yoke embracing the well-tube; of a clutch-lever having loosely-pivoted clutch-block on one side, and a rigid cam-head with concave seat for the well-tube on the other side.

713,487. DEVICE FOR OPERATING THE DOGS OF HOISTING-ENGINES.—Peter Olsen, New York, N. Y., assignor to the Lidgerwood Manufacturing Company, New York, N. Y. In a hoisting-engine, the combination with a drum, a friction driving means for said drum, and a friction-controlling member, of a drum locking or holding mechanism, and an operating member therefor mounted upon the friction-controlling member.

713,512. FUEL BRIQUETTE.—Joseph Simons, New York, N. Y. A fuel briquette containing fuel, plaster-of-paris, and saccharine matter, and which has been heated above the point where the saccharine matter turns into caramel wholly or in part.

713,519. METHOD OF BUILDING TUNNELS, SHAFTS, ETC.—Charles SooySmith, New York, N. Y. A method of excavating which consists in first placing a plurality of supports in the line of the proposed excavation; second, constructing one or more pilot-tunnels; third, introducing freezing means into the pilot-tunnel; fourth, excavating the frozen soil.

713,520. METHOD OF CONSTRUCTING TUNNELS.—Charles SooySmith, New York, N. Y. A method of constructing a tunnel, which consists in, first, driving a series of piles to form a foundation; second, advancing a shield over the same; third, constructing the tunnel upon the foundation.

713,521. TUNNEL.—Charles SooySmith, New York, N. Y. A plurality of piles, a main tunnel superimposed upon the same and a pilot-tunnel.

713,544. STRAINER FOR WELL-TUBING.—John M. Ware, Shuteston, La. The combination in a tubular-well strainer of filtering material consisting of three layers, an inner layer formed by a wire coiled around the tubing in spaced convolutions, an intermediate layer of wire-gauze, and an outer layer of twisted wire wound around the tubing upon the wire-gauze.

713,562. CLAY-PRESS.—William D. Frerichs, Tottenville, N. Y., assignor, by mesne assignments, to the Atlantic Terra Cotta Company, New York, N. Y. In a clay-press, the combination of a receptacle for containing the clay, and a plunger, said plunger being provided with a plurality of projecting portions separated from each other, an air-passage leading to the face of each of said portions provided with a resilient flexible plate on its face forming a valve permitting the entrance of air when the plunger is withdrawn, and openings communicating with the spaces between said projections for the discharge of surplus material.

713,568. NON-ACTIVE METAL FOR USE IN STORAGE BATTERIES.—Henry H. Lloyd, Germantown, Pa., assignor to Electric Storage Battery Company, Philadelphia, Pa. A non-active metal for use in connection with storage batteries and having the qualities of toughness, smoothness, resiliency, and great mechanical strength in proportion to its weight, said metal comprising lead cast with substantially 12 per cent. by weight of antimony and rolled in a cold state.

713,570. BRICK-MAKING MACHINERY.—Charles R. Monroe, Washington, D. C. The combination with the mold-wheel; the cylinder and the supporting-frame of timbers pivotally supported at their lower ends on the main frame, and held from lateral movement; the adjusting-rods supporting the upper ends of the timbers and the presser-roller journaled on the said timbers, said roller having a yielding pressing-surface adapted to engage the mold-wheel periphery.

GREAT BRITAIN.

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

- Week Ending October 23, 1902.
- 13,115 of 1901. FUME COLLECTOR.—W. W. Fyfe, London. Improved arrangement of flues for depositing fume from smelting and roasting furnaces.
 - 24,026 of 1901. GOLD EXTRACTION FROM CYANIDE SOLUTION.—F. J. Mumford, Kalgurli, W. A. An electro depository both for gold extraction, consisting of a horizontal revolving cylinder containing flumes and for cyanide, the internal surface consisting of an amalgamated copper cathode and the current being introduced from the axis.
 - 63 of 1902. TREATING BASIC SLAG.—H. S. Steinberg, Stockholm, Germany. Pulverizing Thomas slag by exposing it to high pressure steam.
 - 11,059 of 1902. MINER'S LAMP.—Rhenish Westfalisch Maschinenbau. A miner's lamp opened and locked by a bolt operated electrically.
 - 15,785 of 1902. BALL MILL.—G. S. Maxwell, New York, U. S. A. Improved arrangement of rolls and balls in ball mills.

THE BOX ELECTRIC DRILL.

The accompanying illustrations show a new form of drill, which, it is claimed, overcomes the objections heretofore made to drills operated by electricity. The "Box" electric drill is manufactured by the Denver Engineering Work Company, of Denver, Colo., and its design is the result of two years' study and experiment in the company's works. It is best described in the words of the makers themselves.

The principle governing the action of the Box electric drill is a well-known one, and is best illustrated as follows: Imagine a small weight suspended from your hand by a long elastic rubber band. By moving your hand up and down slowly, the weight will also move in a similar manner, but through a greater range. Increase the rapidity of motion of your hand and the weight will increase its motion until you reach a speed where the weight is moving up as your hand is moving down, yet the motion of the weight keeps time with your hand. Substitute a coiled wire spring, which is open when at rest, for the rubber and you will find, at the right speed, that you will not only pull the weight up but also push it down as your hand and the weight move in opposite directions, and you will do this without apparent effort or without jar to your hand, because the motion is a naturally harmonic one, somewhat like the swinging of a pendulum. The above describes exactly the action of the drill, the hammer of the drill acting like the weight and the crosshead following the motion of the hand, in the above experiment.

The mechanism of the drill is simple, and may be briefly described as follows: One single crank shaft with a gear on one end and a pinion on the other. The gear is driven by the pinion on the armature shaft of the motor. The crank imparts motion by means of a connecting rod, to the crosshead. The crosshead is a hollow plug moving back and forth in one end of the cylindrical interior of the drill casing. The crosshead is connected by a spring to a solid plug in the cylindrical interior, which plug follows the motion of the crosshead, but through a longer range, exactly as described in the foregoing experiment with the weight and the spring. It is, therefore, to be seen that what is accomplished by a heavy mass moving at a comparatively low velocity (not number of strokes, but feet per second), in the air or other electric drills, is accomplished in the Box electric drill by a slight mass moving at a high velocity, with its

chuck is enormous, in fact, sufficient to twist off the drill steel itself.

In the water scheme of the drill, a steel tube is placed over the drill, through the shell of which tube the water is supplied. The tube holder serves also to effect the water connection with the water supply. By this novel scheme an intense and concentrated washing action is produced which drives everything before it and out of the drill hole. The tube acts also as a guide to the drill steel. The method of

The Box drill is made in but one size at present which is equivalent to an air or steam drill with a 3-inch piston. But one type of motor is used, a direct current, 110 to 125 volts, in order to facilitate manufacture, and the low voltage used avoids unpleasant shocks from the line. Where drills are required to operate from circuits of other voltages or from alternating current circuits, a motor generator is introduced in the circuit to transform the current to that necessary for the drill.

The dimensions of drill are as follows: Length over all when drill is on back end of feed screw, 44½ inches; length over all when drill is at extreme front end of feed screw, 64½ inches; width of drill, over all, 15¼ inches; distance from center of arm to top of drill, 17 inches; distance from center of arm to back end of feed screw handle, 29½ inches; distance from center of arm to front end of guide shell, 15 inches;

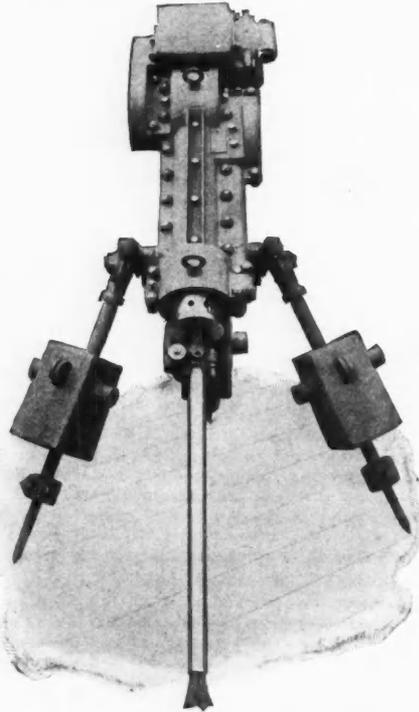


FIG. 1.—GENERAL VIEW OF DRILL.

holding the drill steel in the chuck is very simple. The drill steel has a notch cut in the side, and when the steel is inserted in the round hole of the chuck, the chuck block is dropped into the notch. The steel is thus held loosely the same as in hand drilling.

The power required to operate one No. 4 Box electric rock drill at maximum speed is 1 horse power. With

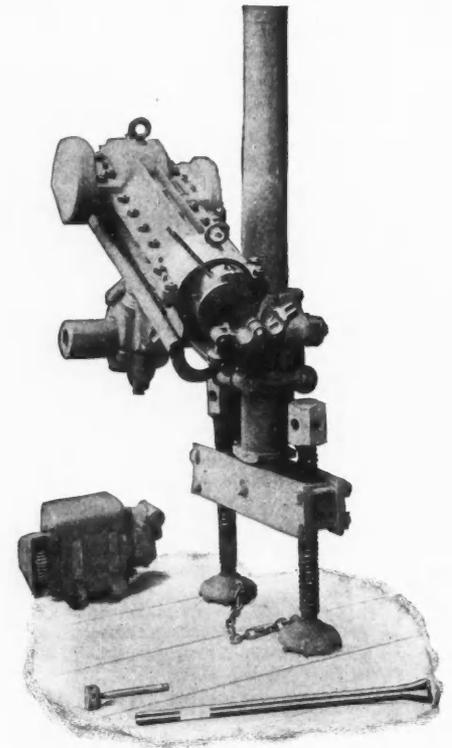


FIG. 3.—DRILL, WITH MOTOR REMOVED.

distance from center of arm to front of drill when drill is on extreme front end of feed screw, 35 inches; length of feed, 20 inches.

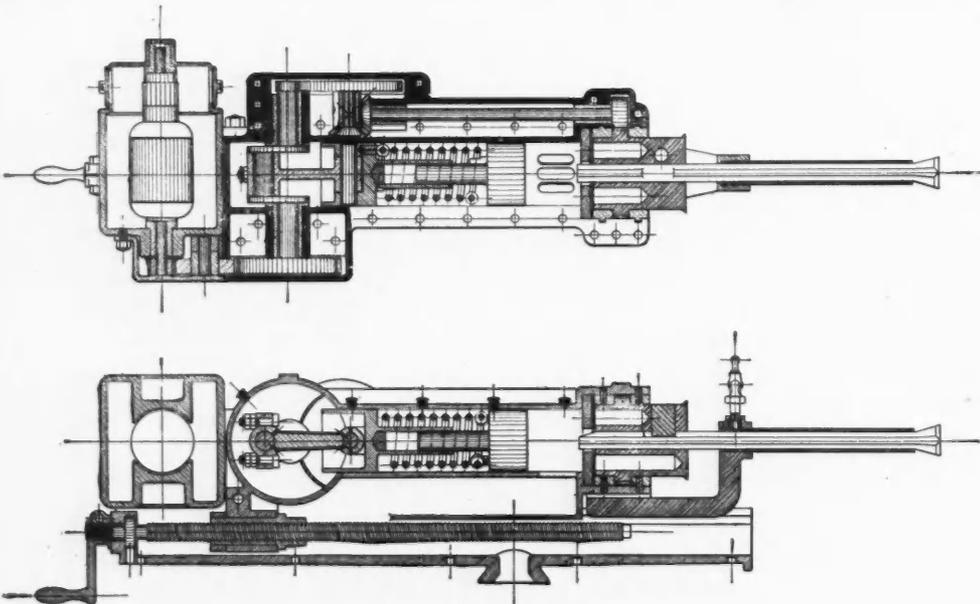


FIG. 2.—SECTIONS OF BOX ELECTRIC DRILL.

accompanying advantages of light moving parts, small power expenditure, little jar or shock, and minimum wear.

Continuing the description, the pinion at end of the crank shaft drives the chuck through a set of gears, and as the gears are proportioned for a power ratio of about 100 to 1, the twisting force at the

this power a 2¼-inch hole can be drilled at the rate of three inches per minute in the hardest kind of granite. The consumption of fuel in an oil engine direct connected to an electric generator, and furnishing current sufficient for one No. 4 Box drill at an altitude of 10,000 feet above sea level, is 4½ pints of kerosene oil per hour.

A NEW USE FOR ALUMINUM.—The *London Engineer* says: "A valuable property of aluminum has, it is said, been discovered by Herr A. Bernhard, of Hamburg, namely, that of being able to sharpen cutlery. Though a metal, aluminum has the structure of a fine stone, possesses a fine dissolving power, and develops during the whetting process an exceedingly fine metal-setting substance greasy to the touch, while showing strong adhesion for steel. The knives in a short time obtain such a fine razor-like edge that even the best whetstone cannot compete with the result."

COAL MINING IN AUSTRIA.—The official statistics which have just been issued show that the mineral production of Austria (exclusive of Hungary) in 1901 included 11,738,839 tons of coal, 22,473,509 tons of brown coal, and 1,963,245 tons of iron ore. Of the value of the mineral output brown coal represented 48.25 per cent, coal 42.26 per cent, and iron ore 4.45 per cent. Compared with the previous year these three branches of mining showed satisfactory increases. There were 143 collieries in operation in Austria in 1901, and they afforded employment to 70,344 persons. The average output per miner during the year throughout Austria was 166.9 tons. There were 254 brown coal mines in operation, and they afforded employment to 59,591 persons.

PERSONAL.

Mr. John B. Farish is in New York City.

Mr. Frank H. Buhl, of Sharon, Pa., has been at Salt Lake, Utah.

Mr. C. H. Wittenoom recently sailed on the *Minneapolis* for London. He has spent the summer in Colorado.

Mr. H. A. Suttle, of Peoria, Ill., interested in the Burlington Gold Mining Company, is visiting Prescott, Ariz.

Mr. G. M. Gouyard, mining engineer, of Denver, Colo., has just returned from a professional trip to Guerrero, Mex.

Mr. M. A. Goel, of the Torreon Mining and Smelting Company, located at Torreon, Mex., has been visiting San Antonio on business.

Mr. Edward G. Stoiber has been operated upon for appendicitis at St. Luke's Hospital, Denver. From last accounts he was doing well.

Mr. Charles B. Flynn, James Flynn and Rafael Bustamante, of Durango, Mex., have gone to Parral, where the Flynn's have interests.

Mr. C. W. Pritchett, mining engineer, returned to Denver, Colo., a few days ago from a trip to Utah and Wyoming on professional business.

Mr. T. H. Oxnam, consulting engineer for the Palmarajo & Mexican Gold Fields, Limited, is examining mines in Arizona for London, Eng., men.

Mr. J. H. Curle, the author of "The Gold Mines of the World," passed through New York City last week and sailed for England on the *Lucania*.

Mr. J. B. Brown, mining engineer, of Warren, Idaho, has recently returned to Idaho, after examining mines near Prescott and Wickenburg, Ariz.

Mr. F. X. Gosselin, land and timber agent for the Canadian Yukon, has been chosen to fill the office of assistant gold commissioner at Dawson, Yukon.

Mr. D. McDonald recently resigned the superintendency of the New Era Mining Company at Searchlight, Nev., to go on a prospecting trip in Arizona.

Mr. Richard H. Terhune, mining engineer and metallurgist, of Salt Lake City, has moved to Denver, Colo., where he will continue to practice his profession.

Mr. Charles Botsford, mining engineer at the Centennial Mine in the Lake Superior copper district, has returned to the mine from a month's visit in Buffalo, N. Y.

Mr. Frank Borrow, who has been superintendent of the Contention Mine at Telluride, Colo., until lately, sailed for London en route to Bulowayo, Africa, on November 22.

Mr. C. T. Geddes, mining engineer of New York City, has been in Basin, Mont., recently examining the property of the Montana Mineral Land Development Company.

Mr. C. L. Hastings has been appointed Pittsburg representative of the Bethlehem Steel Company, of South Bethlehem, Pa. He has opened an office in the Keystone Bank Building.

Mr. Will G. Nebeker has returned from a 3 weeks' trip to the lower portion of California, where he has been conducting an examination of mining property in the interests of local parties.

Mr. Edwin E. Chase, mining engineer, of Denver, Colo., is at present examining mining property at Wickenburg, Ariz. His address there is in care of the Oro Grande Mining Company.

Mr. Ernest R. Woakes, of Nelson, B. C., where he is managing engineer for the Duncan United Mines, recently left Nelson for San Francisco, to attend the meeting of the California Mining Association.

Mr. William A. Farish, for the past 25 years one of the most prominent mining experts in the West, has accepted the management of the Majestic Copper Mining and Smelting Company, at Milford, Utah.

Mr. Sidney A. Witherbee, of Detroit, Mich., secretary of the Vacas-Quebradilla Junction Mines Company, whose property is situated near the Vacas Mine, Durango, Mex., has spent 10 days on an inspection trip to the property.

Mr. J. M. Maxwell, a pioneer attorney and mining man of Leadville, Colo., who has been at the head of the New Leadville Home Mining Company the past year, has been appointed private secretary to Governor-elect Peabody, of Colorado.

Mr. Albert Hill, it is stated, has left England for Rossland, B. C., to take charge of the Le Roi No. 2, Rossland Great Western, and Kootenay mines, in succession to Messrs. Bernard MacDonald and William Thompson, whose engagements will shortly expire.

Mr. L. A. O. Gabany, mining engineer and chemist, of Brookwood, Ala., has been appointed chief engineer for the Alabama Consolidated Coal and Iron Company. This position was recently made, owing to the rapid growth of the company's mining and coke manufacturing departments.

Prof. G. C. Caldwell, head of the department of chemistry at Cornell University, has tendered his resignation, to take effect immediately. Prof. Caldwell was 68 years old, and under the rules recently adopted he would have had two years to serve before being retired under the age limit, which was fixed at 70 years.

Mr. Stephen Pantchenko, of St. Petersburg, one of the leading officials of the Russian Ministry of Ways and Communication and director of the J. S. Pantchenko Paper Mills and Coal Mines Company, of Rostov-on-the-Don, Russia, and Mr. Paul Tiesenhansen, a large owner of Russian coal mines, are in the West studying American mining methods.

The Academy of Natural Science of Philadelphia has, on the recommendation of its special committee, consisting of Messrs. Theo. D. Rand, Amos P. Brown, R. A. F. Penrose, Jr., and Henry Fairfield Osborn, conferred the gold medal of the Hayden Memorial Geological Award for 1902 on Sir Archibald Geikie, late director general of the Geological Survey of Great Britain and Ireland.

Dr. F. A. Wilder has recently been appointed State geologist of North Dakota and professor of geology at the State University. Dr. Wilder comes to North Dakota with a varied experience in geological work, and with an excellent record in connection with other surveys, notably that of Iowa. The work of the survey is an adjunct to the department of geology in the State University at Grand Forks.

Mr. W. P. Mackenzie, who for several years has been manager of the New York offices of the Harrisburg Foundry and Machine Works, of Harrisburg, Pa., has resigned and has made a co-partnership arrangement with M. Quarrier under the firm name of Mackenzie & Quarrier, with offices at 203 Broadway. They will act as New York export agents for the Harrisburg Foundry and Machine Company, and will also represent a number of other concerns.

Mr. Alfred Walter, president of the Lehigh Valley Railroad, has resigned, his resignation taking effect on November 30. Mr. Walter was elected president of the Lehigh Valley in 1897, succeeding Mr. E. P. Wilbur. He was regarded as the choice of the Drexel-Morgan interests, which a short time previously had become the dominant factors in the affairs of the company. Mr. Walter has had wide railroad experience, dating from 1872. He was at various times connected with the Pennsylvania Railroad, the Northern Central, the Baltimore & Potomac, the Baltimore & Ohio and the New York, Lake Erie & Western.

OBITUARY.

Joseph H. Outhwaite, who was for many years an extensive operator of iron ore mines on the Marquette and Menominee ranges, in Northern Michigan, died recently in New York City, aged 51 years. He was born in Cleveland, and was long engaged in business as senior member of the firm of J. H. Outhwaite & Co., which dissolved 2 years ago, after a history of marked success. Mr. Outhwaite had long been in delicate health on account of pulmonary troubles, but the cause of death was a surgical operation for a more recent ailment. He had spent much of his time in California for 7 years, but always considered Cleveland his home. Mr. Outhwaite is survived by a widow and 2 children.

Arthur L. Collins, general manager of the Smuggler-Union Mining Company, of Telluride, Colo., was shot in the back by an unknown assassin on the evening of November 19, while sitting with some friends in the office building of the company at Pandora. He died on November 21. The assassins probably used a short barreled shotgun, standing outside a window, and not over 20 ft. distant from Mr. Collins. No clue to the murder has been found, and in view of the brutal murders attending the strike of July, 1901, at Telluride, which neither county nor State officials sought to punish, it may be doubted if Mr. Collins' murderer will get the penalty of the law.

Arthur L. Collins was born July 8, 1868, at Truro, County of Cornwall, Eng. He received his earlier education in England, and while quite young went to Spain, and was assayer at the Tena del Hierro Mine, near Rio Tinto. He later returned to Cornwall and became assistant superintendent of tin mines there. From England he went to Norway and later visited nearly every part of the globe, including Spain, France, Asia, Africa and Australia.

He received his education in mining and metallurgy under the supervision of his father, J. H. Collins, who is one of the most prominent mining experts in England.

Mr. Collins came to Gilpin County, Colo., about 10 years ago as the representative of the English owners of the California Mining and Milling Company, owning the California Mine at Nevada and the Hidden Treasure Mill at Black Hawk. He was also in charge of the Rocky Mountain Mill at Black Hawk for English parties, and together with his brother, George Collins, operated a number of properties in the county, among them the Kloin-Geramin, Forfar, Minnesota, Baltimore and others, which were worked

as private enterprises by the brothers. He was consulting engineer of the Gold Coin Company which operated the Hidden Treasure property in Nevada and also looked after the interests of the same New York parties when they were interested in the Gregory-Bobtail properties at Black Hawk as well as being consulting engineer of the Perigo properties. When he accepted the position as manager of the Smuggler-Union properties at Telluride in 1899 he still made regular visits to Gilpin County.

His widow is the daughter of Judge Clayton F. Becker in Central City. He leaves two children. While of a reserved nature he was always easy to approach, either on business or social matters.

SOCIETIES AND TECHNICAL SCHOOLS.

COLORADO STATE SCHOOL OF MINES.—The cornerstone of the Stratton hall of Metallurgy and Engineering was laid on November 19, with Masonic ceremonies. The hall is the gift of the late W. S. Stratton.

UNIVERSITY OF CALIFORNIA.—The cornerstone of the new Hearst Memorial Mining Building of the University of California was laid with appropriate ceremonies at Berkeley, Cal., on November 18. The building is to cost about \$250,000, fully equipped. It is the gift of Mrs. Phoebe Hearst, in memory of her husband of the late Senator George Hearst. It is so planned, that it can be indefinitely enlarged without sacrifice of symmetry. The frame work is of steel, the floors are wholly independent of the interior walls, and flues for furnaces, hoods, heating and ventilators are provided in large number. The general mining laboratory will open on the central axis, opposite the main entrance. It will be virtually a great central court, 46 by 118 ft., open to the roof and lighted from above. A traveling crane will provide for the moving of heavy mining machinery. Broad galleries at the first and second stories will serve as corridors and as vantage points for viewing mining operations. In the east wing there will be metallurgical laboratories for juniors and seniors, in the west wing research laboratories, and in the central northern portion of the building a dry-crushing tower, 3 stories high. The tower will be flanked by 2 rooms, 40 by 62 ft. in size, one to be used as a smelting room for copper and lead, the other for a gold and silver mill. On the second floor will be 2 lecture rooms, and private study and drafting room for the dean. On the third floor will be a library and stack room, and attic rooms for drafting, photographic work and other purposes. In the basement there will be 2 large locker rooms, provided with shower baths; forge rooms, heating and ventilating apparatus.

INDUSTRIAL NOTES.

The International Steam Pump Company, is at present making weekly shipments of some 70 pumps to Russia.

The A. Leschen & Sons Rope Company, of St. Louis, Mo., is reported to have received a substantial Mexican contract for wire rope tramways.

The Chicago House Wrecking Company, of Chicago, Ill., is reported to have taken a number of orders for small plants to be shipped to South Africa.

The M. Garland Company, of Bay City, Mich., has an order from a company in Boyne City, Mich., for a set of Garland's improved steam feed valves and steam feed complete.

The Gates Iron Works, of Chicago, Ill., now controlled by the Allis-Chalmers Company, has orders on hand for construction equipment to be shipped to South Africa.

The Stilwell-Bierce & Smith-Vaile Company has secured a contract, through the Strong & Trowbridge Company, of New York City, for turbines to be shipped to Auckland, New Zealand.

The Mount Union Silica Brick Company, of Mount Union, Pa., has received a contract to furnish all the silica brick to the Dominion Iron and Steel Company, of Sydney, N. S., during the coming year.

The new furnace which Joseph Wharton, of Philadelphia, is building at Phillipsburg, N. J., on the site of the old Andover Furnace, is expected to go into blast next March. The stack will be 18 by 85 ft., and will have a daily capacity of about 200 tons.

The S. Obermayer Company, of Cincinnati, O.; Chicago, Ill., and Pittsburg, Pa., manufacturers of foundry facings and supplies, has received several large orders from European and South American points, and a number of others from Mexico.

The board of directors of the American Bridge Company of New York was recently reduced from 11 to 5 members. The new directors are: Elbert H. Gary, Joshua A. Hatfield, Alfred J. Major, Thomas Murray, Henry Schoonmaker. The board re-elected the former officers.

The Burt Manufacturing Company, of Akron, O., has received an order for 2 large Burt exhaust heads and a 200-gal. Cross oil filter for the American Steel

and Wire Company's works at Cleveland, O. This is the 29th order for oil filters which the Burt Company has received from this one concern.

The Salt Lake Engineering Works is the title of a new company, which intends to engage in the manufacture of machinery and mine and smelter supplies at Salt Lake, Utah. The company is incorporated at 1,000,000 shares of \$1 each. William Read is president, Reuben May vice-president, and Charles G. Ferrell secretary and treasurer.

The Heine Safety Boiler Company, of St. Louis, Mo., is about to ship 1,000 h.p. of boilers—2 units—to the Kioto Traction Company, of Kioto, Japan, the contract for which was secured through Bagnall & Hilles, of Yokohama. The engines will be forwarded by McIntosh, Seymour & Co. The General Electric Company got the contract for the generators.

The first heat was melted recently at the new plant of the American organization of William Jessop & Sons' Company, of Shefeld, Eng., at Washington, Pa. As a test about 3,600 lbs. of crucible steel were made. Among the officials of the company present were Treasurer James Jessop and their American representative, W. F. Wagner.

The Baltimore Copper Smelting and Rolling Company, Baltimore, Md., has completed arrangements for abandoning its property at Canton it has occupied for over 75 years, and is transferring the machinery to their new works, on a plot of 8 acres adjoining its adjoining its electrolytic plant, where it will have better facilities for handling goods by cranes and all the latest appliances.

The Borden & Selleck Company, of Chicago, Ill., which makes a specialty of Harrison conveyors, and designs and contracts for the building of complete plants and docks for the storage and handling of coal, says it has equipped some of the largest coal yards and boiler rooms in the country with Harrison conveying machinery. Armour & Co., of Chicago, the Armour Packing Company, and the Northwestern Fuel Company are among the firms that have used Harrison conveyors for years.

The following were among orders received lately by the Colorado Iron Works, of Denver, Colo. One smelting equipment for "Mynbouw Maatschappij Soematata," Amsterdam, Holland, to be shipped to the island of Celebes, Dutch East Indies; 96 waterjackets for the American Smelting and Refining Company, Monterey, Mex.; 50 waterjackets for the Globe plant at Denver, Colo.; one set, 40 in. by 16 in., improved standard rolls for the Economic Mill at Victor, Colo., which makes 4 sets of these rolls in use there; and 3 iron top Bartlett tables for Mexico.

The Union Steel Company and the Sharon Steel Company, the two largest independent producers of steel, except the Jones & Laughlins Steel Company, have consolidated. The reorganized company will be known as the Union Steel Company. George W. Darr, of New York, will retire as president, and A. W. Mellon will succeed him. The capital stock of the two corporations is \$55,000,000, and \$30,000,000 of new stock will be issued. It is said a railroad 120 miles long will be built by the Union Steel Company, to run from Elk Creek Harbor on the Pittsburg and Lake Erie Railroad to Sharon, 60 miles, and from there to Donora, 60 miles.

The Mine and Smelter Supply Company, through its Denver office, recently booked orders for the following plants: A 100-ton cyanide plant for Chihuahua, Mex.; a large plant of mine machinery for a complete mill at Silver Plume, Colo.; a cyanide mill of 100-ton capacity for northern New Mexico, and a complete 40-ton concentrating mill for the Socorro District, N. Mex. It has also a gasoline hoisting engine built especially for it by the Model Gas Engine Company, of Auburn, Ind., designed especially for duty in mines at high altitudes. The Mine and Smelter Supply Company reports the sale of 4 in the last few days, being 40, 25, 16 and 10 h.p., respectively.

The Keystone Driller Company, of Beaver Falls, Pa., is in the market for some new machinery, such as lathes, drill presses, planers, sharpeners, etc. It also require a quantity of lumber for building purposes. The greater part of the plant owned by this company was recently destroyed by fire, and the machinery now required is to be, for the present placed in a building now used for other purposes to provide means for taking care of the business established by the concern. A committee consisting of R. M. Downie, secretary; D. M. Messner, superintendent, and E. O. Eyer, sales manager, has been appointed to inspect the numerous sites that have been offered the company and to select the one seeming to present the most advantages.

The Pacific Steel and Wire Company is a newly organized company in San Francisco, which includes among its stockholders D. O. Mills, H. E. Huntington, I. W. Hellman, A. Borel, F. M. Smith, W. H. Talbot, John Rosenfeld's Sons and L. E. Spear. The company has arrangements with the National Steel and Wire Company, the DeKalb and Union Fence companies, of DeKalb, Ill., and the Lackawanna Steel Company, of Buffalo, N. Y. Frank L. Brown is general manager, Frederick W. Hall vice-president and

Lewis E. Spear treasurer. With cable facilities the company expects to be able to fill Oriental orders from California in about 20 days. It has secured 25 acres of land in Alameda County opposite San Francisco and facing Oakland Harbor. Contract has been let for the first structure, which is to be a brick building 418 ft. long and 132 ft. wide. Other buildings will be put up as the business expands. The Eastern companies named are to furnish all the raw material.

TRADE CATALOGUES.

One of the best illustrated and most comprehensive pieces of commercial literature on the subject of cranes and electric travelers to be found anywhere has just been sent out by the Whiting Foundry Equipment Company, of Harvey, Ill., as Catalogue No. 36.

Roy Hopping, mineralogist of New York City, has issued a bulletin describing some consignments of minerals he has recently received, including rare Tyrolean, Bavarian and Hungarian minerals, and some beautiful English minerals.

A little pamphlet sent out by the Allis-Chalmers Company, of Chicago, Ill., is entitled "A Few Users of Gates' Rock and Ore Breakers," gives the names of some large mining concerns, railroad companies, etc., that use Gates' gyratory crushers, and contains copies of testimonial letters from quarrying companies, iron ore mines, and makers of road ballast.

A little folder, issued by the Cleveland Flue Cleaner Manufacturing Company, of Cleveland, O., describes the A & D steam boiler flue cleaner, which is recommended for its conveniences, simplicity, durability and efficiency. The folder contains copies of testimonial letters from users, and in addition describes the Brisbane shell-cutter emery wheel dresser for truing and sharpening solid emery wheels while running at full speed.

A finely printed and illustrated pamphlet of much more interest than the general run of trade publications is entitled "Underground Wire Rope Haulage," and is issued by the Broderick & Bascom Rope Company, of St. Louis, Mo. The pamphlet describes the tail rope haulage plants installed at the workings of the Coal Valley Mining Company at Sheward and Cable, Ill., and gives valuable information about such details as operating costs, etc.

Stewart gas furnaces, with burners adapted to different kinds of natural gas, gasoline gas or illuminating gas are described in a pamphlet published by the Chicago Flexible Gas Shaft Company, of Chicago, Ill. The muffle furnaces are intended for heating all kinds of tools, such as drills, dies, punches, springs, cutlery, etc., or for many small forgings. The crucible furnaces are for melting babbitt, hardening lead, or heating oil baths for tempering. The company also makes large oven furnaces for heating large cutters, dies, etc., or for case hardening and annealing. Certain of the furnaces are also intended for assayers' use. Flexible shafting for driving light tools is also described in the pamphlet.

The Petroleum Iron Works Company, of Washington, Pa., has got out a 24-page illustrated pamphlet, entitled "Fuel Oil Equipments." This pamphlet is designed to give information applicable to an ordinary steam plant, with cuts of a general nature showing how oil is used as fuel. The pamphlet points out the advantages of oil fuel; the small labor cost about the boiler plant, ease of regulation of fuel, absence of smoke and dust and increased steam heating effects as compared with coal. Some tables show the relative values of coal and oil in evaporating water. Among the devices described for using oil fuel are the Gem burner, a pressure regulator for feeding oil, duplex fuel oil or boiler feed-pumps and tanks of various descriptions.

GENERAL MINING NEWS.

ARIZONA.

GILA COUNTY.

(From Our Special Correspondent.)

Pinto Mining and Smelting Company.—V. V. Clark is building a 100-ton concentrator for this company at Pinto Creek.

MARICOPA COUNTY.

(From Our Special Correspondent.)

Black Rock.—At this mine, near Wickenburg, 2 shifts are working on a large low-grade body of ore on the White Mine, 3 shifts are driving a tunnel along a well defined ledge.

Cocorro.—At this mine, near Black Rock, the 20-stamp mill is nearly completed.

Mariocopa Gold Company.—This company has 3 dry concentrators at work run by gasoline engine.

Oro Grande.—This mine, at Wickenburg, reports good ore in the 300-ft. level.

White Cloud.—This mine, in San Domingo Camp, has started sinking its 2-compartment shaft.

MOHAVE COUNTY.

(From Our Special Correspondent.)

Midnight.—This gold and silver mine, at Niggerhead, is hauling about a car-load of ore from the 400-ft. level to the Vulcan Smelter at Chloride. A gasoline engine and steam hoist will be installed, and the main shoot sunk to 600 ft.

Minnesota.—On the 300-ft. level of this mine at Chloride, another big body of gold and silver ore is reported cut, 1 ft. of which is said to run 28 oz. in gold per ton. This, and a number of adjacent claims, belong to the Philadelphia & Arizona Mining Company. E. T. Loy is general manager.

Ramrod.—E. K. Buttolph and H. E. Nicholson are at this mine in Weaver District from Denver, sampling it, with a view to purchasing.

YAVAPAI COUNTY.

(From Our Special Correspondent.)

Ontario.—This mine, near Ontario, is having the shaft sunk deeper, and drifting on the 400-ft. level is well under way. The vein is 5 ft. wide.

Oriental Company.—This company has finished its 20-stamp mill at Poland, and will handle the ores of the Postmaster Mine.

YUMA COUNTY.

(From Our Special Correspondent.)

Goodenough.—The company is down 350 ft. in the deep shaft, and intends to sink 500 ft.

Old Dominion.—Furnace No. 2, at the smelter at Globe, was blown in recently, making 2 furnaces in operation. The force at the smelter has been doubled, and many more men will be required at the mine to take out and handle the larger supply of ore needed. Men are being put on every day, and within a very short time it is expected there will be 600 on the payroll.

CALIFORNIA.

ALAMEDA COUNTY.

(From Our Special Correspondent.)

Alameda County Miners' Association.—This association, a county branch of the California Miners' Association, has elected Prof. S. B. Christy, of the University of California, president, and A. W. Bishop secretary.

AMADOR COUNTY.

(From Our Special Correspondent.)

Alpine.—This mine, at Plymouth, adjoining the Empire, has been bonded to W. T. Beatty, who will soon develop the property.

Kennedy Mining and Milling Company.—There is some delay in delivery of material for the new mill and hoist at this mine at Jackson. J. F. Parks is superintendent. Construction at the mill will start in January.

BUTTE COUNTY.

(From Our Special Correspondent.)

Golden State Power Company.—This new company has filed on water rights from half a mile below the Big Bend tunnel to the lower end of the North fork of Feather River. Surveys are completed for an extensive electrical power system, which will be very advantageous to the mines. It is claimed that the North Fork of Feather River is capable of developing 300,000 h.p. The power may be brought as far as San Francisco.

HUMBOLDT COUNTY.

(From Our Special Correspondent.)

Big Lagoon Mining Company.—At the Big Lagoon on the coast line about 24 miles by stage from Arcata, this company is to have a new and larger dredge for working the black sands.

INYO COUNTY.

(From Our Special Correspondent.)

Arondo Mining Company.—This mine is between Ballarat and Johannesburg in the new Arondo District, and is owned by Dean & Jones, of Los Angeles. Mr. Dean is now in Los Angeles to secure more machinery. The ore is reported to average about \$5 per ton. It is run through Cornish rolls and then cyanided.

Reward Mining Company.—At the property of this Pasadena company at Reward, H. C. Steele manager, work is progressing on the new 30-stamp mill, which is to be run by electric power.

KERN COUNTY.

(From Our Special Correspondent.)

Napoleon Consolidated Mining Company.—From the Santa Ana, one of the mines belonging to this company in the Stringer District of Randsburg, a good clean-up has been made, 27 tons yielding \$132 per ton. F. V. Layton is superintendent.

St. John District.—Some prospecting is going on in this old district, about 30 miles west of Randsburg. The tailings and old dumps of the St. John Mine are

being cyanided. The Oshkosh Mining Company is developing and has erected a 4-stamp mill.

MADERA COUNTY.

(From Our Special Correspondent.)

Alpha.—At this mine at Coarse Gold Superintendent Cummings has 16 men at work.

Texas Flat.—At this group at Coarse Gold, J. T. McLellan superintendent, the grading is finished for a 20-stamp mill, which is being built in Chicago.

NEVADA COUNTY.

(From Our Special Correspondent.)

California Electric Company.—This new company, which is bringing power from Alta, will shortly let a competitor in, furnishing electric power at Grass Valley and adjacent mining districts. The poles have been set to within a few miles of Grass Valley.

Contin.—At this mine at Grass Valley new buildings are being put up and new machinery installed. A mill will not be built at present. The company has cleared the old tunnel of the Lafayette, and is exploring the old workings. If developments warrant a shaft will be sunk and hoisting work put up.

Gold Canyon Mines Company.—These mines are being advertised in various papers as in Nevada County, but the Grass Valley Tidings-Telegraph says they are unknown to the local press, and inquiry among mining men fails to show what district they are in.

Lamarque.—This mine at Grass Valley, owned by Samuel Dille and William Loutzenheiser, has been bonded by Leonard H. Carver, of 508 California Street, San Francisco. The mine has not been worked for some years, and will be unwatered. The shaft is 300 ft. deep, and will be sunk 200 ft. more. If the ore is as expected a mill will be built. There is a good pumping plant on the property.

SAN BENITO COUNTY.

(From Our Special Correspondent.)

Ramires Consolidated Quicksilver Mining Company.—At the property, near New Idria, retorts and machinery have been received, and active work on the mine has started.

SAN BERNARDINO COUNTY.

(From Our Special Correspondent.)

O. K.—This mine, at Dale, owned by Ingersoll & Easler, of San Bernardino, has been sold to a Boston syndicate represented by A. M. Hinckley, of Middleboro. The amount mentioned is \$75,000.

Southwest Ore Reduction Company.—This company, now putting up a 20-ton cyanide plant at Dale, has contracted for ore with 20 companies in that district. The contracts are also made so that the Reduction Company may acquire the mines within from 3 to 5 years. It is expected that the mines can deliver about 1,000 tons of ore monthly.

SAN DIEGO COUNTY.

(From Our Special Correspondent.)

Redman.—Work has begun in this mine at Banner. This was the first claim located at Banner, as far back as 1871.

SAN FRANCISCO COUNTY.

(From Our Special Correspondent.)

Manganese Location.—John Zachert has located a manganese mining claim, 1,500 by 600 ft., on the north slope of Twin Peaks, within the city limits of San Francisco, under the mining laws, but as all the land in the vicinity has long been held by private owners, and is not public land, Mr. Zachert may have some difficulty in establishing title. Even the well developed manganese deposits in Alameda and other counties have shown little profit of late years, the local demand being very light.

SANTA CLARA COUNTY.

(From Our Special Correspondent.)

Santa Teresa.—In this quicksilver mine, now being reopened by a Boston company under superintendence of R. B. Harper, good ore is reported at 300 ft. depth. It is expected that a 40-ton furnace will be erected. The mine is on the Monterey road some distance from San Jose.

SHASTA COUNTY.

(From Our Special Correspondent.)

Balaklala.—The suit about the ownership of this mine near Copley has been decided in favor of the Balaklala Mining Company. The case was taken into court on a suit for partition, three men claiming an interest and another having a lien. The mine is to be sold, and a balance due on purchase price paid from proceeds. Those claiming an interest are to be paid balance due them and the title will remain in the company.

Mountain Copper Company.—Large volumes of water have been turned into the Iron Mountain Mine in the endeavor to put out the fire which has caused so much trouble. No men have been laid off.

SIERRA COUNTY.

(From Our Special Correspondent.)

Poker Flat Mining Company.—On the property of this company, at Gibsonville, John Lassiat superintendent, a mill is shortly to be erected.

SISKIYOU COUNTY.

(From Our Special Correspondent.)

Hydraulic Mining.—The rains have brought sufficient water to start up many hydraulic mines, and water power mills at quartz mines.

SONOMA COUNTY.

(From Our Special Correspondent.)

Cinnabar King.—Work has been resumed on this quicksilver mine at Pine Flat.

Eureka.—At this quicksilver mine at Pine Flat the furnace is being tested.

Socrates.—At this mine, at Pine Flat, the new machinery has been installed and the furnaces will shortly be fired up. The force has been increased.

TRINITY COUNTY.

(From Our Special Correspondent.)

Ira Weatherby and John Drennan have struck good paying quartz at Coffee Creek, near the Yellow Rose of Texas Mine. At present they are pounding out the specimen rock in hand mortars. The miners are near Abrams.

Bullychoop.—The new mill at this mine, W. B. Gester superintendent, has started up. A tramway conveys the ore from mine to mill. The mine is on the northwest side of Bullychoop Mountain, about 20 miles south of Ono.

Fairview.—At this quartz mine near Minersville, Joseph Porter superintendent, 60 men are employed. The new 10-stamp mill is working well.

TULARE COUNTY.

(From Our Special Correspondent.)

Minnie Ellen.—This mine, 7 miles from Porterville, recently equipped with crushing machinery, etc., has started its new mill. C. S. Cox is manager, the mine being owned by Mr. Cox and F. M. Cook.

TUOLUMNE COUNTY.

(From Our Special Correspondent.)

Big Casino Mining Company.—This company, at Big Oak Flat has acquired the holdings of the Mack Consolidated Company is unwatering them. The company is hauling ore from its Two Brothers Mine to the Mack Mill.

Dreisam.—In this mine, near Carters, A. Trittenbach superintendent, sinking will be resumed.

Dutch.—In this mine at Quartz, A. Trittenbach superintendent, the shaft is now down 90 ft. below the 1,300 level. The mill is running full time on ore from the 1,200 level. A new Wilcox boiler with connections for oil fuel has been put in. A 2,000-ft. Roebling wire cable 1-in. diameter has been delivered at the mine.

Mount Hood Mining Company.—On this property at Jamestown, J. H. Burckhardt superintendent, the vein is showing high-grade ore. The mill building is completed and the machinery is being put in.

Rawhide.—This mine at Jamestown, W. A. Nevills owner, is being retimbered. The hoist has been repaired and a good force will shortly start prospecting the various levels.

Tuolumne Water and Power Company.—This company has resumed operations at the Phoenix Lake power house, and this means power for many big mines which have been shut down for about 2 months. The new 100-stamp mill of the Eagle-Shawmut has started.

COLORADO.

BOULDER COUNTY.

(From Our Special Correspondent.)

Avon Gold Mining and Milling Company.—This company, in which Pennsylvanians are interested, has taken a lease and bond on the San Juan property in Nevada District, and is overhauling the machinery before starting work. Mr. Denison, Central City, is manager.

B. & M.—This mine, at Ward, is worked by lessees, who, in October, shipped 32 tons of \$50 ore. The shaft is 900 ft. deep. Ten men are busy.

Cold Spring Company.—This company has closed down its mines temporarily. It is experimenting with the Wynn process as a method to treat low-grade ores.

Lady Belle.—In this tunnel on Woodland Mountain, near Eldora, a strike of very high-grade ore is reported.

Longfellow.—In this mine at Jamestown, a streak of 30 in. of smelting ore running as high as \$500 a ton is reported opened, and some fine shipments are being made. The ore is an iron sulphide. The Longfellow is now owned and operated by the New Century Company, of Denver.

Nancy Gold Mining and Tunnel Company.—This company at Wall Street, has its tunnel in about 1,300 ft., and have now an upraise on the Gilard vein to connect with a shaft. S. G. Knott is superintendent.

Oronogo Gold Mining and Milling Company.—This company, at Ward, W. E. Meade, manager, is putting in a 60-h.p. steam hoist, boiler and air compressor, and intends to sink to 1,000 ft.

Powers Mining and Milling Company.—The last lot of enargite ore gave values of \$63 per ton, the ore carrying 23 per cent copper. The ores come from a depth of 220 ft., where the smelting ore is fully 12 in. wide. Heavy developments will be carried on this winter. Pennsylvanians are interested, having purchased the property recently, Burt Storey, Central City, is in charge.

Prussian.—The Beam gold and silver process is being installed in the mill owned by this company. There are large quantities of low-grade ore.

Waltham Mining Company.—In sinking the shaft at a depth of 160 ft. ore has been opened, giving assay values of 7.14 oz. gold, 40.70 oz. silver, and 12 per cent copper, or a commercial value of \$181 per ton. Idaho Springs and local parties are interested in a lease and bond, and intend to install machinery and erect a large shaftbuilding. The property has been a splendid shipper for the developments accomplished. M. W. Tanner, Idaho Springs, is manager.

Wellington Gold Mining and Milling Company.—This company has purchased the properties known as the Copper King group, comprising 5 claims, and will erect a matte smelter. The ore is pyritic, carrying some gold, silver and copper, but its chief value is said to be nickel and cobalt. The property is as yet a prospect.

White Cloud.—This group of claims at Salina are being developed by Eastern capital under the direction of Bert Langridge. Some very high-grade free gold ore has lately been mined, while the milling ore is shipped regularly.

Wood Mountain.—Andrezy, Bean, Hubbard & Hendricks, who have a lease on this mine and mill at Wall Street, are milling 20 to 25 tons of ore daily from a vein 5 to 10 ft. wide, said to average \$10 per ton.

CUSTER COUNTY.

Florence Mining and Smelting Company.—This company, having 17 claims between Robinson Hill and Game Ridge, is driving a tunnel on the combination, one of its properties, to penetrate the Summit and Nebraska claims. The tunnel has been run 185 ft., and a vein carrying gold, silver, lead and copper opened.

Tennessee.—J. Q. James, of Chicago, the owner of this claim, is preparing to develop the property, which is located near Rosita.

Wisconsin.—Messrs. Barry & Burnett have driven a tunnel 200 ft., on this claim near Custer and cut a fine body of lead and zinc ore.

GILPIN COUNTY.

(From Our Special Correspondent.)

Winter Work.—Mining conditions are improving, and indications point to one of the most prosperous winters ever seen. Several properties have been idle for several years, are being opened, and others will follow. Several new plants are being installed, and other plants will be ordered. Among the properties reported to be started are the Foote & Simmons and Bates Hunter mines in Gregory District; the Pearce, Corydon and Adaline in Central City District, the Freedom on Winnebago Hill, the Williams in Lake District, Bant below Black Hawk and several others.

Never Sweat.—Local parties are interested in a lease on this claim in Lake District, and at 60 ft. have cut a nice crevice, showing a fair-sized streak of lead. A trial shipment has been made to the local sampling works. E. Drake, Central City, is one of the owners.

Sampson.—Local parties are interested in this claim, and have struck ore which assays 240 oz. silver, 0.75 oz. gold, and 45 per cent copper. The shaft is down less than 100 ft. E. M. Messiter, Central City, is interested.

Shire Gold Mining and Milling Company.—New machinery is being installed at the Belden property in Chase Gulch, the 2 boilers will be overhauled and developments will soon start, as the lessees have been some time retimbering the main shaft. Eastern men are interested in a lease and bond.

LAKE COUNTY—LEADVILLE.

(From Our Special Correspondent.)

Leadville Ore Tonnage.—There is a very heavy increase in the tonnage, mostly iron ores. Daily shipments, including the iron and the zinciferous stuff, now average 2,700 tons. Estimates of mining men on the tonnage for the year are in the neighborhood of 800,000 tons of all classes of material, but the valuation will show a falling off from 1901, due to the lower price of silver.

Buckeye Combination.—The company headed by J. J. O'Neill that has leased the Buckeye and Northside claims has located its new shaft 300 ft. from the Progressive Company strike and announces that the work will be under way by December 1.

Caribou Mining Company.—This property, through recent development work in virgin territory, has again opened large iron bodies, and is increasing production. Two hundred tons will be handled daily by January 1.

Chippewa Consolidated Mining Company.—This concern owns the ground on Breece Hill, leased by the Chippewa Leasing Company, and has just declared 2 dividends of $\frac{1}{2}$ c. a share, making a total of \$2,500 all told in 4 dividends, declared out of royalties. The leasing company is following a rich streak, but has not as yet developed any good-sized ore body.

Corona.—The new strike holds out and the shaft has gone through over 20 ft. of good iron sulphide. Shipments will begin shortly.

Forest City Mining and Leasing Company.—Denver people, headed by L. B. Carpenter, are operating this territory on Little Ellen Hill, and report that they have opened at a depth of 160 ft. 5 ft. of sulphide that will average \$30 to the ton, besides a good streak of oxidized material alongside the sulphide.

Golden Eagle Mining Company.—The only work done is under lease by the Vinnie Mining Company on the Little Vinnie claim. The new officers of the company are J. B. Grant, president; George W. Skinner, vice-president; W. W. Davis, secretary; Raymond Sargeant, assistant secretary; C. T. Limberg, treasurer. These with J. F. McDonald, Charles Cavender and Albert Smith are directors.

Iron-Silver Mining Company.—Shipments average 200 tons a day, while the Moyer dump shipments continue to the zinc work. A large amount of new work is under way. The company will carry to the Supreme Court its case over a renewal of its incorporation papers, the Secretary of State having held that its

Little Tiger Combination.—This virgin territory between Iowa and California gulches is operated by local lessees headed by ex-Alderman F. McCullom, who have just opened a rich small vein of showing wire silver. charter rights had expired.

Midas Mining Company.—The iron shoots hold well. Shipments are still 200 tons daily.

New Leadville Home Mining Company.—The committees appointed to report on means of continuing work and on the physical condition of the properties have reported. The latter finds excellent indications in virgin ground, and 2 fine bodies exposed near the Midas lines. Several mining men have offered to loan \$12,000 on the leasehold and machinery, but the company will endeavor to raise the funds among stockholders.

Phoenix Mining Company.—The low-grade iron market being opened by the smelters enables this company to ship 250 tons a day. It has immense iron deposits blocked out. The water flow is handled by the Coronado pumps.

Progressive Mining and Development Company.—Development on the recent strike continues while a second drift is just opening up an iron body that averages \$3.80 to the ton. The other drift has followed the lead carbonate body 14 ft., where a winze is being sunk. Average assays show \$55 per ton. Ore bins are being built and arrangements completed for starting a new shaft.

Small Hopes Mining Company.—The company is working the R. A. M. shaft, and besides sulphide shipments will begin handling a zinc tonnage in a short time, 100 tons daily. The company is prosecuting important development work on the Rialto properties which it has under lease.

OURAY COUNTY.

Bonanza King.—A rich strike is reported in this claim on Mineral Point. A vein 4 ft. wide and continuous was encountered in the shaft at a depth of 40 ft. It runs in silver, gold and copper. The owner is Ed McIntyre, of Flint, Mich.

SAN MIGUEL COUNTY.

(From Our Special Correspondent.)

Alta Mines Company.—The transformers in the converter house at the mill in Turkey Creek Basin, burned out a few days ago, compelling the plant to close down. It is announced that work will not be resumed until next spring, and probably not then, as the company intends to build an entirely new plant, better suited for Alta ore. The usual force is employed in the mines developing and taking out ore, the higher grade being shipped crude to smelters. A. C. Koch, of Telluride, is general manager.

Keystone Hydraulic Placer Mining Company.—C. F. Eggleston has a contract for driving a tunnel 400 ft. on this company's property on the San Miguel River, 4 miles below Telluride, and is making good progress, notwithstanding the amount of timbering required. The tunnel is being run to tap bedrock at the bottom of a large pit, and when completed the gravel will be washed through sluice boxes therein. The 2 10-in. hydraulics will not be put in operation again until next spring. C. M. Coleman, of Telluride, formerly of Chicago, is manager.

Nellie and Ella.—These properties in Bear Creek, 2 miles from Telluride, are producing enough mineral to supply 30 stamps of the Bear Creek 120-stamp mill,

connected with the workings by a bucket tramway 1 mile long. The ore is almost wholly free milling, and yields \$15 gold and upward per ton. The mines, formerly owned by the North American Exploration Company, were tied up by litigation over a portion of the Nellie vein and idle for about 2 years. The vein carries from 2 to 6 ft. of milling material. Cooper Anderson, of Telluride, has charge.

San Bernardo.—Frank Fox, A. R. Fisher and V. U. Rodgers, of Telluride, recently secured a lease and bond on this property, near San Bernardo station on the Rio Grande Southern Railroad, from an English company, and are operating it. The mill will soon be turning out a car-load of concentrates daily. The ore carries lead, gold and silver values.

Tomboy Gold Mines Company.—This company new 60-stamp mill is in operation treating 150 tons of mineral daily from the Argentine and Cincinnati claims. The vein is from 8 to 16 ft. wide, carrying milling rock which runs between \$15 and \$16 per ton on the plates and in the concentrates. The old mill has been down for the winter on account of a lack of water. The Tomboy Mine proper shut down in consequence, and will not resume until the snow begins to melt in the spring. There are 200 men on the payroll of the company. John Herron, of Telluride, is general manager.

United States Vanadium Company.—This company, composed largely of Chicago men, has 30 men working on groups of claims carrying vanadium ore along the San Miguel River, from Bear to Leopard Creek, a distance of about 15 miles. The product is marketed in Paris and other European cities, a transportation charge of \$14 per ton having been obtained via Galveston. It is probable a plant for the reduction of the ore will be built next season. A. B. Frenzel, at present of Telluride, is directing operations.

IDAHO.

IDAHO COUNTY.

Black Lead.—A. T. Spotswood, of Moscow, recently completed arrangements with G. A. Nehrhood and associates of the Eureka Mining and Smelting Company for bonding this group of 4 claims, located at the summit of the Bitter Root Mountains, on the headwaters of the north fork of the Clearwater about 150 miles east of Lewiston and by the road and trail 60 or 70 miles from Missoula. During the past three years the owners have dug a series of test pits for a distance along the lead of 300 ft. The ore shows copper values, with good gold and silver values. The claim is less than 20 miles in a direct line from the hot springs, which are about 35 miles from Missoula. The present owners include L. F. Williams, of Lewiston, and Messrs. Spotswood & Veatch and others of Moscow.

OWYHEE COUNTY.

Addie Consolidated Mining Company.—This company owns 5 claims on War Eagle Mountain, near Silver City. Within the year it has opened up new and important ore bodies, and made many improvements, including a mill ready to go into commission. The company's works are located up Webfoot Gulch. Four claims of the Addie cover 5,250 ft. on the Eureka-Calavaras lode about a quarter of a mile east of Silver City. The Addie claim was known and worked as the Eureka in the early days. The Calavaras is another of the early day bonanzas, its deepest workings not exceeding 60 ft. The Josephine claim has a shaft down something over 100 ft. The properties are operated through a tunnel, the entrance of which is just above the new mill building. The mine is under the management of A. F. Stevens. The other officers are: S. D. McLain, president; O. S. Wigglesworth, secretary and treasurer, and A. F. Stevens, general superintendent.

SHOSHONE COUNTY.

Ambergis Mining Company.—This company, capitalized at \$1,500,000 in \$1 shares, has property adjoining the Hercules Mine. The incorporators are W. Clayton Miller, of Spokane; John P. Gray, of Wallace; E. M. Gilpin, of Wallace; A. C. Cogswell, of Burke, and L. C. Wilson, of Burke. It is incorporated for \$1,500,000, with the par value of shares at \$1.

Apex Mining Company.—This company has filed articles of incorporation. The incorporators are S. Carl Reitzel, president; M. M. Simons, R. C. Christopher, E. E. Reitzel and H. B. Haisten. The capital is \$1,000,000, with \$1 shares. The property is just north of Wallace. Much tunneling has been done. In the tunnel on the north side of the property a lead was encountered a short time ago, which gives lead and silver values. The working tunnel has been started about 75 ft. above the Northern Pacific tracks. A 3-drill compressor has been ordered. The working tunnel will be continued through the winter.

Bunker Hill vs. Empire State.—This case has been on trial at Moscow. The case involves a section of the Bunker Hill ledge lying west of the Last Chance. The ore in controversy is claimed by the Bunker Hill under the Stemwinder location, while the Empire State bases its claims upon the San Carlos location. The ore bodies in question have been opened by the

Empire State, and are in its possession. The case involves several very important legal questions, and is one of the most important mining cases ever tried.

Judgment for \$185,000 has been allowed by the court in the case of Kennedy J. Hanley vs. Charles Sweeny and others. W. B. Heyburn, for defendants, gave notice of appeal, and issuance of execution and judgment was stayed for 10 days, until a supersedeas bond can be filed.

Hercules.—This company has made application for patents on several additional claims. The development of the property is being pushed steadily. The company has given an order for a 12-drill air compressor.

LOUISIANA.

CALCASIEU PARISH.

(From Our Special Correspondent.)

Merchants Oil Company.—This company has acquired 320 acres, and intends to develop it immediately.

Southern Pacific Railway.—The company has purchased 5 acres of land in the vicinity of the new Welch well from C. E. Smith. The price paid was \$2,000 per acre.

Welch Oil and Development Company.—This company's well No. 3, at Welch, has been brought in. It is stated that oil was thrown 100 ft., and that the gas pressure is so strong that the well is left uncapped to prevent the casing from being blown out. The company's 1 and 2 wells were lost by blow-outs. Operators think a new gusher field has been found, and a great deal of land is being bought or leased.

MICHIGAN.

COPPER—HOUGHTON COUNTY.

(From Our Special Correspondent.)

Atlantic.—This company is installing 6 pumps, with 18-in. cylinders, at the stamp mill to force the tailings into the upper launder, carrying them farther out in the lake.

Calumet & Hecla.—The Hecla power plant is closed. The Frontenac compound hoisting engine of 2,000 h.p., the Corliss engine La Salle, with cylinders 30 by 72 ft., of 900 h.p.; the Corliss engine Perrot, with cylinders 30 by 48 in., and 600 h. p., 2 pair of compressors, with cylinders 42 by 60 in. and 144 drills capacity, and a pair of Rand compressors, cylinders 28 by 48 in. and 31 drills capacity, have gone out of commission.

Trimountain.—This company has laid 6,000 ft. of 8-in. pipe from the dam at No. 3 shaft to the Pilgrim River. The face of the dam across a ravine at No. 3 shaft is 100 ft. long, 18 ft. high and 2 ft. thick. A pump and boiler house, 30 by 40 ft., is erecting on the Pilgrim River. Water will be pumped to the dam through the pipe line.

COPPER—KEWEENAW COUNTY.

(From Our Special Correspondent.)

Central.—The concentrating plant on the tailings from the old stamp is partly in commission. It is substantially the same as used on the Calumet & Hecla sands last year. Todd C. Woodworth, of San Francisco, Cal., is in charge.

COPPER—ONTONAGON COUNTY.

(From Our Special Correspondent.)

Adventure.—At this mine 25 double dwelling houses have been erected. A 1,000-lb. mass of copper was encountered recently. Work on the Evergreen lode is well advanced. It was tapped 400 ft. from surface.

Michigan.—This company will erect a stamp mill next summer. Several mill sites are under consideration. The new hoist will be ready before spring.

Victoria.—No. 2 shaft is sinking to the 17th level. Hoisting from the 16th level is in progress.

MINNESOTA.

(From Our Special Correspondent.)

Iron ore shipments are very near the close, but are much heavier than customary for this time of the season. The mild weather, which has not been cool enough to stiffen ore in cars, has an influence, and the mines are not all up to their allotments. The docks of the Duuth & Iron Range are very busy. The Fayal, which had already shipped about 1,800,000 tons, is pushing forward more ore to meet new demands, and the railway company has been sending to the mine all the motive power it could use to advantage.

Many of the mines have completed work and are now stocking their daily outputs for another season. Orders have been received at many mines to push stockpiling for 1903, in order that a larger output may be made than this season. The predictions are for a shipment of not less than 30,000,000 tons, if nothing untoward happens to prevent active demand. Many of the ore men expect higher prices another year, and look for an additional charge for ore delivered at Lake Erie of at least 50 to 75c. a ton, possibly more. It is probable, too, that the large differential against Mesabi ores will be lessened, as this is now out of all proportion.

The new Great Northern ore dock will contain 160 ore pockets, each of 250 tons capacity, making the total capacity of the dock about 40,000 tons. It will be of the same height as the No. 2 dock of the same company, which is the highest on the lakes, 73 ft.

IRON—MESABI RANGE.

(From Our Special Correspondent.)

Clark, Chisholm and Glen mines, near Hibbing, all belonging to the Minnesota Iron Company, have closed shipments for the year, with a gross product of about 600,000 tons. They will be mined actively during the winter in preparation for 1903. Glen is a new property, opened during last winter, and made a shipper this summer.

Explorations are being conducted near Biwabik by the Minnesota Iron Company, and by private parties. Work that was under way by W. P. Snyder & Co. has been abandoned, and the drills have been moved to the old Arcturus on the extreme western end of the range, where the Snyder interests, under the name of Standard Mining Company, have an option for lease on 320 acres of the Arcturus. Explorations will be carried on there all winter.

Algoma Iron Mining Company.—This company has been formed at Duluth, capital \$50,000; incorporators and directors: D. E. Woodbridge, J. L. Washburn and W. D. Bailey. The company is said to have several excellent tracts of land on the range, and several million tons of ore shown up. Exploring has been carried on for it a year and more.

La Rue Mining Company.—This company has been formed by Jos. Sellwood, R. M. Sellwood and L. N. Leach, with a capital of \$1,000,000. It has lands north of and adjoining the new Hawkins Mine, and has considerable ore proved up.

Republic Iron and Steel Company.—Mining operations for the year have amounted to about 225,000 tons, from the Franklin, Victoria, Pettit and Union. Next year it will include the new Kinney, which is now being stripped. Day and night crews have been put on, and the stripping will be well along by the time cold weather sets in. The company owns half the Union, the rest being in the hands of one of the United States Steel companies. Its Pettit has been hindered by water, and has made a very small output. It will be in shape, it is to be hoped, for a bigger production in 1903.

IRON—VERMILION RANGE.

(From Our Special Correspondent.)

Several drills are at work in the central part of T. 62, R. 14, for the Oliver Iron Mining Company, and east of Ely there are others, some for steel making interests and some for speculative explorers. The probabilities are that more prospecting will be carried on along this range the coming winter than for 6 or 8 years. It is a fact that not a single new iron ore deposit has been found on the Vermilion range since the Chandler ore body was opened in 1885, though this famous ore body has been extended easterly through the Pioneer and the adjoining Zenith, Sibley, Savoy and Silverman.

Shipments from the mines are over for the year, and stockpiling is vigorously under way.

Shipments from this range have been about 1,950,000 tons, and may possibly reach 2,000,000 for the year, though this is to be doubted.

Mahoning Ore and Steel Company.—This company has taken an option on 11 forties between the famous section 30 and the Chandler-Pioneer group, and will prospect very vigorously at once. It has also taken an option on lands northeast of Section 30, and will put several drills there. It will probably have all told from 5 to 6 drills during the coming winter on these Vermilion lands. The company has been prospecting on the range for some years, but without success, and now proposes to go very deep in the tract between Section 31 and the opened mines of Ely. Part of its prospecting will be close to where the Minnesota Iron Company spent \$30,000 or \$40,000 a few years ago.

MONTANA.

LEWIS & CLARKE COUNTY.

(From Our Special Correspondent.)

Elkhorn.—Final shipments of ore are now being made from this mine under the ownership of the Longmaid Brothers, of Helena. Of the 125 men who were employed about the mine and mill a few weeks ago, nearly all are gone to other places. The pumps have been pulled from the mine, yet things are generally left in shape so that work can be resumed without great delay, but a resumption depends on the price of silver. The Longmaid Brothers have shipped great quantities of ore to the smelter at East Helena during the past year, but with the low price of silver and the expense of keeping the water down in the mine it is believed that there has been little or no profit.

Montana Mining Company.—The production of bullion and concentrates for October is valued at \$9,500 from \$2,500 tons of ore. The treatment of 12,900

tons of tailings yielded cyanide precipitates, valued at \$23,700. The cost of treating the 12,900 tons was \$17,400 and the total expenses were \$33,200, leaving an estimated profit of \$4,000.

MADISON COUNTY.

Kennett Mining Company.—This company is said to have completed a deal by which it secured the use of the Shafter mill until the first of next August. The mill will be fitted up with a concentrating plant and the present amalgamation and cyanide will also be used and improved. W. B. Millard, the general manager, intends to operate the mill continually all winter.

Minneapolis & Montana Mining Company.—This company, which has been developing the Whiporwill Mine in the Sand Creek District, has suspended operations so far as the Whiporwill is concerned, and has shipped its machinery to Fred J. Rowlands, of Butte.

MISSOULA COUNTY.

Gold Nugget Mining Company.—This company, of which Charles W. Chrisman is the promoter and general manager, has ordered a sawmill and a planer to get out timber for making sluice boxes and buildings. The ditch for carrying the water will be a large one. The company proposes to have a pressure of 125 lbs., and will have 2 giants.

PARK COUNTY.

(From Our Special Correspondent.)

Bear Gulch Gold Mining Company.—The pending litigation against this company at Jardine has been settled by a compromise. The company was originally organized by Henry Bush, who interested people residing at St. Johns, N. B., in the purchase of the property from the defunct First National Bank, of Helena. Bush retained a large block of the stock. A. C. Jardine, of St. Johns, became general manager. Sometime after the company was in operation it was deemed necessary to increase the capital stock to 1,500,000 shares of \$1 each to acquire additional mining ground in the immediate vicinity. The connection of Bush with the company other than as a stockholder terminated about the time of the increase in the capital stock. Bush then took hold of an adjoining property, the Revenue, under a bond to purchase. The Revenue was also an asset of the First National Bank, of Helena. Bush proceeded to build a 40-stamp mill to treat the ore from the mine, and borrowed \$65,000 from the First National Bank, of Butte, giving as security the mill and his 80,000 shares of Bear Gulch Company stock. The bank finely became owner of Bush's assets. Some months ago a party of Chicago men, Messrs. Kimberly, Ryan and Murdock, offered to buy the stock of the Bear Gulch Gold Mining at 90c. a share for all of the stock. This offer was refused by the St. Johns' men. The Chicago men then purchased the Bush asset held by the bank, including the Revenue 40-stamp mill and the Bear Gulch Company stock. The new owners of this stock in investigating the affairs of the Bear Gulch Company found irregularities in the method pursued by the company in increasing its capital stock, and also in the way the company's accounts had been kept. Suit was entered in the district court of the county for the appointment of a receiver. This suit was tried before Judge Henry at Livingston in October, the company losing. Alex. Livingston being appointed receiver by the court under a bond of \$200,000, the officers of the company being enjoined from further participation in its affairs, pending further adjudication. The injunction was somewhat modified by the State Supreme Court in order to allow the officers of the company to hold a meeting to arrange some sort of a compromise with the Chicago people. The terms of compromise are not known here fully (the meeting having been held in Chicago), but the Chicago men will assume full control, the old crowd stepping down and out. The property is considered very valuable. A 20-stamp mill, old and out of date, is said to have cleaned-up on an average something better than \$30,000 per month for several months from ore encountered in development work.

SILVER BOW COUNTY.

Comanche.—The State Supreme Court has decided the celebrated Comanche case, affirming the judgment of the lower court, holds in effect that the Boston & Montana Company is entitled to the interest in the Comanche which Adolph Wetzstein claims as his. Wetzstein sought to recover his alleged share in the mine as the grantee of David Upton, who with another located the mine in 1879. The lower court decided the case in favor of the Boston & Montana, which secured its interests through various purchases.

NEVADA.

Bamberger—De Lamar Gold Mines.—Work is being pushed on the new road and power plant. Pipe is laid in the new pipe line and the trench is being filled. Connections have been made with the April Fool pipes. The electric line from plant to mill is about completed. Brick for the power house are being made rapidly. It now looks as though everything would be completed at about the same time, and that there would be little delay in making connections if the machinery for the mill come soon.

STOREY COUNTY—COMSTOCK LODGE.

Lucky Girl.—The output of this mine for October was 560 oz. gold, and 280 oz. silver, obtained from 1,500 tons of ore crushed by the 20-stamp mill and treated by cyanide. The return is valued at \$11,900, and the expense were \$8,200, leaving a net return of \$3,700.

Occidental Consolidated Mining Company.—At the annual meeting last week 80,630 shares were represented and the old board of directors was re-elected, consisting of George R. Wells, Herman Zadig, Nat. T. Messer, A. S. Wollberg and J. J. McCarthy. Geo. R. Wells was elected president, Herman Zadig vice-president, A. K. Durbrow secretary and James H. Kinkead superintendent. The company has levied an assessment of 5c. per share, delinquent December 20.

NORTH CAROLINA.

PERSON COUNTY.

(From Our Special Correspondent.)

Person Consolidated Copper and Gold Mines Company.—This company, capitalized at \$1,100,000, has headquarters in New York City, E. B. Beecher, of New Haven, Conn., is president, Fordyce Durgy vice-president and H. P. Layton secretary. The company reports that its mine and mill at Durgy are in successful operation.

NORTH DAKOTA.

Lignite Mines.—It is stated that denizens of the Red River Valley, who had prepared to burn lignite this winter, are unable to get a supply. The miners in the western part of the State had long demanded that their product be given a test, and the people prepared to do so with a feeling that they would be helping along a home industry. Not one-tenth the amount that could be used came to Fargo. No orders are taken for delivery except from a delay of 3 to 10 days. The mine owners blame the trouble on the railroad companies and a lack of cars.

PENNSYLVANIA.

BITUMINOUS COAL.

Orient Coal and Coke Company.—These officers were recently elected: Julian Kennedy, president, Pittsburg; J. L. Jackson, vice-president; C. J. Morse, secretary and general manager, Youngstown, O.; Reed Kennedy, treasurer. These with Robert Bentley and H. M. Robinson, Youngstown, and H. M. Hooker, constitute the directors. The capital stock will be \$2,000,000. A tract of 2,000 acres in Redstone township, Fayette County, will be at once developed and the expenses were \$8,200, leaving a net return of the Pittsburg & Lake Erie and Pennsylvania roads.

Rich Hill Coke Company.—A big coke plant is to be erected in Springhill township, and it will be owned and operated by Uniontown men. J. V. Thompson, William M. Thompson, Altha L. Moser, George D. Howell, C. H. Seaton and D. S. Richey own about 2,300 acres of coal in that township, and will begin operations at once to develop it. They have secured a large tract of surface on the Lou Morgan farm, and will at once have 50 ovens erected. Later this will be increased to 200 ovens. Connections will be made with the Baltimore & Ohio.

SOUTH DAKOTA.

CUSTER COUNTY.

(From Our Special Correspondent.)

Clara Belle.—The 2-stamp Tremaine mill is running.

Mayflower Group.—A bond has been taken on the property by Eastern persons and examinations ordered. A small force is at development.

North Star Mining Company.—The mill is running at full capacity, with 10 stamps dropping water. Water is supplied from the mine and from a spring nearby.

LAWRENCE COUNTY.

(From Our Special Correspondent.)

Black Hills & Denver Mining Company.—The 20-stamp wet crushing cyanide plant in Spruce Gulch, a mile from Deadwood, has resumed. William Randall, chemist at the mill, has installed an invention for the treatment of slimes, consisting of a series of cone-shaped settlers with specially formed bottom. The device is proving satisfactory.

Homestake Mining Company.—The gold product of the mines of the company for October is given as \$388,665 from 111,600 tons of ore. There are 1,700 employees on the pay-roll, aside from contractors engaged at the various wood and timber camps.

Horseshoe Mining Company.—Grading is finished for the 1,000-ton cyanide plant at the Mogul Mine in Ruby Basin, and the timbers are being framed for the building. The company has built a sawmill in Bear Gulch to cut the timbers and lumber, of which 3,000,000 ft. will be required. The Kildonan cyanide plant at Pluma is treating 300 tons a day, from the Mogul, Mark Twain and Lucile mines. The company's smelter at Rapid City is running at its full capacity. This is the plant purchased of the National Smelting Company. It originally had one matte furnace and one

lead furnace. The latter has been slightly altered, and is used for making matte. Some custom ore has been received, and the Holy Terror Mine is shipping its concentrates to the plant. The Horseshoe Company recently purchased a pyrites mine in the Radersburg District of Montana, and is receiving most of its fluxing ore from there. An occasional shipment of flux is received from various sampling works in Colorado.

Golden Crest Mining Company.—The 10-stamp wet crushing cyanide mill is approaching completion, and will be running before the end of the year. Large bodies of siliceous ore are being blocked out.

Montezuma Mining Company.—An average of 2,300 tons of fluxing ore is being shipped to the Golden Reward Smelter at Deadwood a month. This ore is said to carry about \$2 a ton gold and some copper, besides the iron and sulphur. The company receives \$1.30 a ton on board the cars at the mine. Twenty miners are employed. J. T. Gillmore, C. W. Carpenter and Robert Giltner are the owners.

PENNINGTON COUNTY.

(From Our Special Correspondent.)

Black Hills Copper Company.—Work has stopped on account of water. The incline shaft is down 800 ft., and drift has been run over 100 ft. to the west.

Gertie Mining Company.—The last of the machinery is being installed, and sinking will soon be resumed in the incline shaft. A steam hoist, air compressor, drills and self-dumping skip have been put in. The shaft is down 420 ft. Stations are cut at each 100 ft., and loading chutes put in.

Maloney Blue Lead.—This company will increase its capitalization from \$750,000 to \$3,000,000. Eastern men have agreed to take enough of the stock to place sufficient money in the treasury to build a smelter. Work has been resumed in the mine. The main tunnel is 1,800 ft. long. The mine is equipped with air compressor and ventilating fan.

Rapid River Placer.—L. A. Richards, of New York, has closed work on his Rapid River placer for the season, after installing a plant, consisting of centrifugal pump, conveyor and concentrating tables. The sand and gravel are conveyed to the sluice head by belt conveyor.

TEXAS.

BRAZORIA COUNTY.

(From Our Special Correspondent.)

Arnold Oil Company.—This company has contracted with Crosby & Sinclair to put down 3 wells on the Arnold tract, near here, and drilling has started.

HARDIN COUNTY.

(From Our Special Correspondent.)

Sour Lake Springs Oil Field.—The Byrd Syndicate well is being bailed at 2,610 ft. If brought in it will widen the field 2 miles. The Sour Lake Development Company is preparing to drill on the Jackson strip. The Heywood Oil Company has purchased 5 acres in proven territory, and made contracts for the drilling of 2 wells. The Guffy Petroleum Company pipe line to Beaumont is being rushed, and its completion is expected inside of a month.

JASPER COUNTY.

(From Our Special Correspondent.)

Cleveland & Eastern Texas Oil Company.—This company has drilling rigs on property controlled by it, and will at once drill wells at Boles' Ferry and Tar Wells.

JEFFERSON COUNTY.

(From Our Special Correspondent.)

Beaumont Oil Field.—The Higgins Oil and Fuel Company pumping plant on Spindletop was totally destroyed recently by a fire caused by a gas explosion. The fire was fortunately confined to the one plant, and the loss will not exceed \$6,000, although the delay and inconvenience will be serious. Shipments are steady and heavy, and since shippers are able to obtain cars the price of crude in tanks and f. o. b. cars is closer, quotations in tanks being 17 to 19c.; f. o. b. cars, 22 to 30c.

The Spindletop Power Company well No. 1, on Block 21, Gladys City tract, has been brought in. The National Oil and Pipe Line No. 6 well is in, and Nos. 5 and 7, of the same company, are down over 500 ft. The Texas Oil Company No. 2 well on the National tract, has been brought in, and both wells will be equipped with air, the compressor having been received.

Stillwell Oil Company.—This well, at Port Arthur, is in hard gumbo at 1,025 ft., and the drillers consider the prospects good.

NAVARRO COUNTY.

(From Our Special Correspondent.)

Corsicana Oil Field.—Light crude oil is steadily advancing. It is now quoted at 88c. a bbl. This oil sold at \$1.03 before the gushers were brought in at Spindletop, and the rapid advance in price during the last 2 months reflect the best opinion regarding Texas stocks of crude.

WASHINGTON.

FERRY COUNTY.

(From Our Special Correspondent.)

Cliff Group.—The vein at this Park City claim is traceable for 700 ft., and in the last cut is 4 ft. wide, with quartz 26 in., and solid galena 22 in. wide. The latter assays 69 per cent lead, with 33 oz. silver and 0.2 oz. gold per ton.

El Caliph.—The mine has been idle several months, but was recently leased for 18 months. The lessee is driving on a seam of ore supposed to connect with a pay streak above.

Gold Cord.—This property at Keller, on the south half of the Colville reservation, is to ship some rich ore.

Lone Pine-Surprise Consolidated Gold Mining Company.—Returns from the Granby Smelter, at Grand Forks, B. C., from 54 tons of ore from the Lone Pine No. 2 vein give the value at \$24.36 per ton, of which \$22.40 is in gold, and \$1.96 in silver. Six men are employed. Three more car-loads of ore are now being shipped to the Granby Smelter.

Morning Glory.—A new drift on the vein showing an inch or two of rich ore is in 94 ft. Thence a winze, sunk 31 ft. on a rich vein connects with the upraise from the 235 ft. The ore assays from about \$50 to \$125, averages over \$70 per ton, and averages 1 ft. wide. Within 3 weeks 45 tons were shipped to the Granby Smelter and preparations is in progress to ship another car-load in a few days. About 500 tons of lower grade ore on two dumps will run from \$20 to \$40 per ton.

Trade Dollar.—The north drift on the 300-ft. level is in 143 ft. and has cut another rich streak of ore 28 in. wide.

OKANOGAN COUNTY.

(From Our Special Correspondent.)

American Flag.—This claim has a vein, of which 20 in. runs about \$25 per ton. A contract has been let to drive 100 ft. on this. Log buildings have been erected. A new road has been built to connect with the main wagon road at the Zala Consolidated Mine, and supplies have been sent out for the winter.

Bodie.—A new tunnel, to be known as the No. 3, is in 15 ft., with about 100 ft. in all to run for the vein. On the 250-ft. level a drift is being driven southward on the vein, on good shipping ore.

WEST VIRGINIA.

PRESTON COUNTY.

Liverpool Coal and Coke Company.—This company, recently organized, with a number of Pittsburg, Pa., men interested, has secured 10,000 acres of coking coal at the junction of the Big Sandy and Cheat rivers. The company expects shortly to have plants completed for the driving of drift mine entrances and installing electric mining machinery, with a daily capacity of 5,000 tons of coal. The property has a number of large seams underlying it, and, in addition to the mining, the same corporation will build 500 ovens for the manufacture of coke. S. D. Livengood, of Meyersdale, Pa., is president of the company, and Charles Land and F. X. Weixel, of Pittsburg, are among the other officers.

FOREIGN MINING NEWS.

AFRICA.

TRANSVAAL.

The gold output of the Witwatersrand mines in October is reported by the Chamber of Mines at 181,439 oz. fine, being 10,637 oz. more than in September. For the 10 months ending October 31 the total was 1,321,012 oz. fine gold, or \$27,305,318. In 1901 work at the mines began in May and the total output up to September 30 was 147,019 oz.

AUSTRALIA.

WESTERN AUSTRALIA.

Great Boulder Proprietary Company.—This company reports that in October 2,204 tons of oxidized ore and 7,016 tons sulphide ore were worked, a total of 9,220 tons. The yield was 14,516 oz. gold, an average of 1.57 oz. per ton.

Ivanhoe.—The total ore of all classes treated in October was 10,787 tons. The yield was 12,399 oz. gold, an average of 1.15 oz. per ton.

Lake View Consols.—This company reports a total of 6,604 tons of ore of all classes treated in October. The yield was 6,735 oz. gold, an average of 1.02 oz. per ton.

CANADA.

QUEBEC.

Greenville Graphite Company.—It is stated that this company, promoted by W. J. Byrne, of Carbon-dale, Pa., associated with whom were John R. Powell, Simon Wormser, Edward Mulligan, of the Second National Bank; Abram Nesbit and ex-Congressman Morgan B. Williams, all of Wilkesbarre, has 500 acres of land at Greenville, midway between Montreal and Quebec. The new company will operate under a

charter issued in Maine. It has absorbed the old company, known as the Keystone Graphite Company. The Empire State Trust Company is trustee. The new company proposes to begin work at once.

CANADA.

BRITISH COLUMBIA—EAST KOOTENAY DISTRICT.

Sullivan Group Mining Company.—The mine and construction work on the smelter at Marysville have been closed down until next spring. The only men retained are two watchmen, one for the mine and one for the smelter. George Hull, representing Eastern stockholders recently stated that the company would have no trouble in raising the money necessary to complete the plant.

MEXICO.

CHIHUAHUA.

(From Our Special Correspondent.)

Botello.—Among other properties which rumor declares the Guggenheim interests have acquired in Mexico is this group of mines at Minas Nuevas.

DUBANGO.

(From Our Special Correspondent.)

A party of men from the United States, affiliated with the Mexican Exploration Company, is inspecting mining territory. Among the visitors are: Daniel Guggenheim, S. R. Guggenheim, Harry Payne Whitney, S. W. Eccles and President Nash, of the American Smelting and Refining Company.

An American company, represented by S. F. Husted, has recently purchased the Americana, Monte Cristo, and Abundancia mines in the Guanacevi District. The price paid is given as \$200,000 gold. The purchasers intend to work the mines in a large way.

Corrales Mining and Milling Company.—A strike of rich ore averaging high in gold was reported recently in the Washington Mine, in the mining district of San Juan del Rio.

GUANAJUATO.

(From Our Special Correspondent.)

Casa-Rul Mining Company.—A meeting of the stockholders of this company has been called for December 15, to consider propositions made by Americans for the lease and possible purchase of the mines.

MINING STOCKS.

(Complete quotations will be found on pages 732 and 733.)

New York.

Nov. 26.

Liquidation in the copper list has been at flood-tide recently, demoralizing prices and creating a feeling of distrust in the tactics of big speculators. Not satisfied with hammering prices far below last year's average, some operators still believe more water can be conveniently squeezed out of Amalgamated.

Amalgamated sold over 10 per cent of its capital stock in the four days from November 20 to 24, at \$55¼@60. At the lower price the market value of Amalgamated holdings is \$69,252,500 less than the nominal capitalization. Anaconda was also weak, selling in a limited way at 87@91 per cent (\$21.75@22.50), or nearly \$4,000,000 below par value. On curb copper shares were generally quiet, though firm. Greene Consolidated of Mexico, which has just declared a 2 per cent dividend, sold at \$24¼@26, and United of Montana at \$29½@30½. Tennessee floats around \$16, and White Knob of Idaho between \$12¼ and \$11¼. More attention has been shown Montreal & Boston, which gained in price from \$2½ to \$3¼. British Columbia was featureless at \$6¼@6½.

Alice gold and silver of Montana reappeared at 35c., while Ontario of Utah sold in a small way at \$8@8.75.

In the Colorado list the Cripple Creeks are still without special demand, though the Western market shows some improvement. Portland continues to sell at \$2, and Isabella at 29c.

Criticism of Mollie Gibson, whose shares bring only 8½c. now, has made it necessary for the management to issue a public statement of the condition of the company. This statement shows that the mine was closed down in August, because it had been losing money for several months. All the available ore of pay grade had been exhausted, and the entire property down to the 13th level had been thoroughly prospected. The closing down of the property of the Argentum-Juniata Company, which had hitherto been paying one-half of the joint pumping expenses, made it impossible for the Mollie Gibson Company to continue to operate any longer without a constantly increasing loss. Since the mine was closed down the pumps have been pulled from the 13th level, and the mine is now flooded up to the 10th level. Of the \$55,952 cash in the treasury August 4, 1902, about \$23,000 have been expended in the payment of bills incurred in doing some extensive development work in the northern portion of the mine in the lower levels undertaken jointly with the Smugler Company. This work was unproductive of beneficial results, and was discontinued by mutual agreement. The company has on hand now approximate-

ly \$25,000 in cash, and about \$20,000 are due and will be collected. The company has discontinued all salaries to its officers, thus minimizing expenses. The question of leasing the property is under consideration by the directors.

A special stockholders' meeting has been called by the St. Joseph Lead Company, of Missouri, for December 10, to vote on an increase in the capital stock from \$3,000,000 to \$6,000,000. This company pays regular quarterly dividends at the rate of 6 per cent per annum, and has distributed since incorporation a total of \$3,572,000, or \$572,000 more than its capitalization. The stock is closely held, principally by New York people. The market price in St. Louis is given as \$21@22, while the par value is only \$10.

Boston. Nov. 25.

(From Our Special Correspondent.)

Outside of a very vague rumor that negotiations had been turned down by the Calumet & Hecla people to enter into a trade agreement to maintain the price of copper, nothing new has come to light during the week to influence the stock market. Prices stiffened somewhat during the period, but have reacted, and outside of a few stocks prices are not far from where they were a week ago. Copper Range has been about the only active stock, with an extreme fluctuation of \$6.75, selling up to \$59.25, with subsequent reaction to \$56.25. Bids of \$2.50 a share have been made to call the stock at \$65 for 90 days. To listen to insiders one need not be surprised to see it sell at near \$100, so confident are they of the success and dividend prospect of the company. There is something apparently brewing in the stock, and the Street expects fireworks in it before long not unlike that seen in Trimountain a year or so ago. Copper Range Consolidated has \$1,000,000 in its treasury.

A list of 19 copper mining companies, including Amalgamated, shows a shrinkage of over \$250,000,000 in the recent low selling price and the highest in the boom times. Amalgamated alone contributed almost one-half of this shrinkage. The optimistic see a strong bull argument in this.

Calumet & Hecla has lost \$10 more, selling at \$450 per share. A strong but limited buying movement caused Tamarack to advance \$8 to \$154, with subsequent reaction to \$148. Utah Consolidated has been buoyant on reports of a rich strike at the mine, and has advanced \$1 to \$22. There have been liquidating orders in Daly-West, which caused a decline of \$4 to \$41.50. Parrot has been in demand, causing the stock to rise almost \$1 to \$23.37½. Trimountain sold at \$93@94, but so little interest has the public in this stock that \$60 bid, \$95 asked, has been the market at times. Osceola sold up from \$49.75 to \$54, reacting to \$51.50. Late reports from the Lake tell that some effort may be made from that direction to bring about a change in the management at the annual meeting next spring. There is little doubt, however, that the Standard Oil people dominate in this company as well as in the Tamarack.

Colorado Springs. Nov. 21.

(From Our Special Correspondent.)

The leading development of the week was the announcement that the special water committee appointed six weeks ago to devise ways and means of solving the water problem in the Cripple Creek mines, has adopted what is commonly known as the El Paso Tunnel plan. This contemplates the driving of a tunnel 5,200 ft. long, entering the Cripple Creek District from the southwest and tapping the main water course 1,000 ft. north of the El Paso shaft at a depth of approximately 1,000 ft. This tunnel will drain the Elkton Mine at 275 ft., the Mary McKinney at 450 ft., and mines located on the summit of Bull Hill at about 1,500 ft. The cost of the tunnel will be \$80,000, and by driving five breasts simultaneously from various working shafts, it will be possible to afford relief within the next 7 or 8 months. The special water committee has undertaken the financing of the scheme, which will be done entirely by home capital.

Mining shares developed considerable strength this week, due without question to the fact that the solution of the water problem is now merely a matter of detail. While no marked advances were made, a better tone characterized trading. The tonnage of the Cripple Creek District during the month of October was the largest in its history.

C. K. & N. shares advanced from 9 to 9½c., due principally to the unwatering of the lowest level of that mine by reason of the pumping in the El Paso Mine adjoining. Doctor-Jack Pot sold from 11½ to 12½c., closing the week at 11½c. El Paso fell from 70 to 67c., advancing to 68½ and 68c., to-day. The cause of the decline is not known. Elkton sold from 35½ to 35¼c. on November 17, recovering to 36 on the 20th, closing the week at 33½c. Golden Cycle sold at 59½c. during the week, but was not much of a stock feature. A bitter fight among the directors of this company was precipitated this week by President Milliken's call for a special stockholders' meeting on December 1. The minority have secured a temporary injunction, and the contest has been hurried on to the Federal Court for adjudication.

Isabella was quiet during the week, selling at 32½

@33c. Portland made an unaccountable advance, going from \$1.91 to \$1.99, the high price being touched to-day.

Salt Lake City. Nov. 21.

(From Our Special Correspondent.)

The week shows somewhat steadier prices, but the volume of business done is but two-thirds of that for last week. Wabash swung between \$1.02 and 82½@21c., for 46,000 shares. New York Bonanza, another of the heaviest traders, has steadied to 39@32c. for 22,800 shares, as compared with 48@26c. last week. May Day remains nearly the same, 24,700 shares selling 22½@21c. Lower Mammoth, with the calling out of 18,700 shares, has steadied to \$1.37½@1.33. Century sold 4,900 shares at 95@85½c. Consolidated Mercur still hangs low, paying the dividends it does; \$1.81@1.79 are the prices for 5,050 shares. Daly has been silent while Daly-Judge has remained steady at \$9.50@8.85, with 4,175 shares exchanged. Uncle Sam exchanged 6,550 shares at 30½@27¾c. Ingot sells 4,500 shares at 12½@11½c., a rise of 1½c. The total business amounted to 238,047 shares, valued at \$162,645.

San Francisco. Nov. 22.

(From Our Special Correspondent.)

The mining stock market has been more active this week, but very variable. Upon the whole, prices were somewhat stronger than last week. Caledonia was quoted \$1.25@1.30; Consolidated California & Virginia, 87c.; Gould & Curry, 17@21c.; Sierra Nevada, 21c.

Business in oil stocks was a little better, but still rather quiet. Home sold at \$2.80; Monte Cristo, \$1.10; Apollo, 24c.; Monarch, 17@19c.

On the California Stock and Oil Exchange monthly sales for this year are reported as follows:

Month.	Shares.	Value.
January	187,584	\$51,633
February	288,562	76,447
March	214,293	109,364
April	442,231	239,938
May	213,493	185,594
June	110,435	54,140
July	53,165	35,932
August	69,193	57,207
September	50,856	40,802
October	61,525	32,650
Totals	1,491,027	\$913,616

The new departure on this Exchange does not seem to have brought much additional business.

London. Nov. 15.

(From Our Special Correspondent.)

The mining stock market continues in a very dull and lifeless state. There is now an entire absence of rumors with regard to South African affairs, and the issuing houses do not find it necessary to take any special steps to support their markets. The magnates who were trying to force the Government by their grumblings have found it best to be quiet, and all the publicly expressed views as to the future of South Africa are much more reasonable and hopeful nowadays. In other sections of the mining market practically nothing is going on except in the British Columbian, where the condition of the Le Roi group causes great anxiety. The termination of the services of Messrs. MacDonald and Thompson at Le Roi No. 2 was very disconcerting, but shareholders have been cheered up a little by the news that Mr. Alexander Hill is to take over the responsibility for the management. Mr. Hill has had considerable experience in the management of copper mines and is conversant with the practical difficulties to be overcome when the grade is low. So that as far as the personal element is concerned, the prospects of the company are hopeful.

Some time ago I mentioned that the American company, the International Nickel Company, was desirous of obtaining the control of the English company called the Nickel Corporation, one of Whitaker Wright's flotations, owning properties in New Caledonia. A large number of shares were bought that were on sale and afterwards special offers were made to induce other shareholders to part. After much negotiation between committees of shareholders, the directors and the buyers, it was agreed that an offer of \$12½ in stock in the American company in exchange for each £5 share in the Nickel Corporation would be an equitable arrangement, and shareholders in the latter are being recommended to pursue this plan. The present directors of the Nickel Corporation replaced the Whitaker Wright directors nearly a year ago, and they are all men intimately connected with the metal trade. Their proposition may, therefore, be taken as a business one, and a large number of shareholders will no doubt follow their advice.

A few months ago I mentioned that the Bischof White Lead Company, which was floated some time ago under Brunner-Mond auspices, had been unable to proceed to business for various reasons. It now appears that there is considerable friction between the board and Dr. Bischof, the patentee and manager of the company. All kinds of allegations and counter-allegations are being made, but none of them get as much nearer a clear view of the position. At a meet-

ing of shareholders held this week an endeavor was made to obtain the appointment of a committee of inspection, but this was defeated by the directors. A great many questions were asked as to the present state of the business, and efforts were made by shareholders to see how they stood. The directors told very little, and their attitude rather indicated that what they could tell would not be pleasant hearing. Since the company was floated the process has been experimented on and improved, but its commercial value has not yet been demonstrated adequately. Also no site has been obtained for the works, and though the directors say there is difficulty in obtaining such a site, one cannot help thinking there are other reasons for going slowly in this matter.

COAL TRADE REVIEW

New York, Nov. 26.

ANTHRACITE.

Two events of the past week have occasioned wide comment. These are the resignation of President Walter, of the Lehigh Valley, and a possible settlement of the differences between miners and operators by an agreement not based on findings of the Arbitration Commission. The comment shows great diversity of opinion, but there is a strong impression in the trade that President Walter resigned because his endeavor to put the Lehigh Valley on a sound footing did not meet with the favor of a large financial house, which preferred to help the railroad by different methods, as, for instance, dividing its burden among other roads. As to the Arbitration Committee a majority of the operators evidently realize that any patched-up agreement with miners would not last even two years. The miners have twice seen the value of enlisting politicians in labor disputes, and the advantages of striking when a presidential or congressional election is on. The only way to secure quiet through 1904 is for the Commission to render a decision which shall bind both sides for several years. The public, after its experience this year, would not tolerate either side breaking such an agreement.

The demand for anthracite continues very strong; dealers and sales agents in all consuming territories are leading a strenuous life. No supplies were in consumers' hands when the strike was declared off, and what coal is now received by dealers is immediately distributed in small lots to consumers. Those mining companies that got to work promptly are now shipping a normal tonnage, and will make a good showing this month. Nearly all the collieries in the Lehigh region are now busy, and the output from all regions will be as heavy in December as car supply will permit. The operators are not favoring any section of the country, but the demand is from such a wide extent of territory that the daily output of the mines has to be spread out pretty thin to go around. The only classes of coal in good supply are washery steam sizes. These are arriving freely at New York Harbor, and buckwheat and rice sizes can be had cheaply—buckwheat being quoted as low as \$2 f. o. b.

At the head of the lakes coal is arriving, and the receipts by the close of navigation—owing to the mild weather—promise to be larger than anticipated; still less than half of normal supplies will be on the docks when navigation closes. Chicago territory is worse off, since operators realize that all-rail shipments during the winter will make up for much of the shortage in lake shipments. Demand is very active, particularly at outlying points. Along the lower lakes coal is arriving a little more freely. Buffalo still enjoys the distinction of being better off regarding its anthracite supply than any other large city. Along the Atlantic seaboard demand is very strong. At Boston and at Narragansett Bay points prepared sizes are selling for \$9 at retail. At New York \$8 is a common price, though the nominal prices are \$6.50 retail, and \$5 f. o. b. New York Harbor shipping port. In Philadelphia retail prices show wide variation, ranging from \$6.75 to \$9.

BITUMINOUS.

In the Atlantic seaboard soft coal trade demand continues strong, and speculative prices have advanced. As high as \$6@6.25 is asked for Clearfield grades, f. o. b. New York Harbor shipping ports. Various causes are given for the higher prices. Among others, the fact that arrivals of English coal are about over. It is also said that speculators having bought considerable at high prices at the mines must hold up the market to get rid of it without loss. In general, it may be said that there is little or no coal on the market to be had. The main railroads are reported cleaning up their tracks, but so far producers have felt no results in a better car supply. There are rumors that there will be a general advance in through freight rates to take effect April 1, and such an advance seems to be expected by the trade. On account of increased receipts of anthracite, bituminous users at New York Harbor points are having trouble to find berths at which to run off coal.

In the far East demand is strong. Considerable Canadian as well as English coal is arriving, or is

under contract. Shipments on contracts to the ice ports have been heavy, and these contracts are now believed to be pretty well cleaned up. Trade along Long Island Sound is calling for all the contract coal it can get, and is taking speculative coal when necessary, but the immediate wants of consumers are not easily filled. Consumers at New York Harbor points having contracts are getting fair allotments, and in general consumers in this territory are as well off as those in any other. In the all-rail trade coal is still in short supply, and a number of manufacturing plants are obliged to curtail production in consequence.

Transportation from the mines to tidewater is fairly prompt, coal running through in a week. Car supply at the mines continues very poor, and is thought to average only about 30 or 35 per cent of the demand. It is believed that some producers who made the loudest fuss have a little better supply.

In the coastwise vessel market, vessels are scarce, and small craft are out of the market altogether. Rates are firm at current quotations. We quote as follows from Philadelphia, Providence, New Bedford and Long Island Sound, 90@95c.; Boston, Salem and Portland, \$1.10@\$1.15; Newburyport, \$1.35@\$1.50; Lynn and Bath, \$1.25@\$1.30; Bangor and Gardiner, \$1.50, with captains asking an ice clause. Rates from the further lower ports are 15c. above these figures.

Birmingham. Nov. 24.

(From Our Special Correspondent.)

The coal mines are all able to make large outputs, but cars cannot be procured from the railroads, and as a consequence the production is not so great as it should be. Much developing has been going on in Alabama in the past 12 months, and some of it is in a position to show what can be done, but the car shortage holds them back. There is a good demand for every ton of coal that can be mined in the State. The larger producers are meeting with fairly good success in having their product handled, but only as far as their own or other furnace needs are concerned. The domestic trade is attended to, but that outside of the district and State has to suffer.

The main feature of the coal market during the past week was the matter of State convicts. Several companies have made bids to the State for the use of convict labor. Governor Jelks has decided to lease out the labor of the convicts, the State being in charge and receiving so much per ton for the coal mined by the convicts. It is intended that the convicts shall work just as the free miner, getting so much per ton. The State will guard the convicts and feed and clothe them. Several companies have made bids for the labor. The Sloss-Sheffield Company and the Tennessee Coal, Iron and Railroad Company are among those who have offered to take the labor. These companies now operate mines with convict labor, though not all State labor, several counties having leased their convicts. The State expects to get more money from the convicts than under the present plan, which is to lease them at so much per month.

During the past week John A. Rutherford, of New York, one of the principal stockholders in the Lehigh Coal Company, and one of its officers, was in the Birmingham District looking over the coal situation. The Lehigh Company has not had its mines opened very long, but the output is steady and on the increase. The Bessemer Land and Improvement Company is preparing to develop on no small scale in the vicinity of Belle Ellen, in Bibb County.

The supply of coke is not up to the demands, and the erection of coke ovens at several places in the State is being pushed; before next July there will be something like 500 new coke ovens in full operation.

Chicago. Nov. 24.

(From Our Special Correspondent.)

On account of the extraordinarily mild weather, a comparatively light business is being done by both wholesalers and retailers of coal. Prices are lower than they have been for many weeks, and are sure to advance sharply as soon as a cold wave strikes this locality. About 25,000 tons of anthracite has so far reached the city by boat, and perhaps an equal amount by rail, but this is not within 5 per cent of the demand for anthracite that is daily coming into the offices of dealers. With the closing of navigation by December 6, through the expiration of insurance rates, there will doubtless come an advance in the price of anthracite, which now sells for \$6.50 on cars. Retail prices of anthracite vary from \$7.50 to \$9, according to the locality and the buyer's needs. Most retailers refuse to sell more than three tons to one customer, and some set the limit at two tons, at \$7.50. Bituminous coal has declined in general about 50c. a ton, today's quotations for car lots being: Smokeless New River and Pocahontas, \$5.50; smokeless Maryland, \$5; Hocking, \$5; Youghioheny, \$4.50; cannel, \$6; Brazil block, \$4; Indiana lump and egg, \$3; smiting coal, \$5. The last-named is very scarce, as is evidenced by the price. Splint is in better supply, but still not good, at \$4.50@\$5.50; Hocking comes along slowly, but in better fashion than two weeks ago; smokeless coal in general is scarce. For New River and Pocahontas not more than 10 to 20 per cent of

the demand can be supplied. Pocahontas is perhaps in better supply, a large stock having been laid in several months ago by the local agents for the coal. Illinois grades are \$2.50@\$3, and will probably form the bulk of the supply for the Chicago District this winter.

The transportation problem is worrying coal dealers, together with the general public. Never before has there been such a congestion of traffic on Western railroads, and never before have the railroads been using more coal themselves. These two circumstances cause much apprehension for cold weather conditions.

Cleveland. Nov. 25.

(From Our Special Correspondent.)

The coal situation is assuming the first real interest of the year. The shippers are now trying to make as much of the last 10 days' boat movement to Lake Superior as possible, and are trying to rush the material to the lakes with fair success. They are also bidding up for boats, with the result that in the last few days the rates first jumped from 35 to 40c. on the head of the lakes, and yesterday jumped suddenly to 50c., and seems to hold there, but only for a day or two. The shippers have no time to quibble about the rates that are to be paid, and the vessel men have not the slightest compunction of conscience about putting those rates on. The result is likely to be that there will be a strong market for the vessel men for the remainder of the season. The Lake Superior coal movement has been none too brisk during the entire summer, and it began to look toward the last as if some of the prospective consumers would have to go elsewhere or else go without coal. To meet this demand and to shut out the mines nearer to the Minnesota points the coal shippers made a desperate effort to get the coal to the lakes, and it is now being shipped up the lakes with moderate freedom. The Lake Michigan situation will be attended to after a while. That lake is navigable long after Lake Superior has become an impossible place for boats, and after the Lake Superior movement has been completed the boats will then be turned into the coal trade, which is expected to be late running this year. In fact, it seems possible that if the coal pays well enough boats will be out of here pretty late in the season. The conditions in the domestic market have hardly changed, with a good supply and a fair demand.

Pittsburg. Nov. 25.

(From Our Special Correspondent.)

Coal.—A coal famine, according to leading producers, cannot be averted this winter, and some unusual prices are now being paid for fuel. The principle demand is for run-of-mine coal, the circular price of which is \$1.65 a ton at the mine, but rates ranging from \$3 to \$5 are being paid. One sale for Eastern shipment is noted at \$6 a ton. A sale of slack was made recently at \$4 a ton, while the nominal price is 85c. The average price now being paid is \$3.50 a ton, but operators will not make any contracts at that figure for extended shipment. All the mines in the district are in full operation to-day, and there are enough empty railroad cars in sight for to-morrow and possibly Thursday. The heavy freight congestion having been relieved a better supply of cars for the future is being promised, but there is no certainty, and many of the mines may be forced to suspend operations before the end of the week.

Connellsville Coke.—Many ovens were shut down last week, as it was impossible to secure the railroad cars needed. The shipments were a trifle better than the previous week, and on Sunday and yesterday there was a big movement, which enabled most of the furnaces in the Valleys to start. It is difficult to predict how long these conditions will continue. The *Courier*, in its last issue, gives the production for the week at 238,635 tons, a falling off of nearly 10,000 tons. The shipments for the week aggregated 10,094 cars, distributed as follows: To Pittsburg and river tipples, 3,859 cars; to points west of Pittsburg, 4,630 cars; to points east of Connellsville, 1,605 cars.

San Francisco. Nov. 15.

(Special Report of J. W. Harrison.)

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

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

Foreign Coal Trade. Nov. 27.

Export trade continues dull and without change. As to imports, some British coal is still arriving on orders placed a month or more ago; but no new contracts are reported, although there is some expectation abroad that more coal will be taken here.

Exports of coal and coke from Great Britain for the 10 months ending October 31 are reported as below, in long tons:

	1901.	1902.	Changes.
Coal	35,255,015	35,607,620	I. 352,605
Coke	679,488	552,809	D. 126,679
Briquettes	930,711	890,066	D. 40,645
Totals	36,865,214	37,050,495	I. 185,281

In addition to the exports above given there were 12,618,236 tons of coal shipped abroad for the use of steamships engaged in foreign trade, against 11,282,557 tons in the corresponding period in 1901; showing an increase of 1,335,679 tons this year.

Messrs. Hull, Blyth & Co., of London and Cardiff, report under date of November 15, that the general tone of the Welsh coal market continues weak. Tonnage is by no means plentiful, and stems are easy. Quotations are: Best Welsh steam coal, \$384@\$3.90; seconds, \$3.72; thirds, \$3.66; dry coals, \$3.78; best Monmouthshire, \$3.42@\$3.48; seconds, \$3.36; best small steam coal, \$2.28; seconds, \$2.16; 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.

There is but little change to report in the outward freight market. Rates for some of the Mediterranean ports are a trifle firmer. Some rates noted from Cardiff are: Marseilles, \$1.30; Genoa, \$1.26; Naples, \$1.20; Singapore, \$2.64; Las Palmas, \$1.44; St. Vincent, \$1.62; Rio Janeiro, \$2.28; Santos, \$2.52; Buenos Aires, \$1.92.

IRON TRADE REVIEW.

New York, Nov. 26.

Transportation continues to be the chief point of discussion in the iron trade. The railroads in the Pittsburg District made a determined effort to break the freight blockade this week, and partial supplies of coke have reached the blast furnaces and mills. The situation is still a difficult one, however, and there is no assurance of a steady supply of coke.

Other sides of the market are well shown in our local letters which follow.

Exports of pig iron from Great Britain to the United States for the 10 months ending October 31 were 336,147 long tons, against 36,179 tons for the corresponding period in 1901; an increase of 299,968 tons. Exports of steel billets were 41,689 tons, against 10,535 tons in 1901; an increase of 31,154 tons this year.

Birmingham. Nov. 24.

(From Our Special Correspondent.)

On account of the car scarcity and the shortness of locomotive power, the railroads are unable to handle business promptly. The Sloss-Sheffield Steel and Iron Company on Saturday gave out the statement that on November there were 5,000 tons of pig iron in the yards, most of it around the furnaces at Sheffield and Florence, and on November 22 there were 8,000 tons. There are no cars to be procured to move the product. The furnaces in Alabama are all doing well; in fact, the outputs are great and most satisfactory. There is a good supply of raw material, except as to coke, and some relief is expected in that line. The production now appears to be greater than the railroads can handle.

At the steel plant at Ensley, steel rails are now being made, but it is given out that no effort will be made to go into the open market. The plant of the Alabama Tube and Iron Company at Helena is producing a good quantity of wrought iron tubing, and one shift on Friday last made 41 tons of 1¼-in. tubing on a special order.

There is no change in pig iron prices in Alabama. There is no general selling as yet for delivery after July 1, 1903, though a fairly good inquiry has been made. The following quotations are given: No. 1 Foundry, \$21@\$22; No. 2 Foundry, \$20@\$21; No. 3 foundry, \$18.50@\$19.50; No. 4 foundry, \$17@\$18; gray forge, \$16.50@\$17; No. 1 soft, \$21@\$22; No. 2 soft, \$20@\$21.

A compilation of figures from the reports of the Southern Iron Committee of the shipments of pig iron, steel and cast iron pipe made from the Southern producing territory during the first nine months of the year, up to October 1, shows the total shipments to have been 1,452,550 tons, as against 1,233,048 tons for the same period in 1901. During the month of September the six districts making up the Southern producing territory, Anniston, Birmingham, Nashville, Sheffield, Middlesboro and Chattanooga, shipped 148,468 tons of pig iron and steel, and 14,911 tons of cast iron pipe. The export movement from the Southern territory during September was very light, amounting to 64 tons of pig iron and 98 tons of cast iron pipe. By months for the first nine months of the year from the Southern territory the shipments of the three commodities were as follows: January, 182,208

tons; February, 148,919; March, 163,461; April, 163,082; May, 169,739; June, 160,307; July, 143,559; August, 157,896; September, 163,379; total, 1,452,550 tons. The Birmingham District alone during the first nine months of the year shipped 679,977 tons of pig iron and steel, and 64,040 tons of cast iron pipe, a total of 744,017 tons. The shipments in October were every bit as heavy as they were in September, while the shipments in November are only being held back by the shortage of the railroad cars with which to handle the product.

There is still steady work at the rolling mills, and the output is in good demand. The indications are there will be good work at the mills in this State for some time to come. Good prices obtain.

It is announced positively that the Southern Railway will build shops not only for repair work, but also for the manufacture of new cars on the big tract of land recently purchased at North Birmingham. The company expects to do its work for the several divisions at the new shops.

Chicago. Nov. 24.

(From Our Special Correspondent.)

Pig iron is dull. Consumers declare that the prices are too high, and in this they seem to be supported by the opinion of leading sellers of the commodity, privately if not publicly expressed. Indeed, it is rumored in the inner circles of the pig iron trade that the furnacemen have come to the conclusion themselves that prices must be lowered, and that they will quietly let down the artificially stimulated quotations of the present to something reasonable, to a figure at which both the foundryman and the furnaceman can make something. This determination has undoubtedly been brought about somewhat by the reintroduction of foreign iron again into the domestic market. Shipments of this iron are on their way to Chicago, and will undoubtedly net a handsome profit to the sellers. Foreign iron can be sold at very much less than Southern, about which now the battle rages; Northern iron being almost out of the market for the first half of 1903. "The price of Southern must come down," is the assurance that is said to have been given by a member of one of the leading houses of this city, to his agents, a day or two ago. With Southern at \$24.15@26.15, Chicago, the only ray of light that the foundrymen sees is in the lower price of coke, which is now \$10@11, or \$1@2 less than last week. For Northern quotations are nominally as last week, though little iron is to be had; No. 1, \$23.50@24; No. 2, \$23@23.50; No. 3, \$22.50@23. There is practically no Southern iron to be had during the remainder of this year, but the occasional lots that can be picked up command easily \$4 premium. The few buyers who are anxious for iron want it immediately, and, though grumbling, pay the premium.

Cleveland. Nov. 25.

(From Our Special Correspondent.)

Iron Ore.—The end of the season is not more than a week away, at least as far as the shipment of ore is concerned. Most of the big shippers have already prepared the fleets to handle the last cargoes the latter part of this week and the first of next. The rates of carriage remain unchanged, as do the other conditions. The rates are: 80c. from Duluth, 70c. from Marquette and Escanaba. Nothing has been done as yet about ore sales for next year, and nothing has been sold for this year's delivery.

Pig Iron.—The curtailment of the production of pig iron is serious, to be sure, but is not so severely felt as a short time ago, when the demand was better than it now is. The market has eased up greatly, and it seems now that present computations of the strength of the market are based on the possible production through the winter with the coke shortage a factor. Otherwise the sale of material ought to be very much heavier. There is nothing to sell for this year, and very little is left for next year, especially as it seems as if most of the iron which ought to have been delivered the latter part of November and December will have to be carried over into next year. Some of the consumers have thought to go abroad for their material, but have found none of it. The prices do not change from \$23 for No. 2 foundry for first half delivery and \$21.50 to \$22 for second half delivery Valley furnace. Southern iron is now selling at \$21 at Birmingham. The bessemer and basic producers are off of the market, and will be until the output of coke is known, and the possibilities of obtaining a certain supply. The possible prices would be \$21 for basic and \$23 for bessemer for first half delivery, no quotations being made past that time.

Finished Material.—The market has been a little easier along all lines. Plates, although strong, do not seem to command that position which they maintained a short time ago. Deliveries are now possible in five or six months, whereas before it seemed impossible to obtain them short of eight or nine months. This condition applies only to certain mills, some of them being entirely sold up, with, however, some difficulty being experienced in obtaining specifications. The larger mills are getting 1.60c., Pittsburg, and the smaller ones 2c. as a maximum at the mills, while

the jobbers are getting 2.25c., for sheared plates and 2.50c. for universal plates out of stock. The 1/4 and 3-16 plates are in good demand, with the material hard to find, while the heavier plates are comparatively easy. The structural steel market is more interesting and intricate. The jobbers have been slaughtering their prices, and one mill makes a straight out reduction of \$10 in the price of the shapes being offered for sale. This price, of course, holds only on the materials, which have been bringing a premium, and most of these prices are still very much in excess of the association or conservative price of the heavier material. The jobbers are getting 2.50c. to 3c., while the smaller mills are getting 2c., about as a maximum price. The market is expected to revive after the end of the year toward which it is believed in iron circles that the trade is looking with an eye to invoice time. Sheets are still weak, with the prices on the down grade, but with no reductions further than recently announced. The quotations still are based on 3.10 to 3.25c. for No. 27 out of stock. The billet market has been a little weak, with the bessemer bars making great inroads upon the amount of business being done.

Old Material.—The market has been declining for the last few weeks, and those who have high priced material are in a stew, while the smaller fry stands by and rejoices that he has no money invested in the material which he is likely to lose.

Philadelphia. Nov. 26.

(From Our Special Correspondent.)

Pig Iron.—A better feeling has developed in the pig iron market in eastern Pennsylvania, partly due to the increase in shipments from furnaces to buyers. There were quite a number of inquiries yesterday and to-day, and, as usual, from small buyers, who wanted the material within 30 days. Much of this business was accepted, but at prices above those usually quoted. The tendency is upward all along the line. The demand for foreign iron cannot be said to have improved any, although our importers booked some business this week at the usual figures. No. 1 American foundry is \$26; No. 2, \$23.50@24.50; No. 2 plain, \$23@23.50; gray forge, \$21@21.50. English iron, \$22.50; Scotch, \$24@24.50.

Billets.—No business of importance has been closed this week. Quotations for American, \$30; German billets, \$26@27.

Merchant Bar.—Small orders have been going to mill steadily since last week. Bars are quoted to-day at \$1.90; steel bars, \$1.80; concessions might be had on large lots.

Plates.—The interruption which plate makers have encountered has resulted in more or less inconvenience to all consumers who had all plans arranged for quick deliveries. Trouble is brewing at the mills where large deliveries are due later on. Quotations are 2.10@2.15 for small lots; 2c. for large lots, 2.10c. for universals, 2.15@2.20c. for flange.

Structural Material.—The business of the past few weeks has been quite interesting. The bulk of it in rather small lots. The tone of the market is very strong. It is needless to say the mills are crowded. The usual figures are 1.75@1.85c. for angles; beams and channels 1.80c., all the way up to 2.30c., depending on varying conditions.

Old Rails.—Old rails are quoted at \$25 for iron, and \$21.50 for steel.

Scrap.—There is nothing of importance. Heavy steel scrap is quoted at \$21; railroad scrap, \$22.50; low phosphorus scrap, \$27, and country scrap at \$21.

Pittsburg. Nov. 26.

(From Our Special Correspondent.)

As a result of the greatest effort ever made by a railroad company the serious freight congestion is practically at an end. The work of clearing the yards and sidings was begun at midnight on Saturday. Every train man and yard man in the employ of the Pennsylvania Railroad was ordered to report for duty at that hour, and remain on until 5 o'clock yesterday morning. All of the available locomotives, including passenger and shifting engines, were pressed into service. Accurate figures on the heaviest freight movement ever known are unobtainable, but it is estimated that on all roads over 50,000 cars were moved. Thousands of cars of freight consigned to Pittsburg concerns that have been tied up were shifted to unloading tracks, and the work of emptying them was speedily done. There was an unusual movement of coke, and nearly all of the blast furnaces in the valleys are again in full operation, with prospects of turning out the entire capacity during the week. Mills that have been shut down for lack of material are preparing to resume, and a number that have been in partial operation are ready to go on in full. The Pennsylvania Railroad paid particular attention to clearing its side lines, freight having been lying on them the longest time. Thousands of empties were in the trains made up, most of them being coal cars. These were sent to the mines, and a general resumption of mining occurred yesterday. Unless there is a hitch in the arrangements all the mills in the Pitts-

burg district will receive the full requirement of fuel this week.

The general advance in wages of railroad men is to be followed this week by an increase in freight rates. An announcement of an increase in rates of imported iron and steel has just been authorized. It will average about 6 per cent. The Central Freight Association is booked to meet in Chicago to-day, and a new schedule of rates is likely to be announced tomorrow. It is predicted that the new rates will be about 10 per cent higher than those now in force. The action of the railroad managers in advancing wages and freight rates is taken as an indication that they have great confidence that prosperous conditions in the iron and steel industries will continue for several years. Better facilities for handling freight are being provided by extensive improvement in trackage. Additional large orders for steel rails and structural shapes are soon to be placed, and before the end of the year it is predicted the entire production of the rail mills of the country for next year will be under contract. The annual capacity of the mills is about 2,800,000 tons, but 3,000,000 tons possibly may be produced. There is likely to be some heavy importations of rails as the requirements of some roads are too urgent to admit of delay in waiting for orders to be filled by American mills. The Pressed Steel Car Company and the Standard Steel Car Company have all the orders for cars they can fill for the next six or eight months. There soon will be other competitors in the field, but the prospects are that all will have plenty of business.

There is a great scarcity of pig iron, and transactions are limited. Furnaces are so far behind in deliveries that it now seems impossible for them to catch up before the second quarter of next year. The United States Steel Corporation still has about 200,000 tons of bessemer iron coming to it from the merchant furnaces. Deliveries have just begun on 50,000 tons of foreign bessemer pig iron contracted for by a leading concern in this market. The principle steel interests are buyers of crude steel, and as a result the market is much firmer this week. Both bessemer and open hearth billets have advanced in price. Negotiations for 5,000 tons of German bessemer billets, which began several weeks ago, and dropped when the price of \$29.50, delivered at Pittsburg, was named, have been reopened. The plate market continues strong, and the structural mills have orders booked that will keep them busy for six months or more.

The consolidation of the Union Steel Company and the Sharon Steel Company, the details of which were completed late last week, will become effective on December 1. A deal of this kind had been expected for some time. A rumor had included the Jones & Laughlin Steel Company in the arrangement, but it was emphatically denied. These three concerns are the most important competitors of the United States Steel Corporation.

Pig Iron.—With but few exceptions the blast furnaces in the Valleys are in full operation this week. An unusually heavy supply of coke was received on Sunday and yesterday. The furnaces are so far behind in deliveries that they are not taking on any new business. It is impossible to buy bessemer pig iron for delivery this year at less than \$24. Valley furnace, and for the first quarter \$22 is quoted. Foundry No. 2 is \$24@25, Pittsburg, for prompt shipment, and for the first quarter \$23 is asked. Gray forge is quoted at \$21@21.50, Pittsburg.

Steel.—Bessemer steel billet sate firmer and \$30, Pittsburg, is quoted, and open-hearth billets for early delivery are \$31@33. Steel works are decidedly short of pig iron, but expect to have a full supply within a few days. The plate market is strong, and for this year's delivery tank plates are held at 2@2.25c. For the first quarter of next year the price ranges from 1.75 to 1.85c., and for later delivery the pool price of 1.60c. is named. Steel bars are firm at 1.60c.

Sheets.—There is considerable activity in sheets for early delivery, and the market is firm. Nearly all of the mills of the American Sheet Steel Company are in operation. No. 28 gauge black sheets remain at 2.75c., and galvanized at 75c., and 10 per cent off.

Ferro-manganese.—Domestic, 80 per cent is still out of the market, but is quoted at \$52.50. The foreign product brings from \$50 to \$51.50.

Cartagena, Spain. Nov. 8.

(Special Report of Barrington & Holt.)

Shipments for the week were one cargo, 3,850 tons, dry ore to Sydney, Cape Breton. There is a good demand for ores, but freights are still high. To Glasgow 7s. 6d. is quoted.

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 434 tons to Swansea. Other shipments include 12,600 kgs. ocher to London.

CHEMICALS AND MINERALS.

(See also wholesale price-list on page 734.)

Heavy Chemicals.—Alkali, of which stocks in makers' hand are comparatively small, has improved in demand at steady prices. Caustic soda is still being booked for 1903 delivery at \$1.60@1.70 per 100 lbs. f. o. b. works, although at the close makers have strengthened their views as their output is well under contract. Bicarb. soda is quieter in export way, though the home market manifests more interest. Sal soda is in better request. Bleaching powder, being scarce on spot, is firmer, while next year's contracts may still be placed at \$1.25 up. Chlorate of potash powdered, is in small supply in the local market, and sells around \$8 per 100 lbs., but crystals can be had at \$7.37½@7.50, and 1903 orders will be taken at \$7@7.25.

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 \$1.70@1.75 for futures; bicarb. soda, ordinary, \$1.25, and extra, \$3; sal soda, 55@60c.; chlorate of potash, \$7.37½@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; Continental, \$1.62½@1.65; contracts at \$1.25@1.37½, according to seller and time of delivery.

Acids.—Prompt business in the commercial acids is moderate, while for 1903 delivery some further contracts are noted for oxalic at \$5.25 per 100 lbs., and for sulphuric on basis of quotations below. Advices received from abroad state that the output of oxalic acid and salts of all the German manufacturers is now in the hands of a syndicate, which is also to regulate the supply and demand. This accounts for the unanimity among sellers here, who quote alike.

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

Blue vitriol.....	\$4.45@4.62½	Oxalic com'l....	\$5.25@5.50
Muriatic, 18° ..	1.50	Sulphuric, 50° ..	
Muriatic, 20° ..	1.62½	bulk, ton.....	13.50@15.50
Muriatic, 22° ..	1.75	Sulphuric, 60° ..	1.05
Nitric, 36°	4.00	Sulphuric, 60° ..	
Nitric, 38°	4.25	bulk	18.00@20.00
Nitric, 40°	4.50	Sulphuric, 66° ..	1.20
Nitric, 42°	4.87½	bulk	21.00@23.00

Export of copper sulphate from Great Britain in October amounted to 894 long tons, or nearly twice the quantity reported in the same month last year. In the 10 months ending October 31 the exports totaled 40,706 tons, against 35,074 tons in the corresponding period last year, showing an increase of 5,632 tons credited to a heavier demand in countries where the American article has lost customers. The average invoice value of this year's exports was \$97.20 per ton, which is about \$7.50 more than the American.

Brimstone.—Spot market is narrow, as little brimstone is available for prompt delivery. Therefore importers quote only on nearby arrivals, for which they ask \$23.25@23.50 per ton for best unmixed seconds. Future shipments command \$22.75@23, according to position. Best thirds are about \$1.75 less.

Imports of brimstone into Great Britain in October were 1,629 tons, against 1,610 tons in the same month last year. In the 10 months ending October 31 the imports aggregated 19,135 tons, as against 19,267 tons in the corresponding period in 1901; showing a decrease of 132 tons. The imports this year had an average value of \$24.16, while in 1901 it was \$22.40 per ton. The price of brimstone this year is nearly \$7 higher than the average invoice value of the sulphur contained in the pyrites imported.

Pyrites.—Consumption is satisfactory, as also are prices. Importers are paying 10s. 6d. freight from Huelva, Spain, and at ruling prices for pyrites abroad, the imports at Atlantic ports stand about \$5.22 per ton.

Quotations are f. o. b. Mineral City, Va.: Lump ore, \$5 per ton, and fines 10c. per unit; Charlemont, Mass., lump, \$5, and fines, \$4.75. Spanish pyrites, 13@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.

Imports of pyrites into Great Britain in October amounted to 44,550 long tons, as against 52,924 tons a year ago. In the 10 months ending October 31 the imports totaled 515,690 tons, against 562,721 tons in the corresponding period last year, showing a decrease of 47,031 tons, equivalent to about 22,575 tons of sulphur, in 1902. The total imports this year contained approximately 247,531 tons sulphur, which was valued at about \$17.23 per ton, while in 1901 the

270,106 tons sulphur had an average value of \$18 per ton. These prices are far below the cost of crude Sicilian brimstone.

Nitrate of Soda.—The market continues firm on spot at \$2.02½ per 100 lbs., while futures are held at \$1.82½@1.95, according to position. In Europe arrivals are selling at a lower price than last week, but as importers prophesy smaller shipments this month the market is kept from falling. Yet there are some Continental buyers who do not believe in the statistical position, and so refuse to be intimidated. Moreover, the beet sowings next spring are expected to be curtailed, notwithstanding the rise in sugar prices. On the whole, the situation needs thoughtful study, as the prosperity of the nitrate of soda industry in Chile will depend upon the European consumption.

Sulphate of Ammonia.—No change, either in business or prices. Spot sells around \$3 per 100 lbs., while shipments are firm at \$2.95@2.97½.

Phosphates.—Abroad American phosphates are lower, as superphosphate manufacturers feel they can delay orders in the hope of further lessening the power of the phosphate miners. Present tactics between seller and consumer, are of an interesting character; the former (especially the Florida and Tennessee people) feel they control the supply of high-grade rock and need not sell below a certain figure, while the consumers (notably those in Germany and Belgium) believe the aggressive competition of foreign phosphates will eventually force Americans to accept what buyers care to pay. The outcome of this trade struggle is causing much discussion pro and con, but it does not look as though the Florida contingent is particularly nervous.

Shipments of phosphates from Fernandina, Fla., in October were the second largest this year, amounting to 23,500 tons. For the 10 months ending October 31 the shipments aggregated 172,675 tons, as against 175,994 tons in the corresponding period last year, showing a decrease of 3,319 tons.

Phosphates.	Per ton F. o. b.	United Kingdom or European Ports.	
		Unit.	Long ton.
*Fla. hard rock (78@80%)	\$6.50@7.00	6@6½d.	\$9.48@10.07
*Fla. land pb. (68@73%)	3.00@3.25	4@5d.	6.65@7.00
†Tenn., (78@82%) export.	3.25@3.50	5½@6d.	8.58@9.36
†Tenn., 78% domestic	3.00		
†Tenn., 75% domestic	2.75@3.00		
†Tenn., 73@74% domestic	2.30@2.40		
†Tenn., 70@72% domestic	2.10@2.25		
ISO. Car. land rock	3.25	4½@4¾d.	5.67@5.98
ISO. Car. river rock	2.75@3.00		
Algerian (65@68%)		5¼@6¼d.	7.15@8.13
Algerian (58@63%)		4¾@5¼d.	5.70@6.30
Algerian (53@58%)		4¾@4¾d.	4.95@5.23

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

Liverpool. Nov. 12.

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

There is little change to report in the position of heavy chemicals.

The following exports of bleaching powder and sodas for the month of October are taken from the Board of Trade returns, recently issued:

Bleaching powder: To United States, 49,882 cwts.; other countries, 22,699; total, 72,581 cwts. Soda ash, 119,116 cwts.; caustic soda, 136,065; bicarb. soda, 30,864; soda crystals, 23,906; saltcake 70,574; other sorts, 32,524; total, 413,049 cwts.

As compared with the corresponding month of last year the shipments of bleaching powder show a marked decrease, being nearly 50 per cent less than October, 1901. The exports of caustic soda and saltcake are much heavier than last year, but soda ash shows a falling off.

Soda ash is firm. For tierces the nearest spot range is 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, £4 5s.@£4 10s.; 58 per cent, £4 10s.@£4 15s. per ton, net cash. Bags, 5s. per ton under price for tierces.

Soda crystals are in fair request at generally £3 7s. 6d. per ton, less 5 per cent for barrels, or 7s. less for bags, with special terms for certain export quarters.

Caustic soda are in moderate supply and quotations are firm as follows: 60 per cent, £8 15s.; 70 per cent, £9 15s.; 74 per cent, £10 5s.; 76 per cent, £10 10s. per ton, net cash.

Bleaching powder is dull, but there is no pressure to sell. For hardwood, £6 10s.@£6 12s. 6d. per ton, net cash is nominal spot range, with special quotations for certain export quarters.

Chlorate of potash is flat at nominally 2½d. per lb., net cash.

Bicarb. soda is selling 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 quotations for a few favored markets.

Sulphate of ammonia is offered more freely and prices are easier at about £11 15s.@£11 17s. 6d. per

ton, less 2½ per cent for good gray 24@25 per cent in double bags, f. o. b. here.

Nitrate of soda is unchanged and steady on spot at £9 2s. 6d.@£9 5s. per ton, less 2½ per cent for double bags f. o. b. here, but there is not much going on.

METAL MARKET.

New York, Nov. 27.

Gold and Silver Exports and Imports.

At all United States Ports in October and Year.

Metal	October.		Year.	
	1901.	1902.	1901.	1902.
Gold:				
Exports....	\$4,068,747	\$1,446,514	\$36,747,316	\$32,442,833
Imports....	9,138,638	8,113,041	44,538,680	34,919,533
Excess. I.	\$5,071,891	I. \$7,666,527	I. \$7,791,364	I. \$1,576,700
Silver:				
Exports....	\$4,737,689	\$4,382,545	\$46,225,668	\$39,863,064
Imports....	3,070,616	2,706,734	25,561,660	21,470,578
Excess. E.	\$1,667,073	E. \$1,675,811	E. \$20,663,948	E. \$18,492,506

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

Gold and Silver Exports and Imports, New York.

For the week ending November 26, and for the years from January 1:

Period.	Gold.		Silver.		Total Excess, Exports or Imports.
	Exports.	Imports.	Exports.	Imports.	
Week....	\$12,000	\$14,953	\$248,645	\$11,275	E. \$234,417
1902.....	25,023,792	2,567,821	23,664,503	1,094,884	E. 44,025,590
1901.....	41,718,367	4,449,265	28,321,736	3,577,639	E. 62,236,199
1900.....	36,659,648	10,068,218	36,128,926	4,454,972	E. 58,245,724

Imports and exports of gold were in small parcels, from and to different ports. Silver exports were chiefly to London, imports from South America.

Financial Notes of the Week.

The speculative markets are still unsettled, and the process of liquidation is not at an end yet. General business, however, continues active, and there is nothing specially new to report.

The statement of the New York banks, including the 59 banks represented in the Clearing House, for the week ending November 22, gives the following totals, comparison being made with the corresponding weeks of 1901 and 1900:

	1900.	1901.	1902.
Loans and discounts..	\$792,720,100	\$869,063,000	\$868,217,200
Deposits	851,391,300	932,957,500	875,708,100
Circulation	792,720,100	31,972,400	45,337,700
Specie	164,742,500	177,175,500	170,908,000
Legal tenders	60,353,600	70,550,800	67,548,500
Total reserve	\$225,126,100	\$247,726,800	\$238,456,500
Legal requirements ..	212,847,825	233,239,375	218,926,625
Balance surplus ..	\$12,278,275	\$14,486,925	\$19,529,975

The following table shows the specie holdings of the leading banks of the world at the latest dates covered by their reports. The amounts are reduced to dollars and comparison made with the holdings at the corresponding date last year:

	1901		1902	
	Gold.	Silver.	Gold.	Silver.
N. Y. Assd	\$177,175,500	.....	\$170,908,000	.....
England ..	176,063,085	.....	165,310,610	.....
France ..	483,479,855	\$220,443,845	507,651,230	\$221,402,290
Germany ..	189,970,000	66,100,000	161,195,000	54,620,000
Spain	70,290,000	84,775,000	71,650,000	98,500,000
Neth'lds ..	28,709,000	29,910,500	23,488,500	32,146,000
Belgium ..	15,230,000	7,615,000	15,263,335	7,681,665
Italy	79,670,000	10,244,500	88,595,000	10,168,500
Russia	329,765,000	28,480,000	370,300,000	31,850,000

The returns of the Associated Banks of New York are of date November 22, and the others November 20, 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.

Exports of gold from San Francisco in October included \$11,224 to Hong Kong, and \$298,800 to Japan, a total of \$310,024. This gold was all of domestic origin. Exports of silver for the month are reported as follows:

	Domestic.	Foreign.	Totals.
Philippine Islands	\$50,206	\$50,206	\$50,206
Hongkong	\$391,100	720,655	1,111,755
Totals	\$391,100	\$770,861	\$1,161,961

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

Silver has had a sharp fall, and it is still weak, with an uncertain future. Various causes have entered into the condition that has produced this sudden break in the price of bullion, chief of which seems to be cessation of orders from India.

The United States Assay Office in New York reports receipts of 23,000 oz. silver for the week.

Shipments of silver from London to the East for the year up to November 13 are reported by Messrs. Pixley & Abell's circular as follows:

	1901.	1902.	Changes
India	£6,637,910	£5,617,830	D. £1,020,080
China	590,212	162,500	D. 427,712
The Straits	508,859	685,470	I. 176,611
Totals	£7,736,981	£6,465,800	D. £1,271,181

Arrivals for the week were £119,000 in bar silver from New York, £15,000 from the West Indies, and £7,000 from Australia; total, £141,000. Shipments were £153,500 in bar silver to Bombay, and £14,000 to Calcutta; total, £167,500.

Indian exchange has been firmer, owing to free exports and to the limited buying of silver. The demand for Council bills in London was large, and all those offered were taken at 16d. per rupee.

The gold and silver movement in Great Britain for the 10 months ending October 31 is given by the Board of Trade returns as below:

	1901.	1902.	Changes.
Gold: Imports	£18,707,769	£17,789,237	D. £908,532
Exports	10,611,817	11,442,583	I. 830,766
Excess, imports	£8,095,952	£6,355,654	D. £1,740,298
Silver: Imports	9,614,312	7,486,518	D. 2,127,794
Exports	9,941,088	8,429,656	D. 1,511,432
Excess, exports	£326,776	£943,138	I. £616,362

Of the silver imported this year £6,157,125, or 82.2 per cent of the total, is credited to the United States.

Prices of Foreign Coins.

	Bid.	Asked
Mexican dollars	\$.36	\$.36
Peruvian soles and Chilean pesos .....	.38	.40
Victoria sovereigns	4.85	4.88
Twenty francs	3.85	3.88
Twenty marks	4.74	4.80
Spanish 25 pesetas	4.78	4.82

Missouri Ore Market.

Nov. 22.

(From Our Special Correspondent.)

Joplin Ore Market.—The shortage in cars has continued, and there was another surplus of ore piled up in the district, causing another slump in prices. The general assay basis was \$33 per ton for 60 per cent ore for all ores, except those carrying a penalty in lime, which are being purchased on a basis of \$31 per ton.

One feature of the car shortage has begun to show. The coal supply in the district could not be maintained, and some of the largest mines were compelled to shut down everything except the pumps. This shut down will materially reduce the surplus, and may affect the prices.

Lead ore continued to sell at a basis of \$50 per ton all the week, and there was much eagerness displayed by buyers in securing finest lots.

Following are the sales from the various camps of the Joplin District for the week ending November 22:

Camp	Zinc lbs.	Lead lbs.	Value.
Joplin	2,675,410	317,010	\$52,036
Galena-Empire	1,001,460	179,070	19,499
Carterville	1,323,420	383,910	30,111
Zincite	497,030	4,760	8,569
Spurgeon	388,200	60,730	7,341
Duenweg	795,230	54,020	14,075
Aurora	416,350	2,490	6,153
Prosperity	342,360	17,670	6,091
Cave Springs	216,220	9,750	3,312
Central City	81,350	11,610	1,381
Orongo	115,710	4,180	2,072
Cartilage	208,140	.....	3,530
Carl Junction	334,040	.....	5,679
Granby	350,000	63,000	5,275
Gilham	58,000	.....	870
Total	8,800,920	1,108,200	\$166,509
Total 47 weeks	478,994,540	58,029,470	\$8,067,062

Zinc value, week, \$138,803; lead, \$27,706; zinc value, 47 weeks, \$7,280,925; lead, \$1,326,537.

Three well-known Gaena operators have opened up an immense lead mine in the very center of the city of Gaena, Kansas. The mine is located at the center of Seventh and Washington streets, and almost a ton of lead is now being taken out to the shaft.

Imperial Mill Burned.—The concentrating mill at the Imperial Mine on the Continental Company's fee west of Joplin was burned at an early hour Saturday morning. The fine new mill, with all machinery, was destroyed at a loss of \$10,000, partially covered by insurance. The mine is the property of Edward H. Shattuck, of Lowell, Mass. The fire was of incendiary origin, and the parties who started it also tried to explode the powder magazine and oil house adjoining the mill. A train of fuse was laid from the mill to the powder house, where it was connected with a charge of powder. The fuse failed to act, and the explosion failed to occur. If the design had worked out many lives would have been lost. A large sum will be spent in an endeavor to apprehend the guilty parties.

OTHER METALS.

Daily Prices of Metals in New York.

November	Silver			Copper			Spelter			
	Sterling Exchange	N. Y. Cts.	London, Pence.	Lake Cts. per lb.	Electrolytic cts. per lb.	London, £ per ton.	Tin, Cts. per lb.	Lead Cts. per lb.	N. Y. Cts. per lb.	St. L. Cts. per lb.
20	4.86%	49%	32½	11½	11½	50%	25%	@4.10	5.15	5.00
21	4.87	48%	22½	11½	11½	50%	25%	@4.10	5.12½	4.95
22	4.87	48%	22½	11½	11½	50%	25%	@4.10	5.10	4.95
24	4.87	48	22½	11½	11½	50%	25	@4.10	@5.10	@4.95
25	4.87	47%	22½	11½	11½	50%	24%	@4.10	@5.10	@4.95
26	4.87	47%	41%	11½	11½	50	24%	@4.10	@5.10	@4.95

London quotations are per Long Ton (2,240 lbs.) standard copper, which is now the equivalent of the former g. m. l. 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 market throughout the week has ruled rather dull and depressed, and in some quarters there has been an inclination to make concessions. At the close we quote lake copper, 11½@11½c.; electrolytic in cakes, wirebars or ingots at 11½@11½c.; cathodes, 11c.; casting copper, 11@11½c.

The foreign market, which closed last Friday at £50 7s. 6d., opened on Monday at the same figure, but declined on Tuesday, and the closing quotations on Wednesday are cabled at £50@£50 1s. 3d. for spot, and £50 5s.@£50 6s. 3d. for three months prompt.

Refined and manufactured sorts we quote as follows: English tough, £52 10s.@£53; best selected, £54@£54 10s.; strong sheets, £66@£67; India sheets, £65@£66; yellow metal, 6@6¼d.

Exports of copper from Atlantic ports in the week ending November 25 were: Great Britain, 570 tons; Germany, 490; Holland, 697; Austria, 450; France, 180; Belgium, 54; Italy, 20; Australia, 12; Japan, 5; total, 2,478 tons. Imports were 391 tons from Great Britain, 400 tons from Japan, and 154 tons from Mexico; total, 945 tons, all copper.

Imports of copper in all forms into Great Britain for the 10 months ending October 31 were as follows, in long tons; the totals giving the contents in fine copper:

	1901.	1902.	Changes.
Copper ore	80,044	75,632	D. 4,412
Matte and precipitate	76,258	59,205	D. 17,053
Fine copper	55,352	79,585	I. 24,233
Totals, fine copper	104,485	118,751	I. 15,266
Exports, fine copper	37,213	42,295	I. 5,082
Balance	65,272	74,456	I. 9,084

Of the imports this year 804 tons of ore, 12,580 tons of matte and 38,341 tons of fine copper were from the United States; these figures comparing with 824 tons of ore, 15,814 tons matte and 15,533 tons fine copper last year.

Tin has had a declining tendency; nevertheless, the market has been rather active, and at the close we quote spot, 24½c.; December, 24½c.

The foreign market, which closed firm last week at £113 10s., opened on Monday at £112 15s., and the closing quotations on Wednesday are cabled as £111 2s. 6d.@£111 5s. for spot, and £110 7s. 6d.@£110 10s. for three months prompt.

Exports of tin from the Straits Settlements for the 9 months ending September were as follows, in long tons of 2,240 lbs.:

To:	1901.	1902.	Changes.
United States	14,152	13,887	D. 265
Great Britain	18,904	20,137	I. 1,233
European Continent	4,488	5,912	I. 1,424
China and India	2,062	1,280	D. 782
Totals	39,606	41,216	I. 1,610

In 1900 the total exports were 34,681 tons, or 6,535 tons less than those reported this year.

Imports of tin into Great Britain, with re-exports of imported tin, for the 10 months ending October 31, were as follows, in long tons:

	1901.	1902.	Changes.
Straits	21,806	23,097	I. 1,291
Australia	2,569	2,593	I. 24
Other countries	5,052	3,297	D. 1,755
Total	29,427	28,987	D. 440
Re-exports	17,816	18,966	I. 1,150
Balance	11,611	10,021	D. 1,590

The increase in Straits tin was more than offset by the decrease from other countries.

Lead is quiet and steady, without any special feature. The ruling quotations are 3.97½@4.05c., St. Louis, and 4.05@4.10c., New York.

The foreign market is somewhat easier, Spanish lead being quoted £10 13s. 9d., and English lead, 2s. 6d. higher.

Imports of lead into Great Britain, with the ex-

ports, for the 10 months ending October 31, are reported as below, in long tons:

	1901.	1902.	Changes.
United States	37,675	44,647	I. 6,972
Spain	79,097	87,553	I. 8,456
Australia	51,047	50,219	D. 828
Other countries	11,316	15,206	I. 3,890
Total	179,135	197,625	I. 18,490
Exports	32,318	28,090	D. 4,228
Balance	146,817	169,535	I. 22,718

The lead credited to the United States is chiefly Mexican lead, refined here in bond.

St. Louis Lead Market.—The John Wahl Commission Company telegraphs us as follows: Lead is dull at 4c. for Missouri brands, and 4.05c. for argentiferous lead.

Spanish Lead Market.—Messrs. Barrington & Holt report from Cartagena, Spain, under date of November 8 that the price for silver has been 12.25 reales per ounce; exchange being 33.35 pesetas to £1. The quotation for pig lead has been 56.50 reales per quintal on wharf, which on the above exchange is equivalent to £9 10s. per ton. Exports have been 806,500 kgs. to London and 150,000 kgs. to Marseilles; a total of 956,500 kgs. for the week.

Spelter continues rather irregular, and lower prices have been accepted. At the close we quote St. Louis, 4.85@4.95c., and New York, 5@5.10c.

The foreign market is very firm, good ordinaries being quoted £19 17s. 6d., and specials 5s. higher.

Imports of spelter into Great Britain for the 10 months ending October 31 were 75,721 tons, against 56,502 tons for the corresponding period in 1901; an increase of 19,219 tons, or 33.7 per cent, this year.

St. Louis Spelter Market.—The John Wahl Commission Company telegraphs us as follows: Spelter is weak and lower. Latest sales are on a basis of 4.95c., East St. Louis.

Spanish Zinc Ore Market.—Messrs. Barrington & Holt report under date of November 8 that ores are in good demand. Shipments for the week included 3,300 tons blende to Antwerp; 550 tons blende and 79 tons calamine to Swansea.

Antimony is dull and unchanged at last prices; 9@9½c. for Cookson's, 7½ for Hallett's, 7½@7¼c. for Hungarian, Japanese, Italian and U. S. Star.

Nickel.—The price is now quoted by leading producers at 40@47c. per lb., for large quantities down to ton lots, according to size and terms of order. The price for smaller lots, according to quality, runs as high as 60c. per lb.

Platinum.—Consumption continues good, and prices are firm. Ingot platinum in large lots brings \$19 per oz. in New York.

Chemical ware (crucibles and dishes), best hammered metal from store in large quantities, is worth 73½c. per gram.

Quicksilver.—The New York price continues \$48 per flask for large orders, with a slightly higher figure for small lots. In San Francisco prices are steady, and the quotations are \$45.50@-\$6.50 per flask for domestic orders. For export orders \$44 per flask is quoted. The London price remains £8 15s. per flask, with the same figure quoted from second hands.

Exports of quicksilver from San Francisco in October are reported as follows: Mexico, 26,045 lbs.; Costa Rica, 383; Honduras, 4,742; Hong Kong, 76,500; total, 107,670 lbs., or 1,408 flasks.

Imports of quicksilver into Great Britain for the 10 months ending October 31 were 2,441,546 lbs., against 2,588,707 lbs. for the corresponding period in 1901. Re-exports were 1,309,772 lbs., against 1,670,392 lbs. last year.

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

	Per lb.	Per lb.
Aluminum .....	.....	.....
No. 1, 99% ingots.....	33@37c.	.....
No. 2, 90% ingots.....	31@34c.	.....
Roller Sheets.....	4c. up	.....
Alum-bronze	20@23c.	.....
Nickel-alum	33@39c.	.....
Bismuth	\$1.50	.....
Chromium, pure (N.Y.).....	80c.	.....
Copper, red oxide	50c.	.....
Ferro-Molyb'dum (50%).....	\$1.25	.....
Ferro-Titanium (10%).....	90c.	.....
Ferro-Titanium (20@25%, N. Y.).....	55c.	.....
Ferro-Tungsten (37%).....	28c.	.....
Magnesium	2.75	.....
Manganese, pure (N.Y.).....	90c.	.....
Mangan'e Cop. (20% Mn).....	32c.	.....
Mangan'e Cop. (30% Mn).....	38c.	.....
Molybdenum (Best).....	\$1.50	.....
Phosphorus	45c.	.....
American	70c.	.....
Sodium metal.....	50c.	.....
Tungsten (Best).....	62c.	.....

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

Average Prices of Metals per Lb., New York.

Month.	Tin.		Lead.		Spelter.	
	1901.	1902.	1901.	1902.	1901.	1902.
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	4.47	3.06
May	29.85	27.12	4.075	4.350	4.47	4.04
June	29.86	28.90	4.075	4.350	4.96	3.96
July	28.38	27.85	4.075	4.350	5.27	3.98
August	28.23	26.78	4.075	4.350	5.44	3.90
September	26.60	25.31	4.075	4.350	5.49	4.08
October	26.07	26.62	4.075	4.350	5.38	4.23
November	26.07	.....	4.350	.....	.....	4.20
December	24.86	.....	4.153	.....	.....	4.31
Year	26.54	.....	4.384	.....	.....	4.08

Average Prices of Copper.

Table with columns: Month, Electrolytic, New York (1902, 1901), Lake (1902, 1901), London Standard (1902, 1901). Rows include January through December and Yearly averages.

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, 1901, 1900. Sub-columns for New York (Pence, Cents) and London (Pence, Cents). Rows include January through December and Yearly averages.

The New York prices are per fine ounce; the London quotation is per standard ounce, .925 fine.

DIVIDENDS.

Table with columns: Name of Company, Date, Per Share, Total, Latest Dividend, and Total to Date. Lists various companies and their dividend details.

ASSESSMENTS.

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

STOCK QUOTATIONS.

NEW YORK.

Table of stock quotations for New York, listing company names, par values, and prices for various dates from Nov. 19 to Nov. 25.

BOSTON, MASS.*

Table of stock quotations for Boston, Mass., listing company names, par values, and prices for various dates from Nov. 19 to Nov. 25.

Coal, Iron and Industrial Stocks.

Table of stock quotations for Coal, Iron and Industrial Stocks, listing company names and prices for various dates from Nov. 19 to Nov. 25.

PHILADELPHIA, PA.†

Table of stock quotations for Philadelphia, Pa., listing company names and prices for various dates from Nov. 19 to Nov. 25.

†Ex. Dividend.

Total sales, 536,106 shares.

‡Reported by Townsend, Whelen & Co., 309 Walnut St., Philadelphia, Pa. Total sales 9,191 shares.

STOCK QUOTATIONS.

COLORADO SPRINGS, COLO.*

Table of stock quotations for Colorado Springs, Colo. listing companies like Acacia, Alamo, Anaconda, etc., with columns for par value, bid/ask prices, and sales.

*Colo. Springs Mining Stock Exchange. All mines are in Colorado. Total sales 192,400 shares.

COLORADO SPRINGS (By Telegraph.)

Table of stock quotations for Colorado Springs (By Telegraph) listing companies like Acacia, Alamo, Anaconda, etc., with columns for par value, bid/ask prices, and sales.

PARIS.

Nov. 6.

Table of stock quotations for Paris listing companies like Acieries de Creusot, Aluminerie de France, etc., with columns for country, product, capital stock, and prices.

ST. LOUIS, MO.*

TORONTO, ONT.

Nov. 24.

Table of stock quotations for St. Louis, Mo. and Toronto, Ont. listing companies like Am. Nettie, Catherine Lead, etc., with columns for shares, par value, and prices.

*From our Special Correspondent.

Total sales, 4,000 shares.

LONDON.

Nov. 12.

Table of stock quotations for London listing companies like Anaconda, Arizona, Camp Bird, 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. 14.

Table of stock quotations for Mexico listing companies like Durango, Guanajuato, etc., with columns for name of company, shares, last dividend, and prices.

SALT LAKE CITY.*

Nov. 21.

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, and prices.

All mines are in Utah. *By our Special Correspondent. Total sales, 218,769 shares.

CHEMICALS, MINERALS, RARE EARTHS, ETC.—CURRENT WHOLESALE PRICES.
(See also Market Reviews.)

ABRASIVES—			BARIUM			GRAPHITE—Am. f.o.b. Prov.			PAINTS AND COLORS—		
	Cust. Meas.	Price.		Cust. Meas.	Price.		Cust. Meas.	Price.		Cust. Meas.	Price.
Carborundum, f.o.b. Niagara Falls, Powd., F.F.F.F.F. lb.		\$0.08	Oxide, Am. hyd. cryst. lb.		\$0.02½	Idence, E. I., lump. sh. ton		\$8.00	Metallic, brown sh. ton		\$19.00
Grains		.10	Sulphate (Blanc Fixe) "		.02	Pulverized "		30.00	Red "		16.00
Corundum, N. C.		.07@.10	BARYTES—			German, com. pulv. lb.	.01½@.01½		Ocher, Am. common "		9.25@10.00
Chester, Mass.		.04½@.05	Am. Crude, No. 1. sh. ton		9.00	Best pulverized "	.01½@.02		Best "		21.25@25.00
Barry's Bay, Ont.		.07½@.09½	Crude, No. 2. "		8.00	Ceylon, common pulv. "	.02½@.03½		Dutch, washed lb.		.04½
Mont., f.o.b., Chicago		.07@.07½	Crude, No. 3. "		7.75	Best pulverized "	.04@.08		French, washed "		.01½@.01½
Crushed Steel, f.o.b. Pittsburg		.05½	German, gray "		14.50	Italian, pulv. "	.01½		Orange mineral, Am. "		.07½@.08
burg		.03½	Snow white "		17.00	GYPSSUM—Ground sh. ton	8.00@8.50		Foreign, as to make "		.08½@.11½
Emery, Turkish flour in kegs		.05@.05½	BAUKITE—Ga. or Ala. Mines:			Fertilizer "	7.00		Paris green, pure, bulk. "		.12
Grains, in kegs		.03½	First Grade lg. ton		5.50	Rock "	4.00		Red lead, American "		.05½@.08
Naxos flour, in kegs		.05@.05½	Second grade "		4.75	English and French "	14.00@16.00		Foreign "		.06½@.08
Grains, in kegs		.03½	BISMUTH—Subnitrate lb.		1.40	INFUSORIAL EARTH—Gr'd.			Turpentine, spirits gal.		.53@.53½
Chester flour, in kegs		.05@.05½	Subcarbonate "		1.65	American best "	20.00		White lead, Am., dry lb.		.04½@.04½
Grains, in kegs		.05@.05½	BITUMEN—"B" "		.03½	French "	37.50		American, in oil. "		.05½@.05½
Peekskill, f.o.b. Easton, Pa., flour, in kegs		.01½	"A" "		.05	German "	40.00		Foreign, in oil. "		.06½@.09½
Grains, in kegs		.02½	BONE ASH "		.02¼@.02¼	IODINE—Crude 100 lbs.	2.45		Zinc, white, Am., ex dry. "		.04½@.04½
Crude, ex-ship N. Y.: Abbott (Turkey) lg. ton	28.50@30.00		BORAX "		.07½@.07½	IRON—Muriate lb.	.05		American, red seal. "		.06½
Kuluk (Turkey) "	22.00@24.00		BROMINE "		.40	Nitrate, com'l "	.01½		Green seal "		.07
Naxos (Greek) b. gr. "	26.00		CADMIUM—Metallic "		1.40	True "	.04		Foreign, red seal, dry. "		.05½@.08½
Garnet, as per quality sh. ton	25.00@35.00		Sulphate 100 lbs.	2.00@2.50		Oxide, pure copperas color. "	.05@.10		Green seal, dry. "		.06½@.09½
Fumice Stone, Am. powd. lb.	.01½@.02		CALCIUM—Acetate, gray "		1.30	Purple-brown "	.01@.01½		POTASH		
Italian, powdered. "	.01½		" brown. "		.90	Venetian red "	.01@.01½		Caustic, ordinary "		.04½@.05
Lump, per quality. "	.04@.40		Carbide, ton lots f.o.b. Niagara Falls, N. Y., for Jersey City, N. J. sh. ton		70.00	Scale "	.01@.03		Elect. (90%) "		.06½
Rottenstone, ground. "	.02½@.04½		Carbonate, ppt. lb.		.05	KAOLIN—(See China Clay.)			POTASSIUM—		
Lump, per quality. "	.06@.20		Chloride 100 lbs.	.70@.90		CRYOLITE—(See Cryolite.)			Bicarbonate cryst. "		.08½
Rouge, per quality. "	.10@.30		CEMENT—			LEAD—Acetate, white "	.07½@.08		Powdered or gran. "		.14
Steel Emery, f.o.b. Pittsburg. "	.07		Portland, Am., 400 lbs. bbl.	1.70@1.90		Brown "	.06@.06½		Bichromate, Am. "		.08½@.09
ACIDS—			Foreign "	1.65@2.25		Nitrate, com'l "	.06½		Carbonate "		.08½@.09½
Boracic, crystals. "	.10½@.11		" Rosendale, 300 lbs. "	.75		" gran. "	.08½		Chromate "		.25
Powdered "	.11½@.11½		Slag cement, imported. "	1.65		LIME—Com., abt. 250 lbs. bbl.	.80		Cyanide (98@99%) "		.28
Carbonic, liquid gas. "	.12½		CERESINE—			Finishing "	.90		Kalmi "		0.05
Chromic, crude. "	.20		Orange and Yellow lb.	.12		MAGNESITE—Greece.			Manure salt, 20% 100 lbs.		.06
Hydrofluoric, 30% "	.03		White "	.13½		Crude (95%) lg. ton	6.00@8.50		D'le Manure Salt, 48@53% "		1.12
48% "	.05		CHALK—Lump, bulk sh. ton	2.50		Calclined sh. ton	17.50@18.00		Muriate, 80@85% "		1.83
60% "	.11		Ppt. per quality lb.	.08½@.08		Bricks M	170.00		85% "		1.86
Sulphurous, liquid anhy. "	.05		CHLORINE—Liquid "	.30		Am. Bricks, f.o.b. Pittsburg "	175.00		Permanganate lb.		.09½@.10
ALCOHOL—Grain gal.	2.47		Water "	.10		MAGNESIUM—			Prussiate, yellow "		.13½@.14
Refined wood 95@97% "	.60@.65		CHROME ORE—			Carbonate, light, fine pd. lb.	.05		Red "		.36
Purified "	1.20@1.50		(50% ch.) ex-ship N. Y. lg. ton	24.75		Blocks "	.07@.09		Sulphate, 90% 100 lbs.		2.11
ALUM—Lump 100 lbs.	1.75		Bricks f.o.b. Pittsburg. M	175.00		Chloride, com'l "	.01½		90% "		2.14
Ground "	1.80		CLAY, CHINA—Am. com., ex-dock, N. Y. lg. ton	8.00		Fused "	.20		Sylvinit unit		.39½
Powdered "	3.00		Am. best, ex-dock, N. Y. "	9.00		Nitrate "	.60		QUARTZ—(See Silica).		
Chrome, com'l "	2.75@3.00		English, common. "	12.00		Sulphate 100 lbs.	.75@.95		SALT—N. Y. com. fine sh. ton		2.00
ALUMINUM—			Best grade. "	17.00		MANGANESE—Powdered,			N. Y. agricultural. "		1.50
Nitrate lb.	1.50		Fire Clay, ordinary. sh. ton	4.25		70@75% binoxide lb.	.01½@.01½		SALTPETRE—Crude 100 lbs.		3.35@3.40
Oxide, com'l, common. "	.06½		Best "	6.00		Crude pow'd. "	.01½@.02½		Refined "		4.25@4.62½
Best "	.20		Slip Clay "	5.00		75@85% binoxide "	.01½@.02½		Ground quartz, ord. sh. ton		6.00@8.00
Pure "	.80		COAL TAR FITCH gal.	.08		85@90% binoxide "	.02½@.03½		Best "		12.00@13.00
Hydrated 100 lbs.	2.60		COBALT—Carbonate lb.	1.75		90@95% binoxide "	.03½@.05½		Lump quartz "		2.50@4.00
Sulphate, pure "	1.50@2.00		Nitrate "	1.50		Carbonate "	.16@.20		Glass sand "		2.75
Com'l "	1.15@2.00		Oxide—Black "	2.26@2.30		Chloride "	.04		SILVER—Chloride oz.		.05
AMMONIA—			Gray "	2.28@2.40		Ore, 50%, Foreign. unit	.18@.19		Nitrate "		.34
Aqua, 16" lb.	.03		Smalt, blue ordinary "	.06		MARBLE—Flour sh. ton	6.00@7.00		Oxide "		.85@1.10
18" "	.03½		Best "	.20		MERCURY—Bichloride lb.	.77		SODIUM—		
20" "	.03½		COPPERAS—in bulk 100 lbs.	.20@.37½		MICA—N. Y. gr'nd, coarse sh. ton	38.00@38.00		Bichromate lb.		.08½
26" "	.05½		In bbls. "	.25@.42½		Fine lb.	.00½@.02		Chlorate, com'l "		.07½@.08
AMMONIUM—			COPPER—Carbonate lb.	.18@.19		Sheets, N. C., 2x4 in. "	.30		Hyposulphite, Am. 100 lbs.		1.90@1.65
Carbonate, lump "	.08½		Chloride "	.25		3x3 in. "	.80		German "		1.70@1.90
Powdered "	.09		Nitrate, crystals "	.35		3x4 in. "	1.50		Peroxide lb.		.45
Muriatic, grain "	.05½		Oxide, com'l "	.19		4x4 in. "	2.00		Phosphate lb.		.02½
Lump "	.08½		CRYOLITE "	.06½		6x6 in. "	3.00		Prussiate "		.11@.11½
Nitrate, white, pure (99%) "	.12		EXPLOSIVES—			MINERAL WOOL—			Silicate, conc. "		.01
Phosphate, com'l "	.00		Blasting powder, A. 25 lb. keg	.65		Slag, ordinary sh. ton	19.00		Com'l "		.01
Pure "	.12		Blasting powder, B. "	1.40		Selected "	25.00		Sulphate, com'l 100 lb.		.75@.82½
ANTIMONY—Glass "	.30@.40		"Rackarock," A. lb.	.25		Rock, ordinary "	32.00		Sulphide lb.		.01½
Needle, lump "	.05½@.06		"Rackarock," B. "	.18		Selected "	40.00		Sulphite crystals "		.02½
Powdered, ordinary "	.05½@.07½		Judson R.R. powder. "	.10		NICKEL Oxide, No. 1. lb.	1.00		SULPHUR—Roll 100 lbs.		1.85
Oxide, com'l white, 95% "	.09½		Dynamite (20% nitro-glycerine) "	.13		No. 2. "	.60		Flour "		1.90
Com'l white, 95% "	.12		(30% nitro-glycerine) "	.14		Sulphate "	.20@.21		Flowers, sublimed "		2.15
Com'l gray "	.07		(40% nitro-glycerine) "	.15		OILS—Black, reduced 29 gr.:			TALC—N. C., 1st grade sh. ton		13.75
Sulphuret, com'l "	.16		(50% nitro-glycerine) "	.16½		25@30, cold test. gal.	.09½@.10½		N. Y., Fibrous, best. "		10.20
ARSENIC—White "	.02½@.03½		(60% nitro-glycerine) "	.18		15, cold test. "	.10½@.11½		French, best 100 lbs.		1.25
Red "	.08½@.07		(75% nitro-glycerine) "	.21		Zero "	.11½@.12½		Italian, best "		1.62½
ASPHALTUM—			Glycerine for ultra, (82-2-10" Be.) "	.13½@.13½		Summer "	.09½@.09½		TAR—Regular bbl.		2.20
Ventura, Cal. sh. ton	\$2.00		FELDSPAR—Ground sh. ton	8.00@9.00		Cylinder, dark steam ref. "	.08½@.10½		Oil barrels "		4.25
Cuban lb.	.01½@.03½		FLINT PEBBLES—Dan. Best. lg. ton	14.75		Dark, filtered. "	.11½@.15½		URANIUM—Oxide "		2.25@3.00
Egyptian, crude. "	.05½@.06		French, Best "	11.75		Light, filtered. "	.14½@.17½		Oxide lb.		.45
Trinidad, refined. sh. ton	35.00		FLUORSPAR—			Extra cold test. "	.21½@.26½		ZINC—Metallic, ch. pure. "		.07@.09½
San Valentino (Italian) lg. ton	16.00		Am. lump, 1st grade. sh. ton	14.40		Gasoline, 86" @90" "	.15@.20		Carbonate, ppt. "		.09
Seyssel (French), mastic. sh. ton	21.00		2d grade. "	13.90		Naphtha, crude, 68" @72" bbl.	9.05		Chloride solution, com'l. "		.02½
Gilsonite, Utah, ordinary. lb.	.08		Gravel and crushed, 1st gr. "	13.40		"Stove" gal.	.12		Chloride granular. "		.04½@.04½
Select. "	.08½		2d grade. "	12.40		Linseed, domestic raw. "	.44@.46		Dust "		.04½@.04½
BARIUM—			Ground, 1st grade. "	17.90		Bolled "	.75		Sulphate "		.02½@.02½
Carb. Lump, 80@90% sh. ton	25.00@27.50		Ground, 2d grade. "	16.50		Calcutta, raw. "	.48		BORON—Nitrate lb.		\$1.50
92@98% "	20.00@29.00		Foreign, lump. "	8.00@12.00		COKEERITE lb.	.11½		CALCIUM—Tungstate		.60
Powdered, 80@90% lb.	.01½@.02		FULLER'S EARTH—Lump 100 lbs.	.75		PAINTS AND COLORS—			(Scheelite) "		.60
Chloride, com'l 100lbs. 1.67½@1.76			Powdered "	.80		Chrome green, common. "	.05		CERIUM—Nitrate "		10.00
Chem. pure cryst. lb.	.05		ASPHALTUM—			Pure "	.16		DIDYMIUM—Nitrate "		35.00
Nitrate, powdered. "	.05½		Ventura, Cal. sh. ton	\$2.00		Yellow, common. "	.10½		ERBIUM—Nitrate "		40.00

NOTE.—These quotations are for wholesale lots in New York unless otherwise specified, and are generally subject to the usual trade discounts. Readers of the ENGINEERING AND MINING JOURNAL are requested to report any corrections needed, or to suggest additions which they may consider advisable.