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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 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.



EVERY NEW link between distant lands marks the progress of civilization and increased facilities for industry. The cable, which was completed last week, between Vancouver and New Zealand, gives us an improved telegraphic means of communication with the Australian mining regions. In cabling this week to a correspondent in Sydney, we were made aware of the fact that this knitting of the threads of commerce affords another help to technical journalism.



IT IS UNDERSTOOD that the Dominion Coal Company has notified the New England Gas and Coke Company that it intends to abrogate the contract entered into in September, 1897, for the supply of coal to the latter for a period of 50 years at \$1.90 per ton, the ground for this action being that inasmuch as the Gas and Coke Company has passed into the hands of a receiver contracts with it can therefore be terminated. This appears to us very slender. The true motive is, of course, the fact that the market for the Dominion coal has widened greatly since the contract was made, and the price has greatly enhanced. However, the contract was considered advantageous to both parties at the time it was made, and the huge investment at Everett was dependent greatly upon its assurance of an adequate supply of coal at a proper price, so that it does not now seem right for the coal company to seek to get out of its bargain on what is at the best merely a technicality.



AS AN EXAMPLE of the extent to which oil is replacing coal for locomotive firing, may be cited the present equipment and full cost of the Western Division of the Southern Pacific Railroad. Sixty-three locomotives are now operated by oil burners and 83 are yet to be converted from coal burners to oil burners. It is stated that with the present equipment a saving in fuel cost of over \$40,000 monthly has resulted. During the month of September of the current year the oil-burning engines on the Western Division traveled about 200,000 miles and the coal burners 306,000 miles. It takes 24 barrels of oil, as compared to five tons of coal, for each 100 miles, which is a ratio of nearly five barrels of oil to one ton of coal. The saving with oil on each 100 miles varies from \$16 to \$20. The burning question of the substitution of oil for coal, particularly on localities where the latter is of high cost, has been discussed *ad lib* in recent years, and it is satisfactory to note the increasing use of the per-eminently

superior fuel. If, in the past few years, a sufficient supply of cheap oil had been available at Eastern ports, so that manufacturing concerns would have been justified in going to the expense of changing from coal firing to oil firing, much of the inconvenience and suffering which resulted from the recent anthracite coal strike would have been obviated. On the Pacific Coast prices of coal have always been high, so that the proportionate saving is greater than would have been the case elsewhere.



### JOHN FRITZ.

It is a pleasure to record the appreciation of a man's good work, as was so fittingly shown in the meeting held at the Waldorf-Astoria Hotel last Friday night to do honor to John Fritz on his eightieth birthday. Four of the leading engineering societies of the country collaborated in arranging the banquet and, what is of lasting value, in securing for the years to come, the appreciation of this great ironmaster by establishing a medal to bear his name and to be awarded annually for distinguished accomplishment in the iron or steel industry. This act, which places for all time the name of John Fritz on the same high level as that of Sir Henry Bessemer, is an act of justice to one whose devotion to business has contributed so largely to the supremacy of the United States in the iron and steel industries. To use the words of the Hon. Abram S. Hewitt, "John Fritz is to us more than a man to be loved and respected; more than a friend to whom many years of health and happiness are to be wished. His life work affords a very conspicuous example of the working of American institutions during the century which has just closed—the most remarkable era of progress in the history of the human race. \* \* \* That a boy born in humble life, with no advantages of education or opportunities for position, without influential friends or the favoring accidents of fortune, should be able to advance steadily in usefulness, power and the respect of his fellow men, until by common consent he occupies the first place in the domain of practical industry with which he has been connected, gives conclusive evidence that political institutions which afford free play to individual ambition, industry, ability and strict integrity, are worthy of all loyalty, and should be cherished and preserved at all costs and hazards. \* \* \* John Fritz, therefore, is an example of the free spirit of American institutions, a beacon light warning the present and coming generations against permitting any invasion of the principle of the liberty of the citizen, which alone has made our beloved country great and free."



### TRANSVAAL GOLD PRODUCTION.

The October output of the Rand was 190,000 ounces of gold, an increase of 20,000 ounces, as compared to September. These monthly figures of production emphasizes the slowness with which the Transvaal is resuming its former activity as a mining region. In October, 1898, the yield was 423,217 ounces; in August, 1899, just before mining was interrupted by the

war, the output was 482,108 ounces. Since 1887 the total production has amounted to about 24,500,000 ounces of gold.

Peace did not bring immediate fruit as regards normal conditions of unhampered activity; subsequent events have been a series of disappointments. The labor situation was a retarding factor because the unsettled state of the country prevented the natives from returning to work at the mines, moreover the regulations for hiring them had to be changed, new liquor regulations were about to be enforced and a readjustment of the rates of wages was deemed desirable. All this delayed the wheels of action. Then came the discovery that the military use of the railways hindered the prompt delivery of machinery and caused the rates of transport to remain at an exorbitant figure. Finally, the shadow of prospective heavy taxation fell over the industry, so that the capitalist held back his hand from new enterprises and the shareholder became timid concerning the earning capacity of the mines.

We believe that all these obstacles are in course of removal and that a future of splendid industrial progress awaits the goldfields of the Rand. The labor troubles will be overcome by just regulations and the introduction wherever possible of the contract system, the freight and custom charges of a country emergent from war will give place to a reasonable tariff, and as regards the bugaboo of taxation there is evidence indicating that the depressing effect of this factor has been fully discounted, if not exaggerated. It is not possible to estimate with accuracy the amount between expenditure and revenue until the future needs of the country have been determined; nothing, however, is likely to be done which would injure the prosperity of the industry upon which the new colony depends. The projected visit of Mr. Chamberlain is everywhere regarded as a far-sighted departure from precedent and is of good augury for the future of the Rand, in common with the whole of South Africa.



#### CALIFORNIA FOREST RESERVES,

A measure of particular importance to the development of the mining industry of California is the recent action of the Secretary of the Interior, authorizing the Commissioner of the General Land Office to withdraw from the public land area for the creation of forest reserves, lands aggregating over 9,000 square miles. In detail, 3,780 square miles are to be withdrawn from the Klamath River reserve, 3,024 square miles from the Mount Shasta reserve, 1,901 square miles from the Lassers Peak reserve and 872 square miles from the Diamond Mountain reserve. A total of 9,138 square miles. During October nearly a hundred townships in Shasta, Trinity and Siskiyou counties have been taken up mainly by rich timber syndicates. Speculators also have recently acquired large areas locating the mining claims under forest lien land selections which they state are not mineral in character. The tracts will be carefully examined during this provisional withdrawal.

It is to be presumed that the usual history of the development of lands thrown open by Government legislation to private enterprise, will be repeated and that numerous mining companies will be floated to operate in these new lands. Despite the probability that many of these companies will never reach a productive stage, the general result will benefit the mining industry of the State in that the possibilities of the new mining

regions will have become definitely known. In this connection it would appear quite fitting for the California State Mining Bureau to detail an engineer to report on the probable future of these lands from a mining standpoint.

The importance of the three counties containing the new lands in question may be appreciated from the record of their mineral productions. In 1900 Shasta County contributed \$5,034,778 in gold, \$1,158,272 in silver (at the mint value of \$1.292 per ounce), and \$11,917,762 in copper, making a total of \$17,464,809. The value of the mineral production of Trinity County for 1900 was \$698,689, of which \$571,605 was in gold, and the value of the output of Siskiyou County for the same year exceeded \$1,000,000, of which \$951,397 was in gold. The total value of the gold output of California during 1901 amounted to \$16,989,044; copper, \$5,501,782; silver, \$1,229,356; quicksilver, \$1,285,014; petroleum \$2,961,102. The aggregate value of the mineral production of California during 1901 is reported by the California State Mining Bureau at \$34,355,981.



#### SMELTING CONDITIONS.

The Western press contains frequent references to the monopoly enjoyed by the smelter consolidation and in such references there is voiced an undoubted irritation over the fact that local development should be subordinated to the necessities of general conditions; for instance, the market for the oxidized iron and manganese ores of Leadville is affected by the supply of the siliceous ores requiring them in the preparation of a proper furnace mixture, and the rates levied upon the dry ores of a district such as Cripple Creek is largely determined by the quality of lead ore obtainable at any given time. To a mine-owner or a mine-manager it is annoying to find only one market open to his production, and this is the case, irrespective of the character or the methods of the single buyer. Competition is the soul of trade. It is more satisfactory to be able to get two or three bids for the output of your mine and to feel that you have a say in the disposal of it. For this reason there is a disposition, especially among the owners and managers of small properties which feel the helplessness of the situation more acutely, to give expression to the regret that the ore market has shriveled up into a single purchaser.

It is a common saying among well informed mining men, in Colorado especially, that the consolidation of the smelters has diminished the activity in mine development because, in the first place, it is considered that new enterprises are too much at the mercy of the ore market, and in the second place there has been removed that impetus to the search for new mines or the re-opening of old ones which used to arise from the needs of individual smelters in want of particular classes of ore. The first idea is, we believe, largely fallacious because the prospector or the speculator does not look for ore-bodies which yield only a small margin of profit; however often they may have to be satisfied with low-grade proportions they undoubtedly start out to secure "bonanzas" giving a profit per ton which places them safely beyond the uncertainties of a varying smelter charge. The other view of the situation is, we believe, well-founded. In the days when the Argo, Grant, Globe, Philadelphia, Durango, Rico and Silverton smelters were all separate companies controlled by men who were active as mine

owners as well as smelter managers, mines were sought for and mines were purchased or leased for the sole purpose of controlling the supply of a fluxing ore or securing the output of a particular property. We could quote the names of several large undertakings which owed their origin to the energy of men acting with this purpose in view.

Such establishments as the small smelters which eight or ten years ago were actively at work at Rico, Silverton, Kokomo and other isolated mining camps may not have been impressive in their capacity or equipment; indeed, to the latter day financier they may appear to have had no reason for existence and are regarded by him as anomalies due to a suicidal competition for a sporadic ore supply; yet to those who know how they stimulated the development of the surrounding districts and undoubtedly contributed to the opening up of new resources there comes a feeling that the gladiatorial condition of smelter competition was beneficial to the miner.

That condition of affairs, beneficent to the development of the mining regions, has passed away; there are, it is true, sundry large exploration companies in the field, and one of them is closely allied to the smelter consolidation, but they have quite failed to replace the personal activity in mining of men such as Grant, Porter, James, Pearce, Eilers, Wolco, and others, who were both smelter managers and mining investors. It may be lugubrious to pose as a *laudator temporis acti*, but we confess to feeling a regret for the passing of the old methods of mine development.



#### MARKET CONDITIONS.

*Iron and Steel.*—The iron trade is still seriously disturbed by transportation troubles and short supplies of fuel. A number of blast furnaces are still banked, and it seems to be impossible for the railroad companies to make up their deficiency in the way of cars. New trade is rather quiet, and very few orders are coming in for next year. Part of this is probably due to the uncertainty about delivery and about filling orders, but the older heads in the trade are confessing to an impression that the present wave of activity has already passed its summit and that possibly before very long it will be upon the downward grade. This is a sentiment rather than any definite conclusion, but quite possibly it has had some effect. At any rate, there is enough business in size to carry most people well over another year.

The transportation trouble is a serious drawback, and unfortunately there seems to be little probability of any improvement for some time to come. There continues to be considerable buying on the other side by parties who are in need of supplies to fill orders already on hand. The figures given in another column show the growth of imports for the first three quarters of the present year.

*Copper.*—There is very little change in copper, buyers continuing to hold back somewhat and to make purchases only for immediate requirements. This is doubtless due to the opinion which is expressed in certain quarters that there is not likely to be any material advance in prices. Quotations continue without material and business from foreign sources is not falling off, although shipments are said to be well filled for the balance of the year.

*Other Metals.*—Tin is somewhat firmer with a good demand, but comparatively little change in prices.



Lead continues quiet and unchanged, with the usual strong and consumptive demand. There is nothing new to be reported with regard to the proposed combination.

Spelter remains about the same, although prices are hardly as strong as they have been; shipments continue to be very good.

Silver remains dull, and there is no change whatever to be reported in the market. As we have heretofore remarked, the prospects of an advance in prices or of any considerable improvement in demand are still somewhat remote. Supplies, however, have not been pressed upon the market, and there has been no further fall in quotations.

**Coal.**—The western coal markets are still at the mercy of the railroads and are suffering accordingly. Deliveries continue to be very uncertain, and the production of the mine is being abused by the inability to get rid of the coal as it is mined. In Chicago and other large cities the dealers some time ago gave up all expectation of getting supplies of anthracite before the winter sets in, and this has caused an unusual demand for the better grades of domestic coal, such as Pocahontas and Hocking. It has also increased the pressure upon the railroads for deliveries. The western foundries are suffering from a scarcity of coke, which is mainly due to difficulty in transportation. The prices shown in Chicago and other manufacturing centres are so high as to throw the smaller foundries practically out of business for the time, which is especially embarrassing just now when they have many contracts on hand.

The Seaboard bituminous coal market is comparatively quiet and is gradually returning to its normal condition. There is some complaint, however, as to slowness in delivering from the mines. The special demand arising from the anthracite strike is pretty nearly disposed of, but the New England ports are still behind in their regular supplies. The anthracite trade is not yet in shape for regular deliveries, but matters are gradually tending toward an improvement.



**IRON AND STEEL EXPORTS AND IMPORTS.**

The exports of iron and steel, including machinery, from the United States for the nine months ending September 30, were valued by the Bureau of Statistics of the Treasury Department at \$73,351,735, against \$76,846,899 for the corresponding period in 1901, and \$97,311,140 in 1900. The more important items of the iron and steel exports are given below, in long tons:

	1901.	1902.	Changes.
Pig Iron .....	48,989	23,501	D. 25,488
Bar Iron and steel .....	37,555	26,372	D. 11,183
Sheets and plates .....	26,983	14,538	D. 12,445
Rails .....	266,723	63,071	D. 203,652
Structural steel .....	40,932	45,970	I. 5,038
Wire .....	61,512	72,010	I. 11,498
Nails .....	24,785	26,327	I. 1,542

The only increases shown were in a few lines where a foreign trade has been established for years. The largest decrease noted was in steel rails.

Exports of iron ore for the four months were 65,307 tons, against 49,401 tons in 1901; an increase of 15,906 tons. Most of these exports went to Canada.

Imports of iron and steel for the nine months were valued at \$27,842,949, against \$14,057,766 in the corresponding period in 1901; an increase of \$13,785,183, or 98.1 per cent this year. The chief items of these exports were, in long tons:

	1901.	1902.	Changes.
Pig iron .....	33,985	339,406	I. 305,421
Scrap iron and steel .....	15,002	75,488	I. 60,486
Steel billets and Ingots .....	5,753	189,975	I. 184,222
Tin plates .....	49,922	46,671	D. 3,251

The causes for the increase have been commented upon heretofore.

Imports of iron ore for the nine months were 895,237 long tons, against 724,676 tons in 1901, showing an increase of 170,561 tons, or 19 per cent. The greater part of this ore was from Cuba.

**THE ANTHRACITE COAL STRIKE COMMISSION.**

The Anthracite Commission has, during the week, employed most of its time in visiting the coal mines about Scranton, Wilkesbarre and Hazelton. The commission has not yet taken testimony in a formal way, although miners were interrogated in the workings and a stock of information as to the mining conditions was accumulated by the members of the commission.

Beyond this very little is to be said of the proceedings. The only formal action taken was a resolution passed by the commission to the effect that any award or decision made hereafter should be dated from November 1 and should take effect from that date. An adjournment until next week was finally made, and at that time arrangements will be made for the taking of testimony. Both parties, the miners and operators, have filed formal briefs or statements of their cases, and these will be taken into consideration at the meetings of the commission as soon as possible. The formal testimony given will be on either side in support of these briefs. The miners' brief has been made public, but contains nothing new.

**THE ORE DEPOSITS OF THE SILVERTON QUADRANGLE COLORADO.\***

The stocks of the Silverton quadrangle are nearly vertical, irregularly lenticular or spindle-shaped bodies of almost solid ore, surrounded by an envelope of much altered, partly silicified country rock, which is usually impregnated with pyrite. The sizes of the individual ore bodies vary greatly. In plan, lengths of 40 or 50 feet and widths of 10 or 15 feet appear to have been not uncommon. Individual ore bodies appear to have been followed in many cases through several levels, and therefore to have had a nearly vertical maximum dimension of several hundred feet. Although sometimes nearly circular, the ore bodies generally showed a more or less elongated or elliptical plan, the longer axis of which usually lay more nearly north and south than east and west.

The chief difference between the stock ores and those occurring in the lodes is that the former occurred in nearly solid masses, with very little gangue. The occurrence of enargite, moreover, is peculiar to the stock deposits in this region, the mineral not being known in the lodes. It does not, however, occur in all of the stocks. The more common ore minerals of the latter are galena, sphalerite, tetrahedrite, enargite, chalcocite (stromeyerite), bornite, chalcopyrite and pyrite. While the galena ore of the upper levels was argentiferous, the highest silver values occurred in connection with the copper-bearing minerals, especially the chalcocite, bornite and chalcopyrite. These were almost invariably accompanied by pyrite. In the richer portions of the ore bodies the pyrite was subordinate, and appears to have been found chiefly in the peripheral portions of the stocks. But in the poorer ores the argentiferous copper minerals occurred as nodular bunches in masses of low-grade iron pyrite carrying up to 5 per cent. of copper and a little silver, usually less than 10 ounces per ton, and a fraction of an ounce of gold.

There was on the whole a general downward change from argentiferous lead ores to argentiferous and auriferous copper ores, and finally to slightly argentiferous and auriferous iron sulphide (pyrite). Yet the progression was an overlapping and irregular one in detail. Iron pyrite and chalcopyrite occurred at practically all depths, while galena in small

bunches was sometimes found far below the point at which it had ceased to be the principal ore.

The ores of the stocks, like those of the lodes, vary widely in value. In 1883, 3,000 tons of ore extracted from the Yankee Girl averaged nearly \$150 per ton. A lot of 10 tons from the richest stopes of the same mine carried 3,270 ounces of silver per ton and 29 per cent. of copper, corresponding to an average value per ton of about \$3,000. Much richer ore than this occurred in small quantities in the Yankee Girl and Guston. The average sales value per ton of the ore of the latter mine was \$91.81 for a period of 8 years. The highest annual average was \$363.25 per ton, and the lowest \$10.70.

The lode and stock ores were originally deposited by generally ascending solutions, but the lean pyritic ores of the stocks were secondarily enriched by descending waters.

**AMERICAN COAL AND FRENCH GYPSUM.**—A prominent shipping and forwarding firm informs United States Consul Thornwell Hayes at Rouen, France, that it would be glad to learn if there is any demand in America for the finest grade of gypsum known, delivered f. o. b. Rouen at 8 francs (\$1.544), or f. o. b. Havre at 11 francs (\$2.123) per ton. One of the greatest hindrances to the introduction of American coal into northern France is the want of a return cargo. If there is any demand for gypsum at the low prices mentioned, it might be advantageous for parties interested to communicate with this firm, which owns extensive gypsum deposits between Rouen and Paris, and with its own vessels, engines, cranes, etc., possesses unequaled facilities for taking in hand, discharging, reshipping and carrying foreign coal or any other importation from Havre or Rouen to Paris or other destination. The Paris gas company, the largest in the world, uses annually 1,200,000 tons of coal, of which 200,000 tons have been coming from England—80,000 by way of Rouen. In face of the unceasing miners' disturbances in France, which at present are more threatening than ever, a greater quantity must necessarily come from abroad. The address of the firm mentioned above is Fretigny Fils, 13 Rue Centrale, Rouen; or communications to the consulate will be promptly delivered.

**STANDARDIZATION OF METHODS OF CHEMICAL ANALYSIS.**—In a paper read at the recent meeting of the British Association at Belfast, Mr. Bertram Blount enters a protest against the present tendency toward standardization of methods of chemical analysis on the grounds that the conscientious chemist seeks any way to employ the methods that are most nearly accurate, that the employment of various methods that are equally good furnishes a valuable check on the results, that the adoption of standard methods not known to be absolutely correct will simply perpetuate imperfections and discourage investigations toward improvements, and finally that independent consulting chemists who may refuse to submit to dictation even from a committee of their peers as to the methods they are to employ will be put at an unfair disadvantage before the public and especially before courts of law. Mr. Blount admits, however, the desirability of revision of analytical methods and considers it a proper function of a committee acting under some central body to examine and report on old methods and recommend new ones, but the reports of such committees should merely be critical and advisory, and no attempt should be made to erect a standard method. The object aimed at would be to insure that the methods examined and finally approved should be both reliable and practicable. In that way real analytical progress would be effected.

\* See article in JOURNAL of November 1.

### THE JOHN FRITZ MEMORIAL.

The eightieth birthday of John Fritz, who has been well called the "Nestor of the American Iron Trade," was celebrated by a dinner in his honor at the Waldorf-Astoria in New York, at which over 400 engineers and others joined in doing him honor. The occasion was taken by the friends of Mr. Fritz to announce the establishment of a John Fritz gold medal to be given for scientific or industrial achievements. At the dinner the committee presented Mr. Fritz with a cast of the medal as modeled by the artist, whereupon the original model was destroyed.

Early in the spring, at the call of S. T. Wellman, of Cleveland, a number of prominent engineers and manufacturers met in New York to discuss the question of a suitable celebration of Mr. Fritz's eightieth birthday, the outcome of these meetings being the appointment of the following committee: President, S. T. Wellman, Cleveland, Ohio; treasurer, John Thomson, New York; secretary, C. Kirchhoff, New York; S. W. Baldwin,

the dies was intrusted to Victor D. Brenner, of New York, who is conceded to be a master of the art. There was contributed by about 500 persons a sum which, after providing for the artist's fees and other expenditures, left a balance of about \$4,000 as a permanent fund, the interest on which is adequate for the annual purchase of the gold medal.

The general scope of the enterprise is indicated by the following proposed rules for the award of the medal:

"1. The John Fritz medal was established by the professional associates and friends of John Fritz, of Bethlehem, Pa., U. S. A., August 21, 1902, his eightieth birthday, to perpetuate the memory of his achievements in industrial progress.

"2. The medal shall be awarded for notable scientific or industrial achievement. There shall be no restriction on account of nationality or sex.

"3. The medal shall be of gold and shall be accompanied by an engraved certificate, which shall

membership one representative who shall hold office for one year, one for two years, one for three years, and one for four years; and each succeeding year to appoint one member to serve for four years.

"7. In case of failure of any of the national societies to make the original appointments as requested, the selection of representatives from its members shall be made by those appointed from the other societies, and should any future vacancy occur by reason of the failure of any of the said societies to act, or otherwise, such vacancy shall be filled by the Board of Award from the membership of the society so failing.

"8. Should one or more of the four national societies go out of existence its representation on the board shall cease and determine, and future awards shall be made by the representatives of the remaining societies."

The accompanying illustration shows the face of the medal as designed by Mr. Brenner. The medals to be awarded will be  $2\frac{1}{2}$  inches in diameter and  $\frac{1}{8}$  inch thick, and are to be struck in pure gold. The reverse, personifies the messenger; in her right hand is a shield for name of recipient and date of award; in her left hand are laurels and a palm branch, and in the background the torch of knowledge is shown with a scroll stating for what the award is made. The bronze copy of the medal presented to Mr. Fritz at the banquet is 7 inches in diameter, and cast only for this purpose.

John Fritz was born on August 21, 1822, in Londonderry Township, Chester County, Pa. He left his parents' farm at the age of 16 to go to work in a country machine shop at Parkersburg, later on removing to Norristown, Pa. From there he was sent to Safe Harbor, Pa., to put up the machinery of a rolling mill, under the direction of the manager, the late John Griffin. Then he became manager of the Kunsie anthracite blast furnace. After a brief stay at Norristown he went to Johnstown, Pa., in 1854 to remodel and rebuild the plant of what is now the Cambria Steel Works.

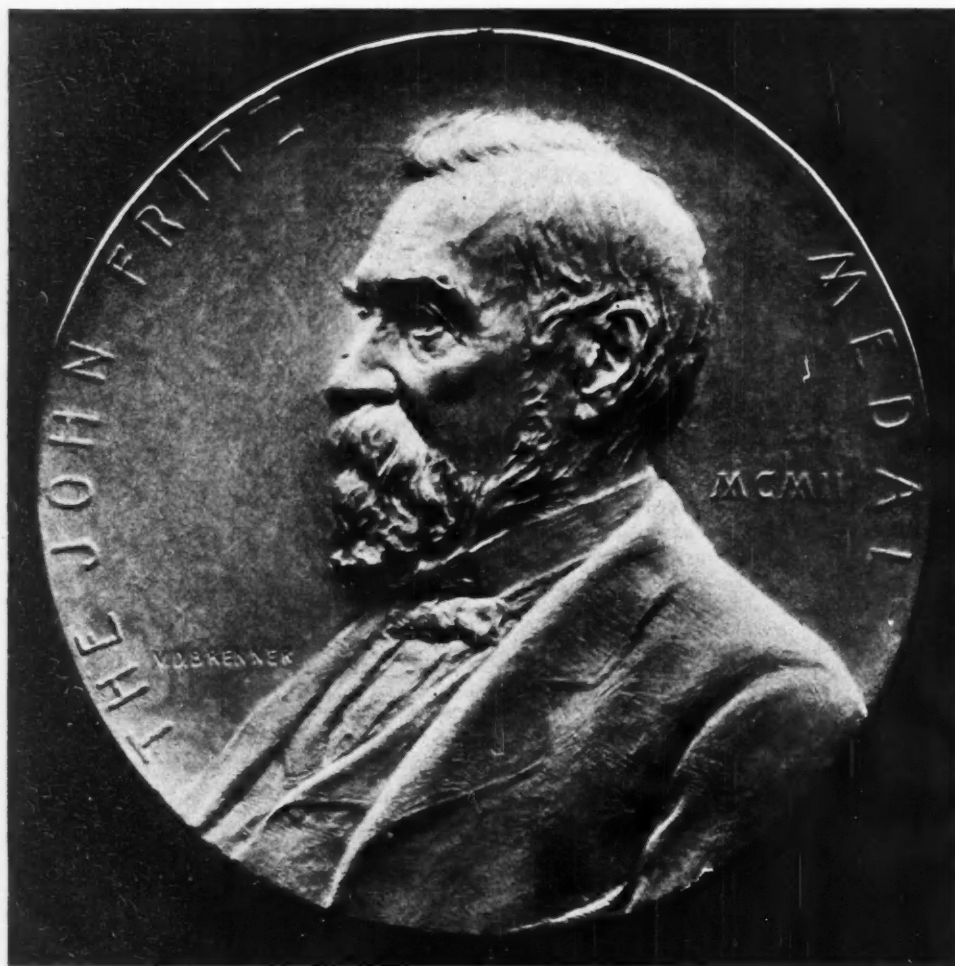
Mr. Fritz has told the details of the struggles in the early days of that enterprise, where he built the first three-high mill, with the co-operation of his brother, George Fritz. An interesting chapter of his reminiscences was given in Volume V of *The Mineral Industry*.

In 1860 he returned to the Lehigh region to erect a puddle mill and a rolling mill, subsequently adding a blast furnace to supply himself with metal. This was the start of the famous Bethlehem Steel Works, with the development of which Mr. Fritz was so closely identified for over a generation. He took an active part in the development of the bessemer process in the United States. He was the engineer who designed and erected the plant which has made the Bethlehem Steel Works the great forge it now is. Since he withdrew from the management of the Bethlehem Steel Works, Mr. Fritz has been actively engaged in public duties and private work, his advice being sought freely and frequently.

Mr. Fritz has been the recipient of many honors, having been elected president of the American Institute of Mining Engineers, president of the American Society of Mechanical Engineers, an honorary member of the Franklin Institute of Philadelphia, and being the recipient of the Bessemer Gold Medal of the Iron and Steel Institute of Great Britain.

**A POLISH MINING SCHOOL.**—At the Polytechnic College, Warsaw, Poland, a new departure has just been made by the starting of a course of instruction in mining engineering.

**COAL IN HOLLAND.**—The Société des Charbonnages Reunis Laura et Vereeniging (Holland) has sunk its first pit to a depth of 132 meters. Two seams of coal have been struck, one 1 meter thick at a depth of 107 meters, and the other 1.15 meters thick at 125 meters.



FACE OF THE JOHN FRITZ MEDAL.

New York; N. H. Heft, New Haven, Conn.; R. W. Hunt, Chicago; F. R. Hutton, New York; C. Warren Hunt, New York; J. C. Kafer, New York; T. C. Martin, New York; E. E. Olcott, New York; R. W. Pope, New York; H. G. Prout, New York; E. G. Spilsbury, New York; Jesse M. Smith, New York; Ambrose Swasey, Cleveland, Ohio; Oliver Williams, Catasauqua, Pa.

The organization was effected by the appointment of four sub-committees, as follows: Medal Committee—C. Warren Hunt, chairman; F. R. Hutton, R. W. Pope, C. Kirchhoff. Finance Committee—John Thomson, chairman; Ambrose Swasey, Jesse M. Smith, E. E. Olcott. Dinner Committee—T. C. Martin, chairman; J. C. Kafer, H. G. Prout, E. G. Spilsbury. Invitations Committee—S. W. Baldwin, chairman; N. H. Heft, R. W. Hunt, Oliver Williams.

The task of designing the medal and cutting

recite the origin of the medal and the specific achievement for which the award is made. Such certificate shall be signed by the chairman and secretary of the Board of Award.

"4. The medal may be awarded annually, but not oftener.

"5. No award of the medal shall be made to any one whose eligibility to the distinction has not been under consideration by the Board of Award for at least one year.

"6. Awards shall be made by a board of sixteen, appointed or chosen in equal numbers from the membership of the four national societies, the American Society of Civil Engineers, 1852; the American Institute of Mining Engineers, 1871; the American Society of Mechanical Engineers, and the American Institute of Electrical Engineers. The governing bodies of each of these societies shall be requested to appoint from its



## COAL STRIPPING BY STEAM SHOVEL IN KANSAS.\*

By W. R. CRANE.

The stripping of coal by steam shovels is by no means a new departure in mining operation, although they are not very extensively employed in the thinner coal seams of the western central States. Stripping has been carried on quite extensively in two localities in Kansas, in Osage and Cherokee and in Crawford counties, which lie within the Upper and Lower Carboniferous strata respectively.

Much coal has been won by stripping in both of these districts, but owing to the greater thickness, as well as better quality of coal obtained, most of such work has been confined to the latter locality. The stripping operations in Cherokee and Crawford counties are confined almost wholly to the outcrops of the Weir-Pittsburg Upper and Lower coal strata, which form a more or less continuous and irregular line trending northeast and southwest through the above mentioned counties, extending from Columbus on the south to Mulberry on the north. Strip pits, old and new, extend from the actual outcrop for a dis-

adjusting and strengthening certain parts, to suit the conditions at hand, a fairly efficient and economical machine has resulted and is, at present, in almost continuous operation. See Fig. 1. By the use of this excavator the cost of stripping has been reduced from 10 to 15 cents, by plowing and scraping, to 2½ and 3 cents per cubic yard.

The excavator, which is in reality a steam shovel, was devised by Mr. M. E. Pugh, of Chicago. The first one built was for the Garden City Sand Company, of St. Charles, Ill., where it was operated as a collector and sizer of sands and gravels—the sizing apparatus, as revolving screens, etc., were part of the shovel, it being complete in itself. Several of these shovels are operating on gravel beds, and are doing excellent service as ballast loaders.

The intention was to mount the shovel on railroad trucks, or heavier trucks of similar gauge, but in the construction of the shovel in question, this idea was departed from and a single set of wheels mounted on an extra heavy axle was substituted for the forward trucks. This single set of wheels is located at the fore end of the body of

load are performed by ropes and pulleys actuated by drums. The supporting framework is about three times as long as wide, the fore end being that which contains the dipper and conveyor, the rear end the boiler, while about midway between is situated the engine and drums for propelling the car and operating the dipper and conveyor.

The propelling device consists of a heavy chain wheel, keyed to the axle of the forward wheels, which extends backward and upward through the floor of the car to a smaller chain wheel mounted upon a journal, which in turn is driven by another chain and set of wheels leading from the drum shaft. Power is applied to the propeller system by a friction clutch on the drum shaft.

The drums are made of cast iron and mounted upon one shaft, which is centrally geared. They are operated by friction clutches, set by foot levers situated on the operator's deck, which is placed at the fore end of the car and about 6 feet above the car platform; besides the foot levers there are also hand levers for operating band brakes, all of which are grouped together in easy reach of the operators.

The smaller of the two drums, which is 18 inches in diameter, is employed in raising the dipper, thus filling it, and is known as the "thrusting" drum; the second or "withdrawing" drum, which is 36 inches in diameter, brings back the loaded dipper to a position directly above the inner end of the conveyor, where its contents are emptied into a hopper-shaped receptacle, the bottom of which is the conveyor belt. As the withdrawing drum, which brings the dipper back to the dumping point, is twice as large in diameter as the thrusting drum, the backward movement must necessarily be twice as fast as the thrusting or loading movement. This arrangement is primarily to save time, but also serves another purpose, namely; unlatching the gate or door of the dipper and allowing the contents of the same to fall out. An examination of Fig. 2 shows the position of the dipper at the two extreme points in its cycle of operation—in the solid lines the dipper is shown with the door closed and latched; in the broken lines the door is open, having been unlatched by the forward movement of the block, which supports the dipper. The quicker this forward movement, the more certain is the springing of the latch, as the total weight of the contents of the dipper is supported by the same.

The cable which winds, on the thrusting drum, is ¾ inches in diameter; that on the withdrawing drum is ⅝ inch. A triangular frame, called the A-frame, supports the sheave over which the cable from the thrusting drum passes; it in turn is supported by stay timbers, which are clamped to the top of the car frame. For convenience in raising and lowering, a block and tackle are provided as shown in the drawing.

The conveyor is driven by a ¾-inch cable, operated by a chain connecting with the drum shaft; the speed is about 120 feet per minute. The belt of the conveyor is extra heavy canvas and runs on rollers, conical at the ends and cylindrical in the middle, which form a trough of the belt and thus prevent the loss of the excavated materials by its falling over the sides.

The sheaves over which the cable leading from the thrusting and discharging drums pass are 30 inches in diameter, and are provided with grooves 2 inches in depth. The sheaves employed in driving the conveyor belt are 2 feet in diameter and double grooved, so as to prevent slippage, and thus make their action more positive.

A 50-horse-power tubular boiler furnishes steam for the duplex (Hamlin & Gamble) engine.

The capacity of the dipper is 1 cubic yard. It has eight teeth, which are riveted to the top of the mouthpiece or lip. The dimensions of the dipper are: Length 52 inches, width 42 inches, and depth 24 inches. The bottom side is the discharging gate or door, which is kept closed by a latch situated at the back of the dipper. The body of the dipper is made of ¾ inch and the bottom or

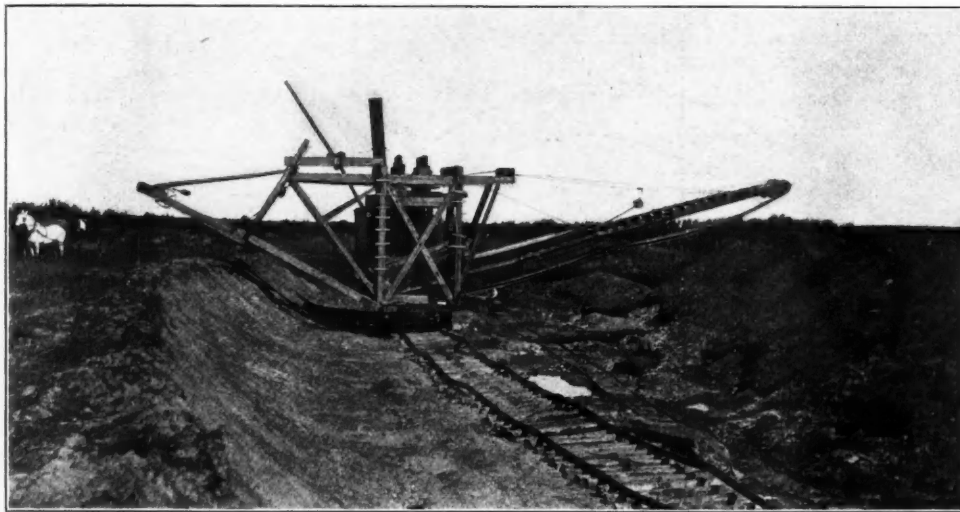


FIG. 1.—STEAM SHOVEL STRIPPING COAL BED.

tance of 2 and 3 miles to the north and west of the same.

The usual method employed in these workings is excavation by plows and scrapers. A ravine or some natural depression is taken as a starting point, along a slope of which the pit is formed, the excavated material being transferred to the lower ground. When the coal is finally reached and extracted the pit itself furnishes a storage place for the excavated material of another pit placed alongside the former. Thus the operations of stripping are extended until the thickening of the covering prevents; or, as often occurs, strata of hard materials such as lime and sandstone intervene and render uneconomical this method of working.

About 20 years ago steam shovels, of the ordinary type, were introduced into the district, and were operated with a fair degree of success, for several years in the neighborhood of Mildens, which is just over the line in Missouri.

One of the centers of greatest activity in stripping is at Mulberry, where W. H. Miller & Sons have been operating since 1882. At present the company is known as Miller Brothers, who own and control large areas of stripping property. Several years ago they decided to employ steam shovels in their stripping, but were advised not to do so on account of the difficulty experienced in operating such machines in soft, wet pits. Later on, learning of a new form of excavator recently patented, they investigated and finally adopted it. After spending considerable time in

the shovel and furnishes the driving device or the motor wheels for advancing or receding the shovel along the track. The rear set of wheels constitutes a truck, which supports the greater portion of the weight of the boiler, engine and other massive parts. The gauge of this machine is somewhat wider than is commonly employed in similar apparatus, being 6 feet. The construction of the track differs also from common practice in that it is not in sections, but is continuous for at least 500 feet, which is the limit of the rail capacity at present. The rails are steel and weigh 75 pounds to the yard.

The framework of the body of the shovel is made of 10 by 12 and 12 by 12-inch oak timbers, which are mortised, staple-bolted and lapped, depending upon the degree of strength required. See Fig. 2. The dimensions of the frame, which is a parallelepiped, are, length 36 feet, width 14 feet, and height 23 feet. The conveyor frame is 60 feet long, and is supported by stay-ropes connecting with the body of the shovel; the conveyor belt is 3 feet wide and extends, of course, the length of the radii of the two supporting and driving pulleys beyond the frame at both ends. The height of the lift of the dipper is about 20 feet; it moves in one plane only, which is vertical and normal to the direction of movement of the car. Unlike the ordinary steam shovel, the two movements necessary in taking a load, are not distinctly differentiated in this form, as each is dependent upon the other. The revolving of the derrick to discharge the load or empty the dipper, as is necessary with the ordinary machine, is wholly eliminated in the machine in question; all movements required in taking and discharging a

\* Data collected principally while working for the University Geological Survey of Kansas, and published with permission of director.

gate of  $\frac{1}{2}$  inch sheet iron. The mouthpiece or lip is 12 by  $1\frac{1}{2}$ -inch steel.

The depth of cut varies from 8 to 12 feet, which is regulated by raising and lowering the A-frame, and the width is the breadth of the dipper, for each advance of car. The average height of lift of dipper is about 18 feet. The slope of the excavated bank as left by the shovel is about  $60^\circ$ . The discharge end of the elevator has a vertical elevation of some 21 feet; it can be raised still higher by blocking up the outer rail—a change in elevation of 10 feet is thus possible. The mean distance from the point of loading to that of discharging is 75 feet, which can be varied somewhat, however, by an adjustment of the conveyor and A-frame, as mentioned above. Three men are employed in operating the shovel—the shoveler, the propeller man and the fireman; besides these there are from three to six men employed in cleaning up about the shovel and placing track.

Before this form of shovel can conveniently be put into operation, from 18 to 20 feet of the coal stratum must be stripped to furnish a firm, level and fairly even place for laying the track. As

withdrawing drums. The backward movement of the dipper to the point of discharge is twice as fast as the former or filling movement; at the end of the movement the latch, which supports the gate, is suddenly released and the dipper empties itself, as explained above. Several cuts are made with the shovel standing in the same position, until, in fact, the required depth of 8 to 12 feet has been made, when the car is moved forward for a new advance. The dipper is allowed to come to rest upon the bare coal stratum, before beginning the thrusting action, so that the covering is wholly removed from its upper surface, thus laying bare the coal.

When the whole line of face has been excavated in the forward movement or advance of the shovel, the entire length of track, with the exception of that upon which the shovel stands, is shifted to a new position within the required distance of the new face to be excavated. The shovel is then run backward, the remainder of the track is shifted, when the shovel is again advanced to the end of the excavated face and is then in position to make a fresh cut back to the

The covering for the coal, in this particular locality, ranges from 4 to 10 and 12 feet in thickness and is made up largely of compact shale; covering which is from 12 to 18 inches of yellow clay, and above that fully as much soil. Then, too, horsebacks, which are of frequent occurrence, extend above the coal stratum into the shale covering, thus adding to the shale and yellow clay a certain amount of fire-clay, all of which materials are thoroughly mixed by the transfer from the face of the cut to the waste bank. It is claimed that the combination of materials obtained in the waste bank makes a most excellent brick stock.

To get the best action from the shovel it is necessary to loosen the covering by a judicious arrangement of small charges of blasting powder. One man is kept busy drilling holes, placing and firing the charges. Holes placed about 6 feet apart, extending to or nearly to the coal, and charged with from 6 to 8 inches of FFF black powder, produce the best effect.

As the operations proceed a long line of coal is freed of its covering, and is in shape to be loosened by pick and bar and loaded into tram

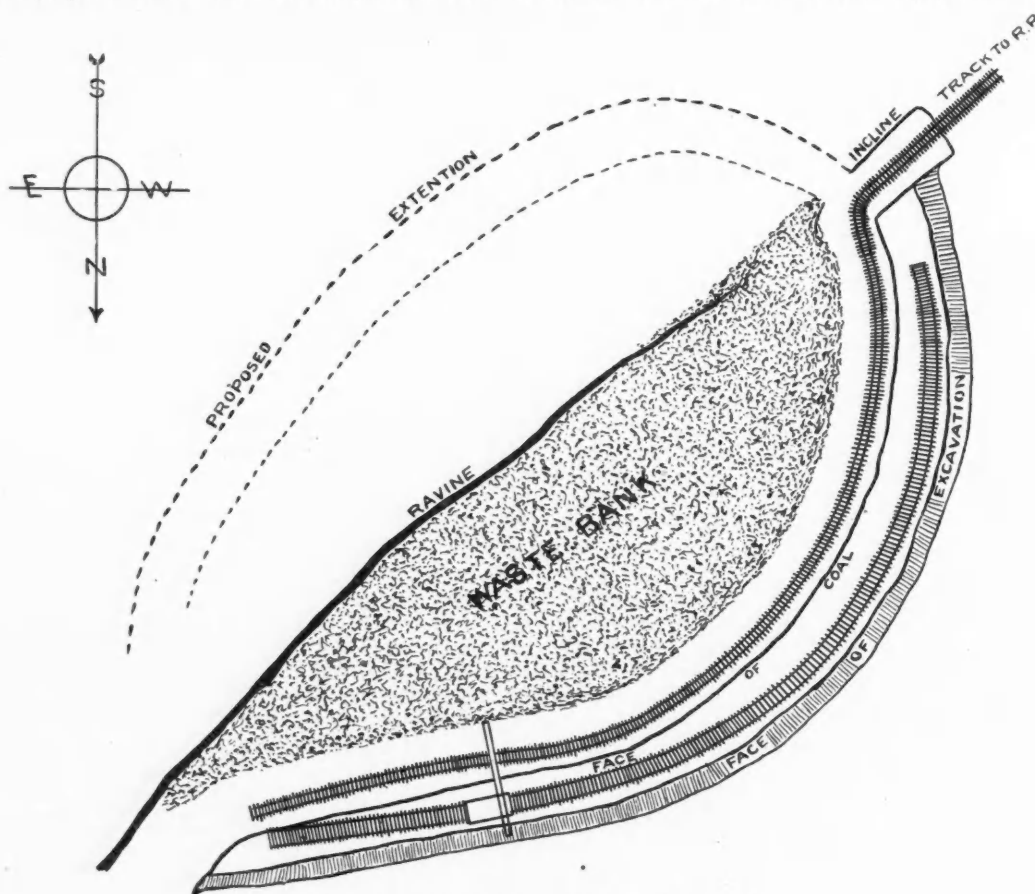


FIG. 3.—PLAN OF STRIP-PIT, MULBERRY, KANSAS.

long a line of face as possible is marked out and prepared for placing the track, which is set within from 4 to 6 feet of the same. The shovel is then run upon the track and placed at the point at which the stripping operations are to begin. There is no necessity of blocking the wheels to prevent a backward or forward movement of the car, as the load is taken from the side; furthermore, no brackets and jack-screws are needed to steady and brace the machine, as the weight of the conveyor, especially when in operation, counter-balances the weight of the A-frame and dipper with its load.

The dipper is lowered, preparatory to taking its load, by releasing the friction clutches and regulating its settlement by the band brakes, which act upon each separate drum. The dipper is then raised by throwing the power onto the thrusting drum, by means of its friction clutch, at the same time tightening the brake on the withdrawing drum sufficiently to keep the cable taut. When the dipper has reached the top of its lift, power is released from the thrusting and thrown on to the

starting point. A special advantage of this form of shovel, then, is that it can by virtue of its construction, work as well in moving backward as forwards.

The strippings, in which the above described shovel is operating, are, as stated above, located at Mulberry, Kansas. They are situated at the head of a small ravine, which allows them to be laid out in a semi-circular or horseshoe form. Fig. 3. Only one-half of the possible line of workings has been developed up to the present time. About three acres have been stripped, leaving a line of face of 1,000 feet in excellent condition for future work. To the north and west for a distance of  $\frac{3}{8}$  to  $\frac{1}{2}$  mile, the ground rises at about 1 and 2 per cent slopes, while to the south and east it is but a trifle higher. The prospects are, therefore, good for uncovering from 25 to 40 acres of 36 to 40-inch coal of excellent quality. Horsebacks occur, but do not interfere with this method of stripping, and are of positive benefit in forming a good road bed for the track over which the cars pass in removing the coal from the pit.

cars and hauled from the pit. The cars employed for this purpose have a capacity of about 2,500 pounds, and are hauled in trains of three and four to the foot of the incline leading out of the pit, where they are uncoupled and drawn out one at a time. Once out of the pit they are again made up into trains, of about the same number as in the pit, and are hauled a mile to a tipple on the line of the Frisco Railroad. A man and a boy with several mules handle the cars as they are filled.

The tipple is situated at the top of a combination embankment and trestle work, which is just high enough to raise the loaded pit car above the railroad cars. The pit cars are delivered to the tipple, upon which are run and by which dumped. The tipple consists of a section of track supported by a heavy plank framework, which is mounted upon a shaft, running transversely and situated at a point about a car's length from the outer end; the inner end of the platform consists of two long arms, extending on either side of the trestle work, which are weighted



and thus counterbalance the empty car and bring it back to a horizontal position, when it can be run from the tippie to the trestle. The tippie is hinged to the trestle at a point 12 feet above the track and as close to the side of the railroad cars as possible; it extends over the car one-third of the car's width, thus allowing the coal to be dumped into the middle of the railroad car. The length of the arms of the tippie are 4 and 12 feet, respectively. To facilitate the loading of the railroad cars there are two of these tippies.

The cost of the stripping operations with this shovel ranges from  $2\frac{1}{2}$  to 3 cents per cubic yard, with labor to be had at the following wages: Shovel man and assistant, \$3 and \$2.50; fireman, \$2, and trackmen, \$1.50 per day.

When the shovel is working properly about 2 cubic yards per minute can be handled, which will give a capacity of about 1,200 cubic yards per 10 hours. At a cost of 3 cents per cubic yard the 1,200 yards can be handled at maximum cost of \$36. This is considerably above the actual cost, unless the excessive repair account is added, which is, of course, a legitimate item to be considered in this connection. A fair figure for the first cost of this particular shovel is probably \$3,500.

There are many hundred acres of excellent

through 657 tons in a day in his 180-inch furnace, and Mr. Johnson is not far behind with a record of, I believe, 522 tons, in a smaller one. And from what I hear of these gentlemen I fully expect that they will make advances upon even these tremendous capacities. Judging by the progress of the last few years it certainly seems as if 1,000-ton copper stacks were to become a regular feature of metallurgy within the near future. There is, of course, no limit to the quantity that may be smelted if the furnace is large enough, and were we to adopt the huge stacks and powerful paraphernalia of the iron smelters we could beat them in capacity. I have lately read of a Pittsburg iron furnace that put through in 24 hours the amazing quantity of 2,300 tons of ore, fluxes and fuel, and produced over 700 tons of pig iron. But I venture to say that if run upon a charge and product such as described by Mr. Johnson, the Pittsburg furnace would have chewed up 10,000 tons or more of Boundary ore in a day. If we compare the costs, bulk, etc., of the iron furnaces, with copper furnaces, we are surprised to find that the latter are doing the most work, in several respects. For example, the Tennessee copper furnace uses quite as much air as the average of iron furnaces, and probably makes considerably more slag than any furnace in this country.

asures as are in use at these two works are considered sufficient, is there any reason why a cheap fan will not do the work as well as a costly engine or rotary blower?

Both these establishments seem to be very finely constructed and exceedingly efficient in every respect, and great credit is due to the designers for their skill and foresight. Still, does it not seem rather curious that the furnaces are run with cold blast, thereby forfeiting the immense advantages which flow from the use of hot air? Were Mr. Johnson to heat his blast he could cut down his fuel bill fully one-half, while increasing his capacity 30 per cent, and as a result getting through more ore at less cost. Let us examine the situation and ascertain approximately what he could do by heating the blast to 600° F. He uses, it appears, 12,000 cubic feet of air per minute, which at his altitude is approximately a half ton weight, or about 700 tons per day. Heated to the above temperature, it would absorb about 150 B. T. U., the whole mass taking up daily 105,000 ton-units of heat. Burning a short ton of coal sets free about 13,000 ton-units, whereby it would seem that about 8 tons of coal should heat the daily amount of air. But it will not do it. The hot blast stoves and other such mechanisms fail to return much over half of the expended heat units, and it would take probably fully twice the

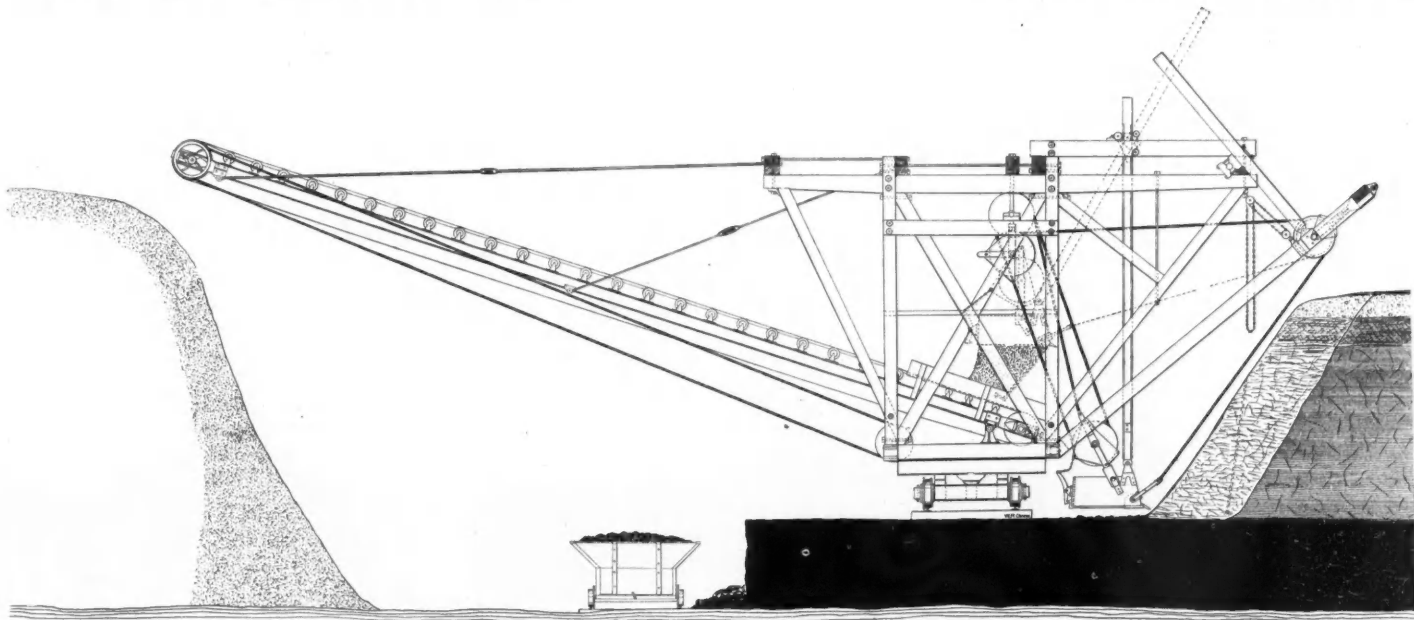


FIG. 2.—END ELEVATION OF PUGH STEAM SHOVEL.

stripping property along the line of the outcrop of the thicker coal seams of the coal measures, which lie in the southeastern portion of the State, and it would seem that some such economical means of uncovering the coal might be employed to advantage.

#### SOME NOTES ON HIGH BLAST FURNACE DUTIES.

By HERBERT LANG.

I hope it is not too late to offer my congratulations to the managers of the Ducktown, Tennessee, and the Boundary Creek, B. C., smelting works, who have so distinguished themselves of late\* by the enormous outputs of their copper furnaces; but in these active times, when metallurgists are so fired by the spirit of emulation, and great deeds of enterprise and originality are of daily record, I cannot be sure that before this letter gets into type some one will not have come along and irremediably fractured Messrs. Heywood and Johnson's world's records by smelting 1,000 tons a day in a single stack. To be the first to do so is a commendable ambition which any young and enterprising metallurgist is justified in entertaining; nor does the 1,000-ton mark appear to be out of reach. Mr. Heywood has put

As to the proper mode of increasing the smelting capacities of copper furnaces, opinions seem to differ. Mr. Johnson, I notice, would build for great capacities, namely, 2,000 tons a day, a furnace 720 inches long at the tuyeres, with a width of 48 inches. Fancy a furnace 60 feet long! For my part I should prefer to look for increase of capacity in harder blowing and particularly in higher temperatures of the blast. Your long furnaces will no doubt do the work, but they require careful feeding, and it is difficult to make too long a furnace work just right through all its length. Mr. Johnson's furnace would have one advantage which the inventor neglected to point out. He could run a variety of charges and mixtures in it at one time, a siliceous one at one end, a basic one in the middle, and any other at the other end, and they would never mingle enough to render the experiment abortive. There are a great many possibilities in a furnace 60 feet long.

Mr. Johnson's criticism of the Tennessee Company's blowing engine and its cost appear to me exceedingly well taken; but if economy in designing has such merit, I should like to ask him why he did not supply a fan blower at Boundary, thereby saving \$1,000 out of the \$1,600 that his rotary machine cost him? While such low pres-

coal to give the necessary temperature. This would be 16 tons, which at Boundary is probably equal to 25 cords of wood, a plentiful fuel in that region, and which should be had at \$3 per cord or thereabouts. This, with a further allowance of \$25 daily for firing and repairs, etc., makes a round \$100 a day as the cost of getting the hot blast by ordinary means of iron pipe stoves. If the daily furnace duty is 400 tons, this amounts to 25 cents per ton of charge for heating the air. This is more than it ought to be by at least cents per ton; but we will let the estimate stand, as it is in the expectation that the anti-hot blast men, should there be such, will give credit for our forbearance in pressing the point.

By thus heating the blast there would be saved one-half of the coke supply which amounts to about one-eighth of the weight of the charge, whence the daily saving on this item would be 25 tons, worth at Boundary about \$7 per ton, if my memory serves. The net saving would therefore be about \$75; but in addition there would be an important economy in the additional amount smelted. By this means one would think it would be possible to bring down even the present remarkably low cost, given at \$1.30 per ton, to something under \$1 per ton, a wonderful showing for so isolated and apparently unfavorable a loca-

\* ENGINEERING AND MINING JOURNAL, July 5 and 26, and August 23, 1902.

tion. If it could be got down to \$1 it would beat, as regards cheapness, the work of the average gold mill of California, this process being generally supposed to constitute the *ne plus ultra* of inexpensiveness. It is results like this that give color to the often expressed thought that in time the smelting process will become universal, taking the place everywhere of other methods of ore treatment.

The pipe stove is a poor device for air heating, giving usually an efficiency of but 50 per cent on the fuel expended—Mr. Walter found it 54 per cent at Silverton—and requiring frequent and expensive repairs. I have seen and examined many stoves in use and out of use in the United States, and I have never found one that did not prove expensive in repairs and renewals, besides which the pipes are generally so small and have so many turns that they impede the blast greatly, necessitating a greater pressure at the blower than is delivered at the furnace. They work better on iron furnaces than on copper and lead for a certain reason that would not occur to every one. Air, under the pressure of 5, 10 or 20 pounds takes up heat a great deal more readily than it does at 1, 2 or 3 pounds, the pressure we use commonly in copper and lead work. With yet higher pressures, such as are used in drilling, for instance, the transfer of heat through the walls of the pipe is still faster. In consequence we find that it requires considerably more area of heating surface to heat a given quantity of air for copper furnaces than for iron stacks, and much more than for the re-heaters that are used so frequently on compressor pipe lines. Again, as a consequence, it is much easier to burn a pipe in the copper furnace stoves than in the others. To understand this better, it reduces the volume of air about one-seventh in volume when a pressure of 2 pounds, an ordinary pressure in copper smelting, is applied; and the reduction is two volumes into one, when the ordinary limit of iron smelting of 15 pounds pressure is reached. But six volumes are usually put into one in compressing for drills and air power transmissions, and an equal area in the stove will have masses of air weighing nearly 1, 2 and 6 units, respectively, resting against them to abstract their heat in a given time. The old-fashioned iron masters who used such stove pipes, knew this, and used to keep several pounds of "back pressure" in the pipes so as to keep them from burning. On these accounts, I would not recommend a pipe stove, for my method of heating the air by means of the hot slag gives as high an efficiency and has the additional advantage that it costs nothing for fuel, very little for repairs, and adds nothing to the cost of tramping out the slag and getting rid of it. My opinion is that when copper smelters get to using really hot blasts, say, of 1000° or 1200°, such as the iron smelters now affect, we shall see something still more startling in the way of large capacities, and also in low fuel percentages. Then, if ever, Mr. Austin's forecast of smelting without fuel will be a reality.

If the Tennessee Copper Company should introduce the hot blast it would be very likely to reach 1,000 tons daily capacity, while doing the work perfectly well. Heap-roasted sulphides invariably contain much fine stuff arising from the friable nature of the roasted material, and this under the tremendous blast used, must blow out of the stack to a large extent. Raw ore—run-of-mine—would not do so to such an extent, and therefore there would not be so much dust. Again, the cost of the roasting, added to the losses incurred by the operation, makes, it would seem, quite an important objection to the present way.

There are uncommon features about the Ducktown furnace that are worthy of our consideration and study perhaps of our imitation. The width of the shaft is 56 inches at the tuyeres—a width that would ordinarily be deemed excessive. This great width, multiplied by the length of 15 feet, gives the stack an effective smelting area of

70 feet, which makes it one of the largest copper furnaces ever built. But there are few who will be willing to admit that the width beyond 3 or at most 4 feet, adds anything to the smelting power of the stack, especially as the ends are not provided with tuyeres. Each side has nine tuyeres, giving 20 inches of longitudinal space for each one. The ends of the shaft are perpendicular, while the sides have but little batter—an arrangement to which exception might be taken on the score of flue-dust formation. It might be better ordinarily to give the sides more slope, so that the gases would have a chance to expand as they go out and thus delay their passage and produce less erosion of the charge. The great depth of the furnace, however, makes against flue-dust, inasmuch as the great volume of cold ore on the top cools the ascending gases most effectually, diminishing their bulk and causing the dust to be deposited in the interstices of the ore. The place to catch the flue-dust is in the furnace itself; and this is what a deep charge with a cold top does. The common practice of running copper furnaces with a hot top is one of the worst mistakes that can be made, especially in the presence of volatile elements, most of which have the power of carrying off valuable metals. The particular injury that hot tops do is, first to cause copious losses by dusting; and, second, to cause heat losses. The hot gases, issuing from among the ore, bring up from below immense quantities of fine materials, producing a remarkably boiling of the surface of the charge, which is an object of interest to the onlooker, who realizes perhaps for the first time how serious the effect is that I have called the erosion of the charge. The easiest way to cure the loss is by feeding an additional thickness of ore into the stack, thus cooling the exit gases to such a degree that the efflux of dust ceases in great part. The next favorable feature is an enlargement of the furnace throat so as to afford the gases a more roomy passage upward, thus diminishing their speed; and a third is to provide a large open space at the top of the stack where the gases will be brought partially to rest and drop the dust in the furnace where it belongs. These arrangements merely diminish the proportion of dust; they do not abrogate it entirely, for the finer particles are bound to escape, and cannot be caught except by providing ample chambers outside of the stack with improved means of arresting their movement. This then implies briquetting the dust in order that it may be smelted—an operation which is attracting more and more attention.

The question of flue-dust has a bearing upon the tonnage smelted by furnaces, for it often happens that a considerable amount of the ore and other materials charged into a blast furnace are driven out again in the form of flue-dust, without having had a chance to become smelted at all. This takes place more often in furnaces that are run with a hot top or with those that are over-blown, as are a good many of our modern furnaces, both lead and copper. There can be no rational comparison between the duties of different furnaces unless we know the amounts of flue-dust which escape during the operation. It is reasonable to suppose that the Tennessee furnace makes considerable dust, owing to its tremendous volume of blast—16,000 cubic feet per minute according to the data printed; and that it has the steep sides of the shaft which do not favor slow travel of the gases; and finally the friable nature of the material smelted. Outside of the question of capacity of furnaces, perhaps we are likely to attach too much weight to the formation of dust, for such improved means exist for catching and re-smelting it that there is actually not much absolute and irrevocable loss. A little reflection will assure any one that it is only smaller ore particles that are really lost, and the excess that is thrown out by a strong blast over that which escapes at a lower one is coarser material that is easy to save and requires but

short and inexpensive chambers for its complete recovery. Still, there is the necessary re-treatment of the dust which may become an important item. One would infer that the Boundary furnaces are less likely to be plagued with excessive dusting than others, owing to the nature of the ore, which does not require roasting, having barely enough sulphur to form the necessary matte.

Mr. Johnson appears to asperse the character of his ore slags and to wish that he might change conditions with the Ducktown people in that regard; but in this I can hardly believe him candid. Most metallurgists of experience would be satisfied with the behavior of such an ideal ore charge as his, a charge that runs down with a low fuel percentage into a slag of this ideal constitution—silica 39, ferrous oxide 29 and lime 20 per cent, very similar to much of the slag which lead smelters have run down on and found as excellent for their purposes as it is for copper work. The very finest copper slag that can be produced by the most scrupulous sorting of materials is a mixture of bi-silicate of lime and singulo-silicate of iron, in equal parts. It has no bad habits—it does not even smoke. Nothing balances quite so well as this delicious substance, for which the cultivated smelter expert must feel a genuine affection, after he makes its acquaintance. He hates to throw it away, so good are its qualities, and as the pots go out over the dump you may hear him sigh regretfully as at the loss of something inexpressibly dear. The Boundary slag is very closely like this in composition, making allowances for probable alumina, magnesia and the alkalis. This combination is far superior for steady, regular and agreeable running to any mixture of roasted pyrrhotite and quartz than can be made; although the old-fashioned school of smelters would not believe it. The time has been, and has not yet wholly passed, when iron in its oxidized forms was held to be the only decent slag-forming material. To some smelters iron is like bread—and to others like a precious medicine; but the itch for high iron in the slag has largely passed away from among the more intelligent of the craft. Slags like Mr. Johnson's carry off little of value in the shape of metals which it is desirable to save; they were never known to assay anything of moment, and the gentlemen tells us that this average slag runs under 0.4 cent of copper, week in and week out. What more could any one ask? I venture to say that he would not like to go back to his former tough proposition at Madera, California. I have no doubt that the abundant success of the Boundary institution arises, aside from the known skill of the manager, from the multiplicity and favorable balance of the bases in the ore.

It is no light achievement to beat the world's record in copper smelting, as these gentlemen have, nor is it a light thing to criticise the way in which they have done it. I would not presume to put forward even these disconnected remarks if I did not feel as others must, that these achievements, great and honorable as they are, are only milestones to mark the progress of the art. The last word in smelting will never be said.

MEASUREMENT OF HIGH TEMPERATURES.—D. Berthelot has described a new optical method for the measurement of high temperatures (*Annales de Chimie* (7) XXVI, 58-144). The melting point of silver was determined to be 962° C.; of gold, 1063° C. The following boiling points were determined, in which *H* is the height of the barometer in millimeters:

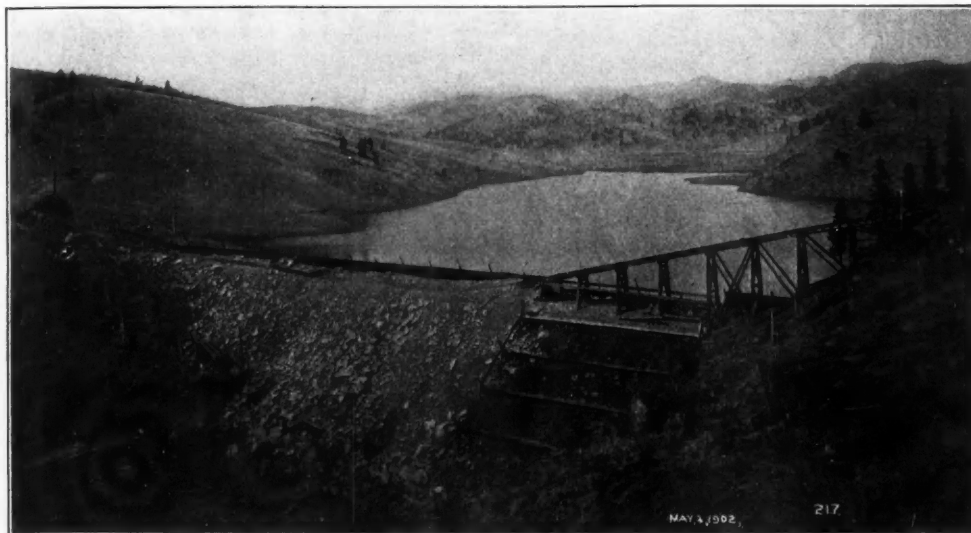
Selenium	Cadmium	Zinc
$690^{\circ} + \frac{H-760}{10}$	$778^{\circ} + \frac{H-760}{9}$	$918^{\circ} + \frac{H-760}{8}$

The above figures are said to be accurate within 2° C., which is a very close approximation for a method of this kind.



### THE PIKE'S PEAK POWER PLANT.

The Pike's Peak Power Company, whose general offices are at Victor, Colorado, was organized in 1899, under the laws of Colorado. The company during that year purchased ranch property, placer claims and reservoir sites on West and East Beaver creeks, in Teller and Fremont counties; also located, developed and patented placer claims along these streams, and owns by patent all of the lands on and along these streams, in-



DAM DURING CONSTRUCTION.

cluding reservoir sites, and all water power privileges, over a distance of  $1\frac{1}{2}$  miles on Beaver, 7 miles on West Beaver and  $3\frac{1}{2}$  miles on East Beaver, which streams are noted for excessive difference in elevation in short distances, and produce sufficient water to make of them valuable water power properties.

One of the power stations contemplated by the company is completed, and has been in operation during the past year, and known as Station A, located on West Beaver, in Fremont County,  $2\frac{1}{2}$  miles up the stream from the junction of East and West Beaver. The completion of this station has also accomplished much of the development and actual construction of Stations B and C, by way of reservoir capacity and pipe line delivery of water, which is especially serviceable to the two lower stations after having been used through Station A. The description of the completed work is as follows:

The dam and reservoir are located  $5\frac{1}{2}$  miles east of Victor. Here is located the largest steel-faced, granite back filled dam on record to date. The structure is 405 feet in length along the cap, 220 feet at the base, 148 feet cross section of base and 20 feet cross section of cap. Upper slope (being the steel face) is  $30^\circ$  from the vertical and lower slope  $50^\circ$ ; vertical height of dam from bed-rock to top of 16th Plate (being the spillway) is 70 feet. The spillway is 40 feet wide, cut in granite formation and passes around the northwest end of the dam. The granite back fill to which the steel plate is laid, is carefully laid in dry wall of heavy granite boulders, usually of 20 to 80 cubic feet each, as broken from heavy blasting, with loose, fine granite filling the intervening space.

The steel plate is built up of sheets 5 by 15 feet, and  $\frac{1}{2}$  inch in thickness for the bottom, 8 plates in height. Continuing, the plate is reduced in thickness to  $\frac{3}{8}$  inch, and finally at the cap it is  $\frac{1}{4}$  inch in thickness. The entire sheet is riveted up with horizontal butt strips, and 4 by 5 by  $\frac{1}{2}$  inch angle-bars placed vertically the entire height of the dam across each interval of 15 feet for the entire length of the dam. The 5-inch leg of each pair of angle bars projects into the reservoir and constitutes a standing joint seam, with an iron liner  $\frac{3}{8}$  by 2 inches, riveted between the extreme outer points of these angle bars, thus making a

thorough expansion joint for each section of 15 feet. The bottom and end connection of the entire sheet is concreted into a deep channel way, quarried out of bed rock, and the bottom terminates in two pairs of 5 by 8-inch angle bars, which are riveted through the plates. The end connections are prepared in exactly the same manner, but are applied vertically. The quarrying of the bed rock channels was carried out horizontally in each case to a point rising to an ele-

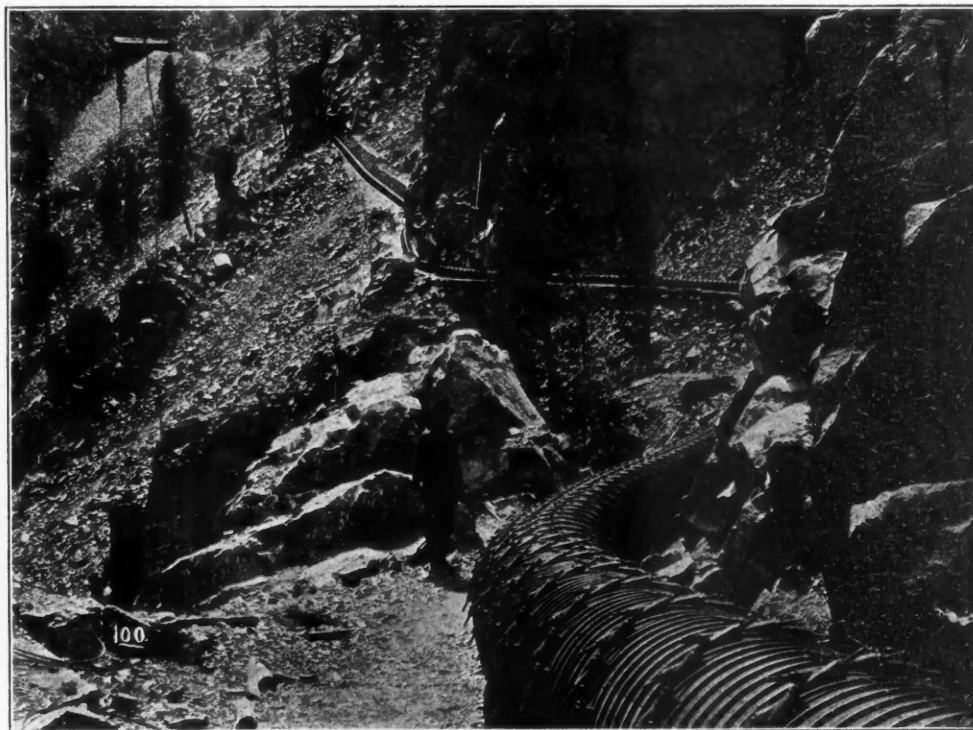
inside diameter, and is of  $1\frac{1}{2}$ -inch redwood staves, banded with  $\frac{1}{2}$ -inch steel bands and cast iron lugs. The bands are spaced at intervals along the pipe, as necessary for resisting the internal pressure, variations being caused by various inverted syphons along the line, two of which reach 215 feet pressure. This pipe line extends over very rough country, about half of the grade being through original granite formation; many curves were on less than 100 feet radius and one compound curve was 35 feet. The wood pipe passes through the Skaguay Tunnel, which is 1,535 feet in length, located 21,000 feet from dam.

From a point 200 feet below the Skaguay Tunnel, where the static pressure reaches 220 feet, the line consists of steel pipe 29 inches in diameter in various thicknesses of plates, ranging from  $\frac{1}{4}$  to  $\frac{3}{4}$  inch, as required to meet the internal pressure with an ample factor of safety.

The total length of steel pipe, including the receiver, is 2,900 feet, and on an incline averaging 38 per cent. It passes over grades constructed through a tough granite formation. At one point it passes through an inclined tunnel 335 feet in length, just above which is a bridge 70 feet in height, both being on a 40 per cent gradient, and at various points there are extremely deep open cuts. From the south end of the Skaguay Tunnel the pipe line is entrenched in the grade on which is constructed a 3-foot gauge railway leading from the Skaguay Tunnel to the power house, its grade being 1,165 feet vertical in 3,100 feet horizontal. This road is the only means of access to the power house. The cars are operated by a double-hoisting engine.

The upper terminus of the railroad lies under a vertical ledge 70 feet in height, and all machinery, apparatus and materials of all kinds, were lowered by boom and derrick, taking loads from the wagon at the upper landing and lowering them 70 feet over the ledge to the cars, from

vation, and thence the rise was made abruptly in terrace form. The entire sheet is riveted up and calked in the same thorough manner as in boiler practice. A space of 6 inches was left between the steel plates and smooth surface of the granite back fill. This narrow space is taken up by



PART OF 30-INCH WOOD STAVE PIPE.

sand, gravel and sedimentary deposit, the filling being applied with ample water and permitted to dry before water pressure was allowed to enter the reservoir.

The reservoir has a surface area of 130 acres and holds 102,000,000 cubic feet of water.

Water is taken into the wood stave pipe through a grizzley 240 feet long, perforated, giving 30 times greater area than the pipe. The main pipe line is connected to the steel facing of dam by steel angle connections.

The wood pipe is 23,200 feet long, 30 inches

which point the loads were lowered by friction brake on the hoist equipped with a  $\frac{3}{4}$ -inch steel cable. In all, 1,400 tons of building materials passed down this peculiar railroad.

The power house, Station A, is 38 by 98 feet, with two side wings 16 by 48 feet each, and is located on the summit of a granite projection surfaced off true to grade. The building is constructed of brick, with steel, corrugated steel arched roof, concrete tar and gravel covered; concrete floor and is absolutely fireproof. The building is provided with a 10-ton traveling crane.

The hydraulic apparatus was manufactured by the Pelton Water Wheel Company, of San Francisco. Each unit consists of two steel disk wheels 66 inches in diameter, keyed to the same shaft and working in the same wheelhouse. The base frames are built up box pattern of the same type and general design as the generators, to which they are connected. The frames of the waterwheels and generators are faced for accurate, rigid connection to each other by bolts and dowels. The connection of waterwheel and generator shafts is effected by a 7,000-pound steel cast balance wheel banded with a rolled steel band, 4 inches in thickness. The wheel is 7 feet in diameter, and its hub forms the connection on the waterwheel shaft; one-half of the hub forms the other half of face coupling, and is keyed to the armature shaft, forming an accurate and rigid connection of the shafts of the two machines.

The nozzles used as applied under 1,160 feet effective head, require only a diameter of 1 inch to produce 236 horse-power, including losses. The nozzles for each unit vary in diameter.

The nozzles are of the deflecting type, and work under full pressure at all times, which is the cause of such variation in the diameters of the nozzles. The regulation is of the Armstrong type. Provision has been made to connect the actual control and regulation of each unit to a point directly in front of the switchboard panel belonging to that unit. The receiver runs longitudinally through the building under the steel-concrete floor. The discharge or tail-race water returns directly under the receiver to the south or lower end of the building at which point it will later unite with water conducted from a point 800 feet above Station A, where a catch-dam is to be constructed, and the water diverted from the Beaver Stream channel. There being a considerable accumulation of water between the dam and Station A, it is the purpose of the company to unite the waters through Station A with the accumulation in the stream, and conduct the combined waters through a pipe line to a point 200 feet above the forks of East and West Beaver Creek, at which point will be constructed Station B. There will be a small pipe line up the East



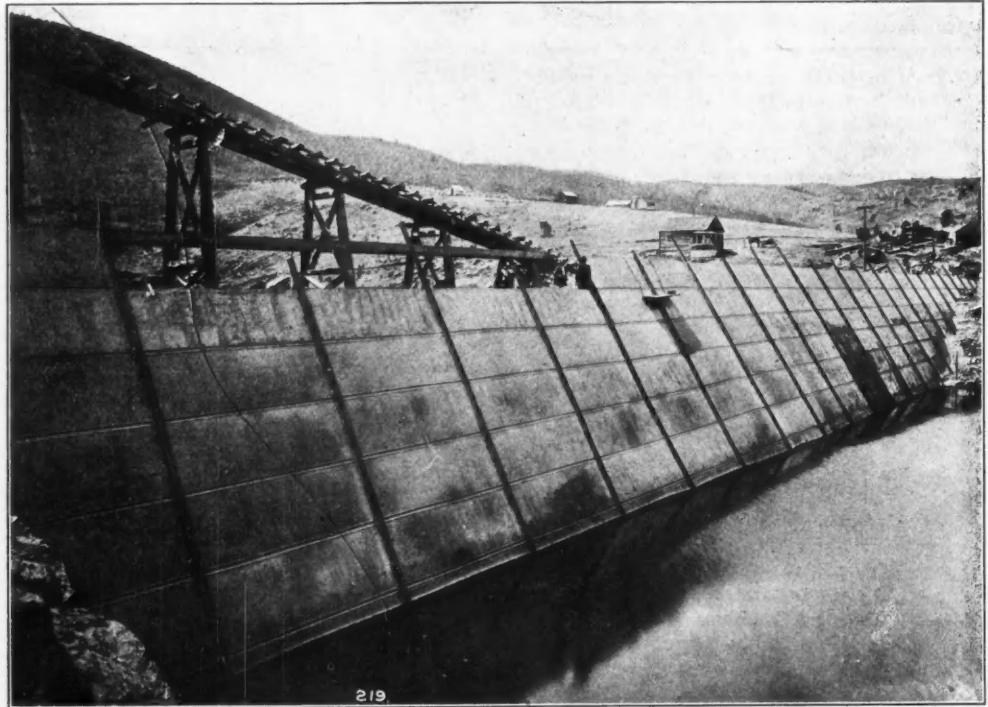
STEEL FACE OF DAM, SHOWING CONCRETE CONNECTION WITH BED-ROCK.

Beaver to the same static level as the tail-race water of Station A. The waters of both pipe lines will be united before entering the receiver. The pressure at Station B will be 1,257 feet, or 544 pounds per square inch. With the added ac-

cumulation of water in the West Beaver Branch, 3,500 horse-power should be obtained, and from the East Beaver Branch about 2,000 horse-power, all of which may be developed at Station B.

The electrical generators now in operation at Station A includes four 400-kilowatt General Electric machines, three-phase, 30-cycles, 600 volts, with stationary armatures and rotary fields, mak-

circuit. The transformers are six 250-kilowatt air blast, of the General Electric make, having 600 volts on the primaries and 12,600 on the secondaries. The 12 complete sets of lightning arresters are of the General Electric make. The cable connections between the generators and switchboard, and from the switchboard to the transformers are all highly insulated, and laid in



STEEL FACE OF DAM DURING CONSTRUCTION.

ing 450 revolutions per minute. As already mentioned the generators are directly connected to the waterwheels. Two four-pole exciters, direct-current machines, have a capacity of 30 kilowatts each, running at 675 revolutions per minute, producing an exciting current at 70 volts, each giving sufficient exciting current for all four generators, while working at full load.

In reference to the efficiency of the waterwheels, it may be stated that they were guaranteed to develop 83 per cent of the theoretical power on their shafts at full load under conditions when the nozzles are in normal position. In considering the efficiency of the waterwheels, the General Electric Company's generators were assumed to have a commercial efficiency of 94 per cent at full non-conductive load, therefore with every 33,000 foot-pounds of water the waterwheels will produce in current one indicated horse-power, less 17 per cent loss in the wheels and 6 per cent loss in the generators, delivering 77-100 horse-power, or 582 watts, from the brush-holder terminals of the generators. These efficiencies have been fulfilled by tests. All water connections are tested to 800 pounds pressure to the square inch. In making the efficiency tests, measurements are made through the standard weir commonly used in the United States, which measurements are verified by spouting tests by working water through nozzles of known diameters. The developed power is measured by the highest grade electrical instruments obtainable.

The switchboard apparatus is especially liberal in design, and is made up of one exciting current panel, four generator panels, two distributing panels, two high-tension panels, and one paralleling or synchronizing panel. Each panel is made of Vermont marble, 62 by 36 inches, with a sub-base 28 by 36 inches, and 2 inches in thickness, with a complete equipment of indicating and recording instruments, switches and regulating apparatus. The main line switches from each machine are operated independently, either for power or light. The circuits are arranged so that any or all of the machines may be applied on either

conduits in the concrete floor. Since the early operation of this station, it was found necessary to install some thorough system for combined arc and incandescent lighting, which has been fully accomplished by the installation of two 200-kilowatt compensated three-phase generators, 60 cycles, with full equipment. These generators are 12-pole, and operate at 600 revolutions per minute. Each generator contains its own independent exciter, 12 poles, built directly on the revolving field shaft. These machines are also directly connected to impulse type waterwheels.

The line transmission from Station A to the center of distribution (at the Gold Coin Mine at Victor) includes a distance of 8 miles by pole line. The circuits consist of three power wires, No. 4 B. & S. gauge, and the lighting circuits of three No. 6 B. & S. gauge, which are ample to deliver 1,600 kilowatts at less than a 5 per cent energy loss. These lines are transposed at intervals of each ½ mile along the line. The poles also carry for telephone purposes two No. 10 galvanized iron weather-proof wires, transposed each 120 feet. The insulators were furnished by R. Thomas & Sons Company, of East Liverpool, Ohio. They are 5½ inches in diameter, of porcelain, and each is made up of three independent cups. In manufacture they are subjected to a 40,000-volt salt test. The line voltage is 12,600, both on 30 and 60-cycle lines.

The sub-station is a brick, steel and concrete structure, fireproof, adjoining the Gold Coin ore house, in Victor. All transmission circuits enter this building where the current is transformed through nine 50-kilowatt oil transformers, General Electric type, 12,000 volts primary and 115 460 volts secondary, for local lighting distribution connected in the Y four-wire system, also for local power work. There is also a set of three 50-kilowatt oil transformers 12,000 to 350 volts, which operates a 120-kilowatt rotary converter, which operates in turn a locomotive in the United Mines Transportation Tunnel, for ore hauling from first level of the Gold Coin Mine to the Economic Mill, also for Bull Hill Tunnel



haulage. High-pressure distributing lines leave the sub-station in various directions (after first passing through 20,000 volts oil switches, making each line independent) to Economic Mill, where about 300 horse-power is delivered to the Beacon Hill Power distribution for hoists, power and lights; to the Deadwood Mine, where a 100-horse-power air compressor is operated; and a secondary 400-volt power circuit reaches Independence, Altman and the Wild Horse districts. Another primary line reaches Cameron and Gillett, after first passing through Goldfield, all for lighting services and distributed in each of these towns through their local transformers connected in delta.

Two additional primary distributing lines reach Anaconda, where independent lighting and power is distributed to the town of Anaconda and the various mines in that vicinity, the Morning Glory, Doctor-Jack Pot and others. These lines also reach Elkton on its way to Anaconda, where lighting is also distributed.

The Pike's Peak Power Company has just begun, in fact, to reach its various points of distribution. It has reached all the places and properties mentioned with a good, series-alternating system of 60-cycle arc lighting, which is distributed in three directions through one 70 and one 50-arc current transformer, located in the Victor sub-station.

It is the purpose of the company to construct an independent transmission line from Station B to Station A, and possibly an independent line to the distributing stations in Victor, including the connections through Station A, thus permitting the use of the entire energy of both stations to work in parallel over either station's lines or to work each station independently, as desired. It is also proposed to extend transmission lines from these stations to other localities within reach. Thus, with two complete pipe lines, pole lines and generating station systems, reliability may be counted upon. The distribution of light and power, together with the company's independent telephone system, constitutes one of the most valuable systems of its kind in the country.

It is also the intention of the company to install a third station on the combined Beaver streams at a point near the mouth of the canyon, and approximately 2 miles below Station B, the lower one known as Station C. Here the difference in elevation is but 373 feet; however, the volume of water, it is believed, will reach 50 second-feet, which could develop 2,100 horse-power, less losses.

The company owns also an excellent reservoir site on East Beaver, at 1,700 feet elevation above Station B, and but  $2\frac{1}{2}$  miles distant, which reservoir may be developed to excellent advantage in the near future.

#### NEW COKE SUPPLIES.

A very complete statement of the new coke ovens now under construction in the United States has been compiled by the *Iron Trade Review*, of Cleveland. The general comments on this statement and the summary given with it are reproduced below.

The proper operation of blast furnaces and foundries in the United States has been greatly interfered with for more than six months past, on account of the apparent shortage in the supply of coke, which is no doubt largely due to conditions outside the coking industry.

The losses due to this shortage have been very great. The production of iron has been greatly curtailed—and this at a time when every available pound of iron can find a ready market. The future of the coke industry is no doubt causing iron manufacturers, founders and other large consumers of coke considerable concern, as many of them fear that with the constantly increasing blast furnace and foundry capacity the situation will be much worse next year.

The anthracite coal strike, resulting in the blowing out of many blast furnaces in the Eastern part of the country was the cause of diverting a large portion of the coke production to other channels, as some of the furnaces operating on anthracite coal changed over to coke, paying the higher price demanded for this product in order to take advantage of the high prices prevailing for iron. The railroads have also been greatly at fault in not having sufficient motive power to properly move the production of the Connellsville region, resulting in the stocking of more than 1,000,000 tons. Coal strikes in the bituminous fields of West Virginia and Alabama also interfered with the coke production to a very great extent. On June 7 the coking plants in Fayette County, W. Va., were shut down on account of the coal strike, and only recently operations were resumed. Other regions of West Virginia suffered likewise, and the great coke production of this State was almost entirely cut off for a period of about four months. The midsummer coal strike in Alabama, and more recently that at the Tennessee company's mines, also interfered with production.

As the miners in both the anthracite and bituminous fields have returned to work the renewed production from the coking plants thus affected will shortly begin to relieve the scarcity to some extent, but the situation in the Connellsville region for several months to come remains to be solved by the railroads upon which the operators depend for the shipment of their product.

That new coke operations have more than kept pace with additional iron and steel capacity is clearly shown by figures which have been compiled by the *Iron Trade Review*. Never in the history of the country were as many new coking plants under construction and projected as at the present time; and this enormous additional capacity, which will find its way into the market during the next 14 months, will entirely relieve the present stringency and make ample provision for new blast furnaces and foundries.

At present there are 14,708 beehive ovens under construction and projected in the United States. West Virginia leads with 6,484; Pennsylvania is second with 4,245, and the other operations are detailed in their order as follows: Alabama, 1,435; Illinois, 1,128; Tennessee, 546; Virginia, 390; Indian Territory, 300; Colorado, 100, and Minnesota, 80. Of this number, 3,016 will be placed in operation before January 1, 1903. Ovens to the number of 6,392 will probably come in between January 1 and July 1, 1903, and from that time to January 1, 1904, 5,300 additional ovens will be fired.

As all of these ovens are large and modern it is fair to estimate the annual production of each at 600 net tons, although the average production of the beehive ovens in the United States is much smaller than this for the reason that the majority of ovens in operation are much smaller than those now being erected, and have about half the capacity. Taking 600 tons as a basis, there will be an increase in the output from the beehive ovens amounting to 8,824,800 net tons annually. To this must be added the increasing capacity of the retort or by-product ovens of which there are 858 under construction, while 1,490 additional are to be built in 1903. As the average annual output of these ovens is 1,000 tons, this industry will further increase the coke production to the extent of 2,347,000 tons.

On the above basis of computation we have a grand total which will be available January 1, 1904, of 11,171,800 tons in addition to the regular production which amounted to 21,795,883 tons for the year 1901.

On January 1, 1902, there were 3,622 beehive ovens under construction in the United States all of which have been completed and which do not enter into the compilation above. These ovens have further increased the output to the extent

of 2,173,200 tons a year, but we will take no account of this figure, permitting it to offset the ovens which went out of use during the year, although the allowance thus made is somewhat high.

According to a compilation made by the *Review* in the issue of July 31 last, the blast furnace capacity of the country will be increased by fully 4,900,000 tons by January 1, 1904; and since these figures were presented additional capacity has been projected which will increase these figures to 5,500,000 tons. Allowing an average of 1 ton of coke for 1 ton of pig iron produced, it would appear that 5,671,800 tons of the added annual production as of January 1, 1904, will have to be marketed in other channels. While the foundry capacity of this country is being greatly increased at present by the erection of additional plants, not more than 25 per cent of this surplus production can find a market through this channel. The balance will be available for other metallurgical uses and for the increasing demand for coke for domestic purposes.

#### THE BRIQUETTING OF FUELS.

By R. SCHORR.

Briquetting—the manufacture of solid bodies from fines—offers great interest to the engineer and investor as it opens a wide and promising field to capital and enterprise. The more important points at present is found in the briquetting of fuels and the peat industry.

There are three points which form the basis for the briquetting industry, as follows:

1. The utilization of practically worthless debris, unavoidable in mining.
2. The creation of a good fuel by cleaning and compressing materials of inferior heating value.
3. The condensing of the highest number of heat-units into the smallest space possible. All these items are of importance in modern domestic life as well as in locomotive and marine practice.

In the mining of coal it is unavoidable that a certain proportion should be fines, and it is not unusual that more than 50 per cent of the whole output is brought to the surface in this form. Up to the last 60 years nearly all fines were thrown upon the waste heap, and this is still practiced in this country with the exception of bituminous and semi-bituminous fines, which are utilized to some extent in coke-making.

The waste that has been going on for a long period of years has begun to be generally recognized, even in countries where fuel is cheap. Patents have been taken out for the manufacture of briquettes since the time of Queen Elizabeth, and every possible and impossible material has been suggested as an agglomerant to bind the small coal together.

A desirable binder should increase the burning qualities, should be free of ash, and should make the briquette waterproof so as to permit transportation and exposure. Pitch, the distilling product of coal, asphaltum or petroleum, is the best bonding agent, and it is used wherever obtainable in sufficient quantities and at reasonable expense.

Most of the earlier attempts to briquette in this country failed on account of the difficulty of procuring a good binder cheaply, but with the rapid increase of by-product coke-ovens, chiefly of the Otto-Hoffman and Semet-Solvay types, this point will be overcome. The Westfälische Kohlen-Syndicate in Germany uses over 100,000 tons of pitch thus obtained in making nearly 2,000,000 tons of briquette per annum.

The oldest German literature on the subject is a publication by Herr Tars (1776), describing the making of ball-shaped briquettes in the district of Aix-la-Chapelle, by incorporating coal fragments with weeds (Letten, terre grasse) by hand. The first briquetting works using machinery were built in 1842 at Beraud, in France, and by 1867

there were 31 plants, with an aggregate annual capacity of 800,000 metric tons, in operation there.

The developments in Germany were very slow up to 20 years ago. Its yearly production, exclusive of peat briquettes, is now nearly 9,000,000 tons, or almost 6½ per cent of all coal mined there. The total European manufacture of coal briquettes in 1882 was but 3,000,000 tons, while it is estimated to be now approximately 25,000,000 tons.

Very little has been done in the line of fuel briquetting in the United States, chiefly because of the cheapness of coal and the discovery of oil in sections where it is expensive. There is no doubt that in spite of the cheapness of fuels, briquetting once thoroughly understood and energetically taken up by Americans, will soon reach very considerable dimensions, as have a good many other important industries which inaugurated but a few years ago.

United States Consul General F. H. Mason's recent reports on German Processes and Machinery for Briquette Manufacture are very interesting. He refers to the clean condition of German cities as compared with the smoky centers of industry in this country, and attributes this solely to the use of patent-fuel and the scientific construction and management of furnaces in general.

The briquetting works of the San Francisco & San Joaquin Coal Company, at Stockton, Cal., were destroyed by fire a few weeks ago. It was the largest undertaking of its kind in the country, and as it proved to be a complete success it will be rebuilt at once. The press used is of the continuous-acting type, and it was designed by the writer under suggestions of Mr. John Treadwell, Mr. Davis and Messrs. Connor & Grant. The press as well as the process of manufacture is covered by United States patent No. 667,254. The ideas involved, however, are not new. There are two presses installed, each capable of turning out approximately 280 tons of 8-ounce boulets per 24 hours.

There is another lignite briquetting plant under construction at New Dallas, Tex., and the only commercial enterprise East is the Chicago Patent Fuel Works, making eggets on a small scale. The press used there was built by the Chisholm, Boyd & White Company, Chicago.

The writer is not familiar with any other plant in this country, but is informed that there are some prominent capitalists contemplating the briquetting of soft coal slack on a large scale.

The White briquetting machine as built by the Henry S. Mould Company, in Pittsburg, as well as the other process, above referred to, are also well adapted for fuel briquetting.

Lignite, or brown coal, and peat are almost entirely neglected in this country, but most of the deposits, as far as known, are of higher calorific value than in Europe. Brown coal and peat do not need a binder for briquetting, and in both cases usually open-tube presses are employed; that is, machines in which the friction of the material along the mould-wall forms the resistance for the piston. Thus briquette after briquette is made and ejected in a continuous band. This class of press, while wasteful in the consumption of power, permits briquetting of partially dry raw materials—as a rule, 15 to 18 per cent moisture is present; while employing presses with solid resistance, a commercial dryness, of not more than 7 per cent moisture, is necessary. Considering the low value of brown coal and peat and their high water contents, the elimination of almost all moisture is a too expensive operation. For the briquetting of coals and older lignite, presses with solid resistance are used almost exclusively. The Coufinal type of press is the most favored in Germany and France for the manufacture of heavy patent fuel blocks, weighing up to 10 kilograms, used for steam fuel. The English presses of the Middleton, Yeadon and Stevens system are

also used very extensively all over Europe.

For the manufacture of small ball or egg-shaped bodies—boulets, eggets, etc.—continuous-acting presses, as the Fourquemberg & Evvard, are mostly met with abroad.

Heavy square blocks permit a large output and convenient storage, but they have the disadvantage of large, smooth surfaces, and unless broken up prior to being fed into a furnace they are apt to choke the draft and to smother. The perforating of such bricks facilitates a proper air-circulation, and it is done in one operation with the pressing. The manufacture of hollow, tube-shaped briquettes is very limited. It is not advisable to use a poor grade of fuel in small, round briquettes, as they ignite too slowly, and as breaking them up is rather troublesome. The round shape insures a good air-circulation, and consequently a good combustion. They give little waste in transportation, but as they are disagreeable for storage, they are used as domestic fuel only.

The French Navy figures 820 kilograms of fuel-blocks for each cubic meter bunker capacity, or about 10 per cent more, as compared with the storing of lump coal. The losses in dust seldom

## THE POLAND MINE, BIG BUG MINING DISTRICT, ARIZONA.

By Our Special Correspondent.

The Big Bug Mining District lies 16 miles southeast of the town of Prescott, Arizona, in a group of mountains, the highest points of which are Mount Union and Mount Davidson, the former being 9,000 feet above sea level. On the slopes of these peaks are the beginnings of the Agua Fria River, Big Bug Creek, Lynx Creek, and the Hassayampa River.

The formations of the district are massive granite, hornblende granite and diorite, which are cut by many small quartz fissure veins, quartz porphyry and porphyritic granite dikes and bands, all about paralleling each other or running at small angles, and having an approximate strike of north and south.

The Poland Mine, the largest of the district, is on Big Bug Creek, 2 miles northeast of the summit of Mount Union. Its salient features are a large well developed property, a cross-cut tunnel to connect Big Bug Creek and Lynx Creek, and its immediate connection with the Prescott & Eastern Railway.



POLAND MINE, ARIZONA.

pass 4 per cent, while the best Welsh coal gives about 30 per cent, and in stormy weather often near 50 per cent, thus reducing the stored heating capacity. The specific weight of briquettes varies with the material and pressure employed, but it is usually almost as high as the specific weight of the fuel they are made from.

Pitch is the best binder, as the 5 to 8 per cent of it necessary for briquetting adds materially to the heating value of the raw material—often over 10 per cent.

There are a number of unorganic binders used also, as clay, lime, gypsum, seaweed, blood, starch, molasses, and notably magnesia cement, but all these substances increase the ash. In very hot climates, however, they are preferable.

Many attempts were made to briquette coal without the aid of a binder, and the earliest patent granted for such a process was to Sir Henry Bessemer in 1850. The briquettes thus obtained are very hard and dense, but their manufacture is too expensive, and it is not practiced to-day on a commercial basis.

The manufacture of peat fuel and the briquetting of mineral fines will be discussed in other articles.

The whole question of manufactured fuel may be regarded as settled mechanically; the commercial side is the present point.

The mine has been opened by tunnels, raises, winzes and shafts amounting to 6,140 feet, exclusive of its cross-cut tunnel. The vein lies in a granitoid diorite on the south and passes into a granite on the north and is cut by a small quartz porphyry dike about midway of the mine. Throughout its whole demonstrated length, the fissure shows a secondary opening, filled with a soft siliceous matter, fragments of the original fissure and detached pieces of the country rock, and in places the walls of the vein have closed and crushed the filling into a hard compact conglomerate. The mineralization consists of the sulphide of iron, zinc blende, galena, bornite and chalcocite, carrying gold and silver values. The minerals sometimes occur solid and compact, but generally they are disseminated through a gangue of quartz and the secondary filling of the vein.

The Poland-Lynx Creek cross-cut tunnel cuts the Poland vein 700 feet from its mouth, and at an angle of 75°, and opens the mine at a point 615 feet below the highest point of the outcrop. The tunnel is projected to connect Big Bug and Lynx Creeks, and when completed will be 8,000 feet long. Of this distance, 2,370 feet have been run. It enters the mountain on the Big Bug side at 6,230 feet above sea level, will run 6,000 feet on a 1 per cent grade and 2,000 feet on a 3 per cent grade, the above grades being necessary to over-



come the elevation at the Lynx Creek opening. At the point of change of grade there is an angle of 39° to the right. The highest point on the mountain cut by the tunnel will be 1,200 feet. Twelve veins on the company's property will be opened at from 600 to 800 feet below their outcrops. The tunnel, which is 8 by 10 feet in the clear, is being driven from both ends by Sullivan 3¼ and Ingersoll-Sargeant 3½ drills, and California Powder Works 40 per cent gelatin powder is used for breaking the ground. Compressed air is furnished by a Rand compressor on the Lynx Creek side and a Leyner two-stage compressor

The mill is located 200 feet from the mouth of the cross-cut tunnel; all ore comes through the mine by gravity, is trammed to the mill on a level, and passes through the mill entirely by gravity.

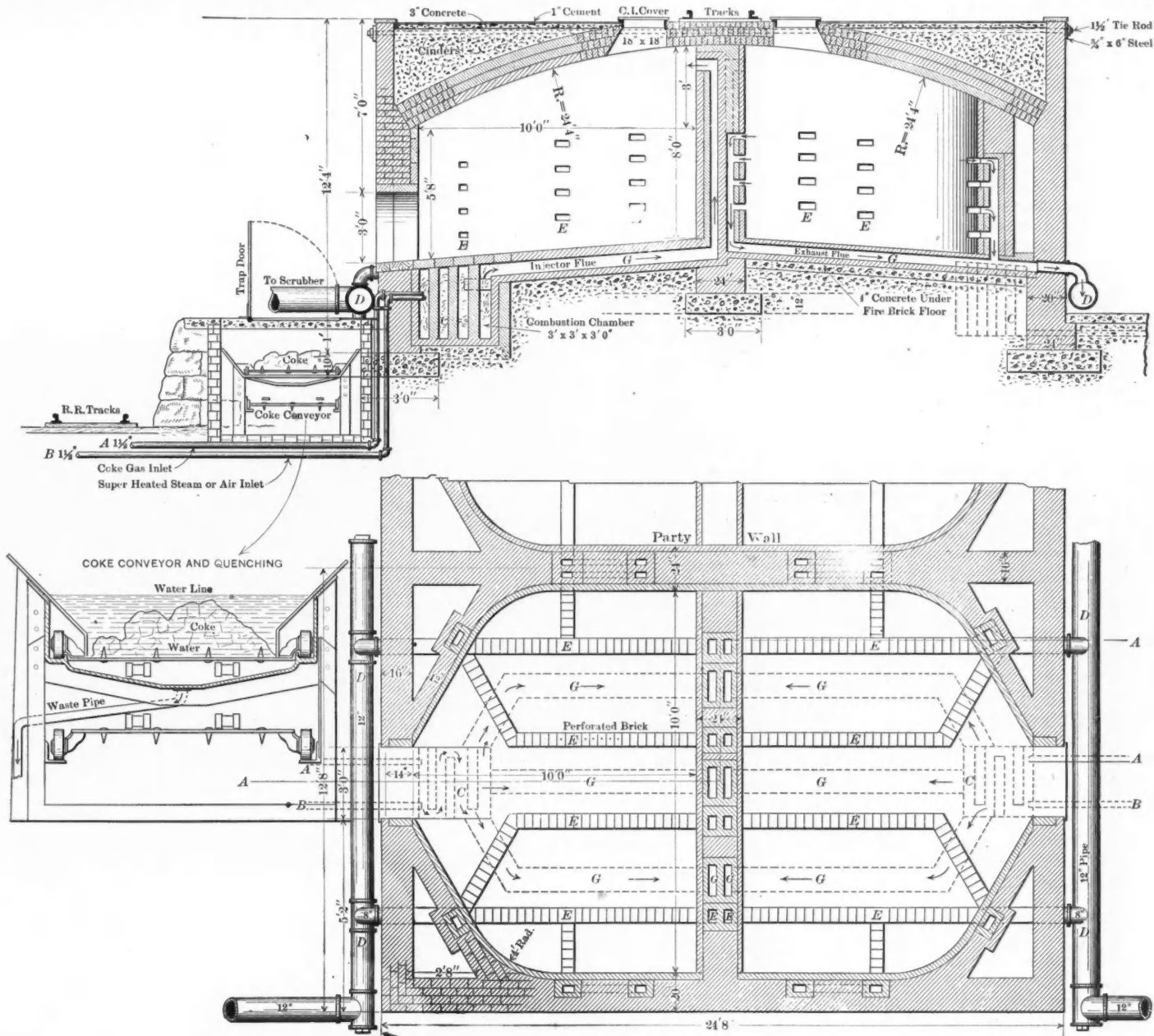
The mine was opened, the cross-cut tunnel projected and the reduction works designed, erected and put in operation under the direction of Mr. C. J. Stone, the company's superintendent.

The Big Bug branch of the Prescott & Eastern Railway was completed to the Poland mill May 1, and since that time regular shipments of concentrates have been made.

**DAUBE'S ECONOMIC DOWNDRAFT COKE OVENS.**

The accompanying illustrations show the details of a coking oven invented by Oscar Daube, of New York, having for its object an improvement in the quality of by-product coke.

The oven is built on a beehive plan. Under each one is located a combustion chamber operated under forced draft with coke-oven gas or fuel. This results in coking from the bottom up while the waste gases from the combustion chamber pass up the rear, entering the oven above the coke bed under pressure, which causes the coking to take place from the top down and from rear to center. The gases gener-



DAUBE'S DOWNDRAFT COKE OVEN.

on the Big Bug side. A pressure of 120 pounds per square inch is maintained by the latter at the power station. The best progress that has been made thus far on either side in a heading is 200 feet per month. The ground is hard, compact and breaks poorly. The sum of \$200,000 from the company's funds has been set aside for the construction of this tunnel.

A 20-stamp mill furnished by the Allis-Chalmers Company was put in commission March 1. The batteries are upon solid anvil blocks and concrete foundations and will crush from 80 to 88 tons hard ore in 24 hours. Eight Wilfey tables were placed in the concentrating room, two of which are used as roughing and six as finishing tables, the former taking out from 50 to 70 per cent of the product.

The Poland Company is a subsidiary company of the Development Company of America, of New York City. The American Finance and Securities Company, of New York, were agents for and have placed the entire bonds of the Poland Company.

**A COINCIDENCE.**—Mr. Van den Broeck has brought an interesting fact to the notice of the Belgian Société de Géologie. At the beginning of 1899 considerable outbursts of firedamp occurred in certain of the working places at the Marchienne Mine, near Liège, notably on February 26 and 27. He points out the inspector for the Manchester District records a slight earthquake there on those dates, accompanied by outbursts of gas in the mines in the neighborhood.

ated in the coking process are drawn through flues that pass down the sides and also under the floor of the ovens, giving off their radiant heat on its outward passage to the coke in the oven. It will thus be seen that the coking process takes place from the bottom up, top down, and from sides to center. The process is claimed to be rapid, completing in 24 hours a charge of 6½ long tons. The coke obtained is said to be of first-class quality, running from 88 to 92 per cent. carbon and yielding 67 to 72½ per cent. of coke.

The manner of withdrawing the gases at the side and bottom of the oven has for its object the decomposition of the heavy hydro-carbons. These, coming in contact with the incandescent coke, decompose, on their outward passage adding a percentage of carbon to the coke. Hence the large

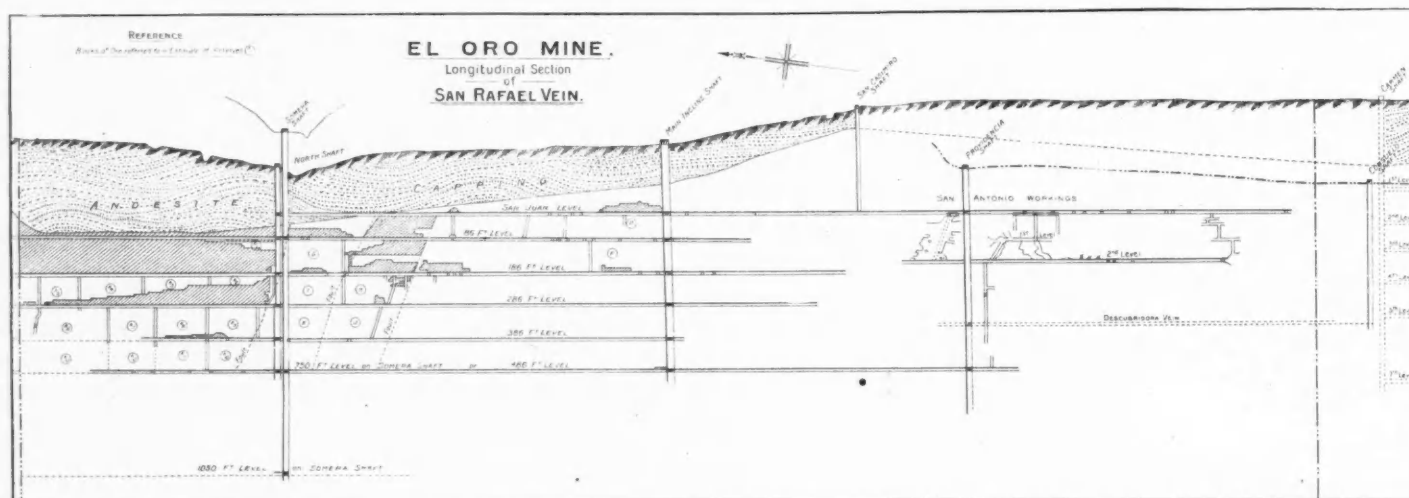
yield of coke per ton of coal. The yield of tar is correspondingly reduced from 12 to 14 gallons per ton to from 4 to 5 gallons.

The quantity of gas recovered is approximately 5,000 cubic feet per ton, the balance being used for heating the ovens. This recovery compares favorably with the amount now being obtained by other by-product retort ovens. The ammonia saved amounts to from 25 to 35 pounds per ton of coal, depending, of course, upon the percentage of nitrogen in the coal coked. The above results are on a basis of a good coking coal, capable of coking by any process. There are, however, large areas of so-called non or poor coking coal, that up to date none of the present coke ovens have successfully coked. The Economic downdraft coking process has been developed on the opinion held by Sir Lowthian Bell, and others, that the cause of the poor or non-coking qualities of coals lay in the fact that they are low in disposable hydrogen, and which in slow ovens volatilizes before the coking stage is reached. This theory is claimed to have been proven correct in this process, which, owing to its ability to generate a high uniform heat at the beginning of the coking operation, brings about the fusing or coking stage before the disposable hydrogen has volatilized. The

not comply with a statute requiring him to state the approximate bearing of his location, and it is void. And under the Canadian law, before a prospector can locate a claim he must actually find "minerals in place." His belief that such claim contains minerals is not sufficient.—*Collom v. Manley*; Supreme Court of Canada.

**EJECTMENT MAY BE MAINTAINED AGAINST TRAMWAY THROUGH ACQUIRED IN.**—The mere acquiescence of the owner of real estate in the entry, construction, and use of a tramway upon his land by a mining company, without proof of the necessity of such use, will not prevent him from maintaining ejectment for the possession of his premises at any time within the limit prescribed for the commencement of such actions by the laws of his State. The necessity of using the particular property sought is an essential pre-requisite of the exercise of the power of eminent domain over it by a corporation having that power. In an action of this kind an equitable defense may not be successfully presented in the Federal courts. The strict legal title prevails, and if there are equities, they can only be considered upon the equity side of the courts upon the presentation of the proper complaint. In the national

**MINE AND FELLOW-SERVANTS.**—Three shifts of men were engaged in driving a tunnel in a mine, working alternately. One shift would drill a number of holes in the face of the tunnel, charge them with blasting powder, and explode them, and then retire, to be succeeded by another shift. It was the custom for the outgoing shift to note the number of explosions, and inform the succeeding shift how many, if any, of the blasts remained unexploded. The foreman of one retiring shift, stated to the incoming shift that two blasts had been heard to explode—one at the top, and the other at the bottom of the tunnel. Their location, however, could not be certainly known without examination, and this was made by one of the men, of the second shift. He located one at the top, and supposed the other was at the bottom, where it was covered by the fallen rock. It was, in fact, in the breast of the tunnel, and on further drilling it was exploded, injuring the person who had made the examination. It was held that the injury was not chargeable to the negligence of the foreman of the outgoing shift in failing to correctly locate the exploded blasts, which the party afterwards injured, as an experienced miner, must have known could not be done with certain merely from the sound of the explosions. An employer is not required to furnish



inventor states that a number of western coals, heretofore considered as non-coking, have been successfully coked by the "Economic" process.

The cost of these ovens independent of by-product recovery plant is said to be only slightly higher than that of the ordinary beehive oven.

In connection with these ovens a system of desulphurization is employed by which it is claimed that coke running high in sulphur and consequently undesirable for metallurgical purposes can be converted into one fulfilling the requirements of the furnace and foundry.

#### RECENT DECISIONS AFFECTING THE MINING INDUSTRY, SPECIALLY REPORTED.

**SUITS ON ADVERSE CLAIMS IN CANADA.**—In an action on an adverse claim the plan to be filed pursuant to Section 37 of the Mining Act (Canada) must be based on a survey made by a professional land surveyor. The filing of an affidavit and plan pursuant to said section is a condition precedent to the right to maintain such action.—*Paulson v. Beaman* (9 B. C. Reports, 184); Supreme Court of British Columbia.

**NECESSITY OF ACCURACY IN DESCRIBING LOCATION IN CANADA.**—Accuracy in giving the bearings in staking out a mining claim is as necessary in the case of a fractional claim as in any other. A prospector in locating and recording his location between stakes No. 1 and No. 2 as running in a northeasterly direction, whereas it was nearly due north, does

courts an action at law cannot be maintained in equity, nor is an equitable cause of action or an equitable defense available at law.—*Highland Boy Gold Mining Company v. Strickley* (116 Federal Reporter, 852); United States Circuit Court of Appeals, District of Utah.

**MINING REGULATIONS NOT EX POST FACTO IN CANADA.**—The suppliant by right of discovery under the Dominion Lands Act, and the Dominion mining regulations of 1889, may thereafter patent grant of a certain gold mining claim in the Yukon District in December, 1896. His grant, among other things, gave him, for a term of one year from its date, the exclusive right to all proceeds realized therefrom; and the rights which it conferred upon him were, it was declared, those laid down in the Dominion mining regulations, and no more, and were subject to all the provisions thereof, whether the same were expressed in the grant or not. During the currency of the original grant an order-in-council was passed, making grants of gold mining claims in the district subject to a royalty. Afterwards, namely, on December 7, 1897, the suppliant's grant was renewed, on the same terms as those expressed in the original grant. It was held that, the terms of the renewal should be construed by reference to their meaning in the original grant, and that the renewal was not subject to the royalty imposed by the order in council. He was, also, entitled to recover back any royalties that he had paid.—*Chappelle v. The King* (7 Exchequer Reports, 414); Exchequer Court of Canada.

**ASSUMPTION OF RISK AS TO PLACE TO WORK IN**

the employee with a safe place to work as against a danger which is temporary, and arises from the hazard and progress of the work itself, and is known to the employee, who in such cases assumes the risk. Also, the foreman of one shift of men alternating with others in working in a mine is a fellow servant with the members of the other shifts, and the employer is not liable for an injury to one of the men caused by the negligence of the foreman of the preceding shift.—*Davis v. Trade Dollar Consolidated Mining Company* (117 Federal Reporter, 122); United States Circuit Court of Appeals.

**BLAST FURNACES IN BELGIUM.**—Out of 39 existing blast furnaces in Belgium 32 are at present in operation, as compared with only 25 at this time a year ago. Of the furnaces in operation the output per twenty-four hours is—seven, 665 tons of forge pig; five, 365 tons of foundry pig; and twenty, 2,330 tons of steel pig.

#### ABSTRACTS OF OFFICIAL REPORTS.

##### *El Oro Mining and Railway Company, Mexico.*

The report of this company, which owns and operates a large property in Mexico, covers the year ending June 30, 1902, and shows, upon the whole, a prosperous year. The accounts, as stated from the London office, show that the total receipts for the year were £352,506, of which £308,481 were from the mines, £42,605 from the railway, £1,420 from interest and exchange. The total expenses of all kinds were £177,003, leaving a



profit balance of £175,476. From this dividends amounting to £147,000 were paid, leaving a balance forward for the current year of £28,476.

The general manager's report shows that the Somera property, formerly worked under lease, has been purchased, increasing the company's holdings to 775 acres. The development work for the year included a total of 7,991 feet, of which 415 feet were shaft sinking, and the balance drifts, levels and cross-cuts. The total depth of the inclined shaft is 744 feet; of the North shaft 628 feet, and of the Consuelo shaft, 398 feet. The total ore raised was 105,108 tons. The reserves blocked out are estimated at 530,000 tons of ore.

In the mill, 99,158 tons dry ore were crushed. About 15 per cent of the value was recovered by amalgamation on the plates, and all the ore from the mill was sent to the cyanide plant. The recovery in that plant was about 63 per cent of the value of the ore, which is a larger proportion than has been obtained in previous years. The following table shows the assay value of the ore and the total recovery in the mill and cyanide works. During the year the old tailings plant was operated 11 months and bullion valued at \$37,263 was recovered at the cost of \$19,192.

	Gold		Silver	
	Value	Per ct.	Value	Per ct.
Assay value .....	\$1,543,169	100.0	\$174,592	100.0
Mill recovery .....	\$250,991	16.2	\$6,313	3.6
Cyanide recovery ..	1,022,733	66.3	55,451	31.8
Total .....	\$1,273,724	82.5	\$61,764	35.4

The total recovery in bullion was \$1,335,489, or 77.8 per cent of the assay value of the ore. The costs of working are shown in the following table:

	Total.	Per ton.
Total tons worked .....	99,158	....
Mining .....	\$177,128	\$1.79
Development .....	78,887	0.79
Milling .....	71,351	0.72
Cyaniding .....	85,482	0.86
General expenses .....	94,267	0.95
Total working .....	\$507,115	\$5.11
Construction .....	30,210	0.30
Total costs .....	\$537,325	\$5.41

The figures above are in Mexican dollars. All costs showed a decrease from the preceding year, the average being 20 per cent. Exchange average 223.625 for the year, against 203 for the previous year, affecting expenditures for labor and local supplies accordingly.

The railway department showed about the usual amount of business and profits. The lumber department did not show favorable returns, owing to the fact that most of the timber cut last year was at a considerable distance from the railroad, involving large charges for transportation. With a view to obtaining supplies of water for the mine, arrangements have been made to build a large reservoir on the Tultenango Hacienda, and the dam required is partially completed. The total number of men employed during the year was 1,977, of whom 1,206 worked in the mine, 564 in the mill and cyanide plant, 68 at Somera and 139 at the old tailings plant.

The manager estimates the ore in sight at 530,889 tons and probable net profit to be obtained at somewhat over \$3,800,000. In addition to this there is a probable profit from the treatment of the old tailings stored, amounting to 135,000 tons. The present condition of the mine is shown by a map appended to the report, which is reproduced herewith.

The directors' report says: "The issued capital remained unchanged during the period under review at £980,000; but at a meeting held on July 17, 1902, the authorized capital was increased by 150,000 shares of £1 each, making a total of 1,150,000 shares, of which 1,080,000 have been issued, leaving 70,000 shares in reserve. Of the 100,000 shares then offered to the shareholders, 81,989 were subscribed by them at £1 5s. per share, and the bal-

ance of 18,011 has been allotted to the guarantors at £1 4s. per share.

"Dividend No. 3, of 1s. 3d. per share, was paid July 31, 1901; No. 4, of 1s. 6d., on January 1, 1902; No. 5, of 1s. 6d. on June 30, 1902.

"The sum of £20,000 has been written off for depreciation of plant as in the previous year.

"The Somera property, comprising 268.11 acres, was purchased on July 26 last, for the sum of £125,000, which has been provided by the above-mentioned issue of 100,000 new shares, and does not therefore come under the statement of account now submitted. The reasons for this purchase were fully explained at the meeting, at which the purchase was resolved upon by the shareholders. The amount of £8,484 written off in the accounts has reduced the previous expenditure on this property to the actual amount paid as consideration for the option, namely, £30,526; the directors consider it advisable to thus write off the whole amount spent on development, rather than to debit it to capital account."

*Hall Mining and Smelting Company, British Columbia.*

The report of this company, which is a reorganization of the Hall Mines, Limited, covers the year ending June 30, 1902. The accounts, as stated in the London office, show in the mining department that 22,661 tons of ore were mined and treated. The total returns from this ore were £66,179, while receipts from interest were £440, making a total of £66,619. The expenses for crushing, transportation and smelting charges were £19,457. Mining and other expenses were £33,476. In addition to this were charges for ore reserves exhausted for the sum of £19,572, and for supplies £1,095. This shows a loss of £6,981. The smelting department showed matte and bullion during the year amounting to £231,702, while the total expenses were £226,630, leaving a profit of £5,072. Deducting the general expenses and the London office, the year's operations showed a net loss of £5,946.

The report of the smelting department shows that the copper furnace was in blast 202½ days, treating 22,936 tons of Silver King ore, and 2,558 tons purchased ore, a daily average of 136.3 tons. This average was reduced by the change of character of the Silver King ore which contains so much more sulphur than formerly, that it was frequently impossible to make matte of shipping grade at a first smelting, making it necessary to resmelt a considerable quantity of low-grade matte. The cost per ton was reduced owing to a lower charge for coke. The matte produced during the latter part of the year was shipped to the Granby Smelter for treatment in the new converters there instead of sending it to New York. The earnings, however, were decreased by the falling of the price of copper and silver.

Lead smelting was carried on in the large furnace, which was in blast 306 days during the year. The percentage of zinc in the ore smelted was rather high, reducing the capacity of the furnace. A reduction of freights on lead ores was obtained from the Canadian Pacific and the Great Northern Railroad. There was no recovery, however, in the price of either lead or silver, and conditions still remain unfavorable, owing to the peculiar provision of the Canadian tariff on lead. The Government, however, has granted a bonus on pig lead refined in Canada, which for 1902 is \$5 per ton, and which will be \$4 for 1903, \$3 for 1904, \$2 for 1905, and \$1 for 1906. The Canadian Smelting Works have erected a refinery which is now in operation. Some interruption in the fuel supply was caused by the explosion in the Crow's Nest Pass Coal Mine, and later a strike of the miners in that mine. The feeling in the Kootenay silver and lead districts is more cheerful than in the past. The director's report says: "It will be seen that in consequence of the exhaustion of the ore reserves, and the necessity therefore for writing off the amount £19,572, charged to develop-

ment account at June 30, 1901, and also writing off £1,095 from the value of the mine supplies, there is a loss on the mining account of £6,981; on the other hand, the smelting account shows a profit of £5,072. After taking credit for sundry receipts and providing for the general expenses, including debenture interest and the balance of preliminary expenses not dealt with last year, there is a loss of £5,946, which together with £6,673, written off for depreciation, must be added to the amount brought forward from last year, £6,980, making a total debit balance to be carried forward of £19,599.

"The development work outlined by the mine superintendent last year was duly carried out by him with confident hopes of success, and it was not until the spring of the year that he began to doubt the permanence of the ore body at the lower levels, when the board, having obtained an independent report confirming his views, at once issued their circular of April 10 to the shareholders. Before deciding to abandon operations, the board subsequently had the mine examined by the best expert available, whose views entirely coincided with those of the other two. Mr. M. S. Davys, formerly superintendent of the mine, then entered into negotiations to work it on tribute for a year, with the option of a second year should he not develop an ore body during the first. These negotiations are now complete, and the board has leased the mine to him on satisfactory terms, one of the conditions being that they can resume possession should they wish to do so, whenever the output reaches 50 tons a day. The advantage of this arrangement is that the mine will be thoroughly explored by one who knows the property well, and has faith in his ability to find other ore bodies, entirely free of expense to the company.

"As will be seen from the smelting department report, the most serious obstacle to the expansion of this branch of the company's business has again been the loss caused by the fall in prices of metals, an adverse factor which it was hoped would have been eliminated through the change in the system of buying ores, but it is apparent that some further extension of the time for final settlement of purchases is necessary, and steps to that end will be taken as soon as possible. Notwithstanding the difficulties which have had to be met, the business still shows a profit, and the board agrees with the smelter and business managers in thinking that there is every reason to expect reasonable profits in the future, more especially owing to the cheapening of flux and to the reduction of working expenses through the installation of the electric plant, and as soon as a refinery is erected in the immediate vicinity, there will be a considerable saving in the freight which now has to be paid for sending bullion to a distant refinery in the States."

**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.

*Annual Report of the Register of the Treasury of the United States.* Judson W. Lyons, Register. Washington; Government Printing Office. Pages, 32.

*Bulletins of the United States Fish Commission, Nos. 500-508.* George M. Bowers, Commissioner. Washington; Government Printing Office.

*Mexico. Censo y Division Territorial del Estado de Queretaro; y del Estado de Tlaxcala.* Compiled by the Statistical office. Mexico; Printing Office of the Secretaria de Fomento.

*Guide de l'Immigrant au Perou.* Prepared by Dr. Eugenio Larrabure y Unanue. Lima, Peru; published by the Ministry of Agriculture. Pages, 54; illustrated.

*Die Darstellung des Chroms und seiner Verbindungen mit Hilfe des Elektrischen Stromes.* By Dr. Max Le Blanc. Halle, Germany; Wilhelm Knapp. Pages, 108. Price (in New York), \$2.

*A Manual of Drawing.* By Prof. C. E. Coolidge. New York; John Wiley & Sons. London; Chapman & Hall, Limited. Pages, 92; with 10 plates. Price, \$1.

*The Design of Simple Roof Trusses in Wood and Steel.* By Prof. Malverd A. Howe. New York; John Wiley & Sons. London; Chapman & Hall, Limited. Pages, 140; illustrated. Price, \$2.

*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.

#### BOOKS REVIEWED.

*Lead Smelting. The Construction, Equipment and Operation of Lead Blast Furnaces.* By Dr. Malvern W. Iles. New York: John Wiley & Sons. London: Chapman & Hall, Limited. Pages, 236; illustrated. Price, \$2.50.

After a careful perusal of this little book, we laid it down with mixed feelings of thankfulness and regret; thankfulness for the extremely valuable information that Dr. Iles has given us, and regret that he did not draw and give us more fully from his great store of knowledge and experience; also regret that what he has given us was not better presented and more expanded. Dr. Iles has had a very long experience in silver-lead smelting in Colorado and has been very successful in his vocation. He was during the major part of his active career the superintendent of the Globe Smelting Works at Denver, and was most instrumental in developing that into the great plant it became. The record of his experience at that plant, frankly disclosed in his book (although he does not once mention the name of the plant it is known, of course, to what he refers), cannot fail to be of great value in spite of any shortcomings and any differences of opinion as to various technical matters. The men who are or have been engaged in the daily supervision of the operation of large industrial plants for periods so long as to give an extended continuity to their work seldom appear in print and when they do their contributions are rightly hailed as something fresh in technical literature.

Dr. Iles explains in his preface that his intention was to relate simply what has been, and is done in silver-lead smelting in the blast furnace and its accessories. This is to be understood as referring only to his own experience, there being little or no reference to the practice of other metallurgists. Merely to cite an example, there is no reference to the subject of mechanical feeding of silver-lead blast furnaces, on which Mr. Arthur S. Dwight lately contributed an interesting and valuable paper to the *Transactions of the American Institute of Mining Engineers*. Dr. Iles' book can not, therefore, be considered a broad treatment of the art of lead smelting as it exists at present. It is rather an expression of his opinion of what is best, and he pronounces it positively and dogmatically. Coming from him it carries weight and will be of conceded value. His views impress us as being generally very sound, but upon some points there is room for honest differences of opinion, and certain of his assertions will, we think, provoke discussion. Thus with respect to the bag-house, the latter portion of his book is chiefly a brief in advocacy of its general adoption. He states on page 175 that "The successful installation of the bag-house, for collecting fume from furnaces smelting lead, gold and silver ores, marks the greatest step taken in metallurgy during the century." This is certainly very sweeping, and rather injudicious, because the dictum of one man can hardly be accepted as to what is the greatest metallurgical achievement of a century. Without detracting one whit from the high credit that is due Dr. Iles for

his share in the development of the bag system of fume filtration and its successful application to silver-lead smelting as exemplified at the Globe Works, it must be remarked that lead smelters themselves do not appear to be agreed yet as to its efficiency. The new plant of the American Smelting and Refining Company at Murray, Utah, which ought to typify the most approved practice in silver-lead smelting (whether it does so or not is another question), has been built without a bag-house, although its metallurgists are undoubtedly fully conversant with the results at the Globe Works, which are now owned by said company. We refer to this with no intention of disputing the opinion of Dr. Iles, who may be entirely right, but merely to show that on this point a different opinion evidently exists.

Irrespective of any question there may be as to the bag-house and other matters, however, Dr. Iles has had in all his practice a very clear perception of the fact that the only purpose of an industrial plant is to make money and of the importance of contributing to that end by reducing the losses in treatment. The latter is the theme of a large part of his book, and if in recounting his own extensive experiments and the results of their practical application he induces others to concentrate their efforts toward the same end, his work will be of inestimable benefit. Dr. Iles' experiments and technical investigations covered a wide range; among others the design of blast furnaces, the settling of dust in flues, the velocity of gases in flues and chimneys, the temperature of gases escaping from furnaces and the quantity of fume carried by them, and mechanical draft. On these subjects and many others of equal interest he presents us with his conclusions, but we should like to have had all the data from which he deduced them, not that we might arrive perhaps at different conclusions, but because it is precisely that kind of work of which there is a grave deficiency in technical literature, wherein every scrap of such information may serve a useful purpose. We need all the available experimental data to deduce new generalizations for rules of practice in many branches of work which to-day are destitute of rules. Many of the valuable records which Dr. Iles has communicated come to us with diminished value because he has not given all the needful data. Often where he has confined himself to broad generalizations we feel that we want some accounts of specific cases.

Dr. Iles' presentation of his subject is not entirely fortunate, but he partially disarms criticism as to this in his preface, wherein he states that without attempt at perfection in style he goes directly to the pith of the subject. He makes the mistake, we think, of being too concise. Fuller explanations of his statements and opinions would have been generally advisable. Sometimes he is rather obscure; sometimes we fear he has said things he did not intend. His treatment of certain subjects is very scanty, Roasting Furnaces, for instance. He hints that the importance of that subject may warrant more elaborate treatment in a separate volume. We suggest that it be done in the same volume when a new edition becomes necessary, which we feel sure will be soon, since we have no doubt the book will meet with the keen appreciation of its high value that we have had for it.

#### 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.

#### Retaining Ink on Glass.

Sir: Would you, or some of your readers, kindly give me some light on the following, if possible? I want to make a glass model of an iron mine, using glass plates as cross-section sheets; but the difficulty lies in inking the plates. Do you know of any solution or substance, with which glass may be coated

so that it will take ink readily and not cause it to run?

Duluth, Minn., October 30, 1902.

#### Working a Hydraulic Elevator from a Pump.

Sir: In your issue of October 11, replying to question by S. A. T., you invite information regarding the successful operation of a hydraulic elevator worked direct from a pump. Upon the Calhoun Mine, the site of the original discovery of gold in the South, and near Dahlonega, Ga., a hydraulic elevator, or lift, has been in successful operation for 3½ years. The power is generated by water, and operates a 14 by 18 Blake duplex pump which forces a stream through a pipe reducing from 12 to 7 inches, where it is divided to accommodate a giant which is used in hydraulicking, while the other portion of the stream passes through one nozzle 1½ inch and one 1¼ inch, leading through a 4-inch throat. It lifts to a height of 18½ feet. Upon the same property, an elevator operating under a head of 40 feet, with 60 inches of water lifts 8 feet through a 2½-inch throat.

Adjoining the Calhoun, upon the Turkey Hill Mine, Mr. Packard is operating an elevator direct from the pump, with steam power, and raising 8 feet. He consumes 3 cords of wood per day, and is successful. Mr. Wharton Anderson, is manager of the Calhoun.

HENRY V. MAXWELL.

Dahlonega, Ga., Oct. 18, 1902.

#### Coal Mining Accidents in Kentucky.

Sir: I note the criticism directed at this office (coupled with another) by Mr. F. L. Hoffman, statistician for the Prudential Insurance Company, in his review of fatal accidents in coal mines, which appeared in the last issue of the *ENGINEERING AND MINING JOURNAL*. While I acknowledge regret that this office has incurred Mr. Hoffman's displeasure, and admit that his threat of "severe criticism" (for those who fail to report to him, I presume) is an awful thing to have impending over one, I fear that I am not as guilty as I ought to be to deserve such distinction. We Kentuckians are notably modest, and are averse to receiving unmerited attentions; we desire to have the satisfaction of feeling (a selfish desire, of course) that we have fully merited all that comes our way—whether it be good or bad.

I came into this office January 20 last. For reasons that need not be stated here, compilation of statistics for 1901 was attended with difficulties and delays unusual in my former experience in the office. I find by memorandum on a letter, dated July 17, received from Mr. Hoffman, that on August 18 I sent him the statistics he had requested. On August 20, the statistics relating to Kentucky coal mines (including fatalities and causes) appeared in the *Louisville Courier-Journal*, a newspaper of some note even in the East. About the same time, statistics relating to fatal accidents were sent to Mr. E. W. Parker, Statistician of the United States Geological Survey. I believe they have been incorporated in Mr. Parker's report for 1901. And so, I do not feel "just right" about this matter; I feel that I am in the stupid situation of having been shot at without having given cause. So far as concerns Mr. Hoffman, I shall endeavor to avoid such embarrassment in the future.

It may be well for me to here give a brief summary concerning fatal accidents at our coal mines in 1901, as follows: Average number of persons engaged at the mines, 9,783. Of these, 9,325 were employed inside. Total deaths from accidents in and about the mines, 21. Of these, 19 occurred inside. Total short tons of coal produced, 5,324,712.

Coal raised per fatality in and out.....	253,558 tons
Coal raised per fatality inside.....	280,248 tons
Persons employed per death in and out.....	466
Persons employed inside per death inside.....	491

I suggest that in these days of increasing development of machine mining, deaths should be stated according to tonnage raised, and not according to number of persons employed.

C. J. NORWOOD,  
Chief Inspector of Mines.

Lexington, Ky., October 30, 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.

**Manganese Ore.**—I have a lease on a deposit of manganese ore that runs about 60 per cent manganese; 10 per cent silica; 1 per cent iron; phosphorus, 0.25 per cent. Would this ore pay to be worked, other conditions being good?—R. E. P.

**Answer.**—The ore you describe is a high-grade manganese ore, and would certainly pay to work, provided you have enough of it. Location and cost of transportation are, of course, important elements.

**Fullers' Earth.**—Will you please inform me through the columns of your paper if there is a great demand for fuller's earth? Who are the chief buyers? What is the value per ton? What is the composition of the very best.—H. C. L.

**Answer.**—The production of fuller's earth in the United States last year was 14,112 short tons. Imports were 10,769 tons. This will show the extent of the demand. The chief buyers are the oil refiners and the makers of lard, cottolene and similar products. A recent analysis of fullers' earth from Bakersfield, Cal., which is of very good quality, showed: Silica, 54.32 per cent; alumina, 18.88; iron oxide, 6.50; lime, 1.00; magnesia, 3.22; ignition loss, 11.86; alkali (by difference), 4.21 per cent. Current quotations in New York are \$15 per ton for lump and \$16 for powdered.

**Molybdenum.**—I have an extensive deposit of molybdenum, averaging 13 per cent in value from hand samples. I desire information on the method of extracting, refining, handling and marketing same; also the uses therefor. It is  $\frac{1}{4}$  mile from a plentiful water power and fuel.—H. S. P.

**Answer.**—This question has been so often answered in our columns that only a brief reply can be made here. The demand for molybdenum is very small. The ore is usually sold to the few reduction works which make a business of handling it. They buy ores on assay entirely. The demand is so small that it would not pay to put up works to treat the ore, even if your deposit is large. It would be impossible in our space to give a full account of the methods of reduction.

**Placer Mining.**—Do deposits of gold-bearing iron-sand present any difficulties in the way of recovering the gold?

2. Is there any way of extracting gold and diamonds at the same time from the alluvial deposits or river beds containing both of these minerals and if not, can they be extracted separately?

3. Can you refer me to any book or pamphlet on the practical way of extracting gold from placer deposits, including river beds?

**Answer.**—1. The iron sands or black sands present difficulties with which placer miners in many parts of the United States, New Zealand and elsewhere have struggled, generally with indifferent success. Many ways have been devised and patented to treat these black sands and to recover the gold, but none of them have been entirely successful. The government of New Zealand recently offered a large money reward for a successful plan of treating the black sands of that country.

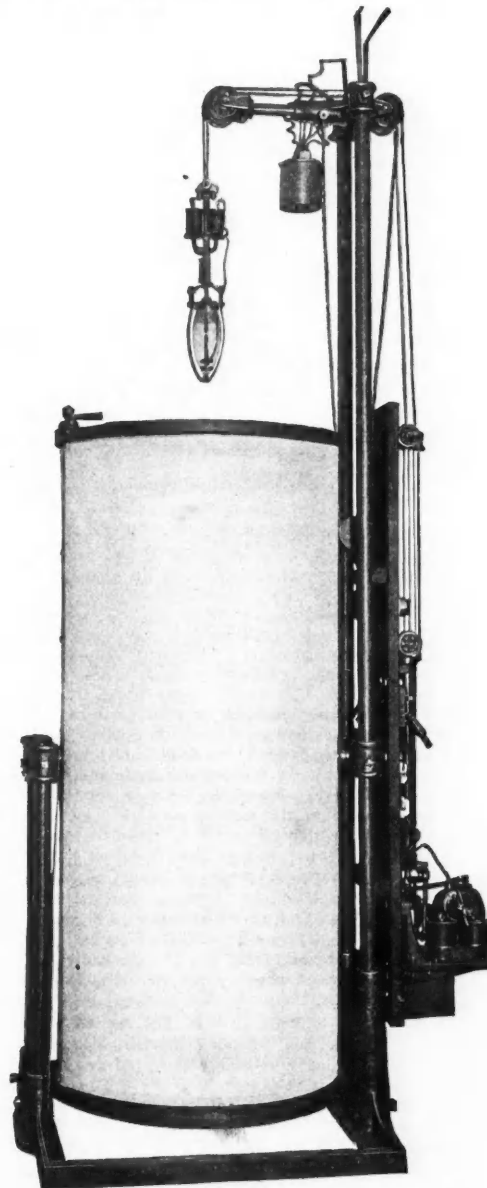
2. We do not know of any case in which gold and diamonds are extracted from alluvial deposits at the same time. This is, we presume, chiefly because there are no deposits worked in which both are found. If they did exist together, however, a placer mining expert would doubtless be able to devise some method by which both would be recovered.

3. There are a number of books on placer mining, among which we might mention Bowie's *Hydraulic Mining*, Evans *Practical Notes on Hydraulic Mining*,

Kirkpatrick's *Hydraulic Gold Mining*, Wilson's *Hydraulic and Placer Mining*, and Lake's *Placer Mining*. These works can all be furnished by our Book Department.

## BLUE PRINTING BY ELECTRIC LIGHT.

The Eugene Dietzgen Company, of Chicago, manufactures an automatic blue printing machine which will be of interest to engineers, not only from its application to the needs of the drafting room, but the peculiar working features of the device. The apparatus consists of a cylindrical printing frame, composed of two heavy curved plates of glass, bedded in soft material in an adjustable, though rigid frame, together with two



THE EUGENE DIETZGEN AUTOMATIC BLUE PRINTING MACHINE.

tubular uprights which support the arc lamp and automatic driving mechanism. This drive operates the lamp, having means for lowering it through the cylinder and then automatically raising it to its former position. The cylindrical frame revolves on trunnions, so that it can be swung to a horizontal position for inserting or removing tracings and paper from the frame.

In operating, the cylinder is revolved to a horizontal position, and the tracings and sensitized paper are placed around the outside of the cylinder, being confined by stout canvas covers, which are drawn tight by turning a lever, giving complete contact between tracings, sensitized paper and the glass. The cylinder is then swung to the opposite horizontal position and the manipulation repeated, after which it is returned and locked in vertical position and is ready for printing.

By touching a lever the arc lamp is started in its descent through the center of the cylinder at a speed which can be regulated to suit the sensitiveness of paper employed. When the lamp has reached the lowest point of printing surface, it automatically reverses its motion. The downward movement of the lamp can be regulated to take from 5 seconds to 1 hour. When the lamp has passed the printing surface, thereby completing the exposure, the motion of the lamp reverses automatically and returns it quickly to the original position—no time being lost and no hand labor required. The limit of the motion of the lamp can be regulated according to the size of the prints.

It is claimed that the cost of making blue prints by electric light is less, where the full capacity of the machine is utilized, than by the use of sunlight, and with an average allowance made for wasted material under the ordinary method due to over-printing, etc., with attendant loss of time.

**DEMAND FOR PUMPS IN JOHANNESBURG.**—United States Consular Agent William D. Gordon writes from Johannesburg, September 17: "A considerable market exists here for a high-lift centrifugal pump, having a capacity of from 6,000 to 15,000 gallons per hour. The most common height required would be from 500 to 600 feet. They are usually provided with extension bed-plates for direct driving by electric motors. Such machines are now being built in Sweden and Switzerland, and if any manufacturer in the United States makes a competitive machine, I can secure a good connection here for him."

## PATENTS RELATING TO MINING AND METALLURGY.

## UNITED STATES.

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

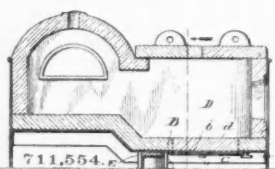
Week Ending October 21, 1902.

- 711,467. SHIELD AND FUNNEL FOR RECHARGING CRUCIBLES.—George B. Brown, Reading, Pa., assignor to Carpenter Steel Company, New York, N. Y. In combination with a smelter's crucible having an upwardly-tapering upper portion, an exterior protector consisting of a hollow drop-shield fitting a prescribed part of the upwardly-tapering upper portion of the body of said crucible and having an outwardly-flaring lower end.
- 711,468. METHOD OF RECHARGING SMELTERS' CRUCIBLES.—George B. Brown, Reading, Pa., assignor to Carpenter Steel Company, New York, N. Y. A method of recharging smelters' crucibles, consisting essentially in applying a protecting-shield to the hot crucible immediately after its molten contents have been poured out and then recharging the shielded crucible preparatory to the removal of the shield and the introduction of the newly-charged crucible into the smelting-furnace.
- 711,484. PYROMETER.—Edward H. Earnshaw Philadelphia, Pa., assignor to the United Gas Improvement Company, Philadelphia, Pa. The combination with a frame, of an object-piece, an eyepiece, both aligned with each other, a series of independent carriers revolvably mounted in the frame and eccentrically with reference to the object-piece and eyepiece, so that they may be brought into line with the object and eye piece, and each of said carriers furnished with a substance capable of obscuring light.
- 711,489. HOISTING-BUCKET.—Charles M. Gearing, Brownwood, Tex. A hoisting-bucket of the clam-shell type, consisting of two pivoted sections whose meeting edges abut against each other when the sections are closed, and sharpened teeth along the transverse meeting edges of the scoops, the teeth being set back from said edges and being adapted to interlace across the closed edges of the scoops when the same are closed.
- 711,500. COKE-OVEN.—John M. Hunker, West Superior, Wis., assignor of one-half to Edmond T. Safford, Superior, Wis. A coke-oven in the walls of which is arranged a series of blocks, said blocks formed with centrally-arranged longitudinal and transverse openings, said transverse openings communicating with each other, thereby forming a continuous passage, and the longitudinal openings forming a series of direct communication between the exterior and the interior of the coke-oven.
- 711,525. APPARATUS FOR LIQUEFYING AIR.—James F. Place, Glenridge, N. J., assignor of one-half to Samuel M. Gardenhire, Brooklyn, N. Y. In a machine or apparatus for liquefying air the combination of a recip-

rotating expansion-engine, provided with a cut-off valve or valves and means for operating the same; double insulating-chambers substantially inclosing said engine, one of said chambers being an exhaust-chamber connected with the cylinder of said engine, and the other being a vacuum-chamber; and a counter-current thermal interchanger located outside of said insulating-chambers, said interchanger being arranged as an insulating coil, surrounding or inclosing said double insulating-chambers within its folds or coils.

711,545. ART OF BLASTING.—George Thomson, Elizabeth, N. J. An improved mode of blasting, which consists in introducing an electric furnace within a blast-hole, passing a suitable current through said furnace to generate a great quantity of heat, and continuing this heat until the surrounding rock is heated to a high temperature, whereby its expansion exerts a disruptive effect against the outer mass of rock.

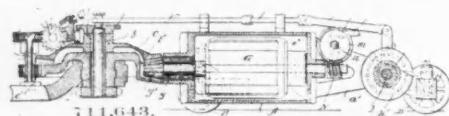
711,554. ASSAYER'S FURNACE.—Albert C. Calkins, Los Angeles, Cal., assignor to F. W. Braun & Company, Los Angeles, Cal. An assayer's furnace comprising the sheet-metal floor with openings therethrough; sheet-metal walls or jacket extending below the floor; a door hinged to the under side of the floor to close the opening; fire-brick inside the sheet-metal jacket formed by the walls and the floor; a removable fire-clay mixture which rests upon the trap-door; means by which the trap-door is held up in place; and a strengthening-bar which is equal in length



to the width between the downward extensions of the side walls of the furnace below the floor thereof and provided at each end with a downwardly-extending leg provided with holes therethrough; said bar also being provided at its mid-length with a downwardly-projecting boss or leg, the bottom of which is in the same plane with the bottoms of the side legs; the depth from the top of the bar to the bottom of the legs being equal to the space between the under side of the floor and the bottom of the downward extension of the side walls of the furnace-jacket; and rivets inserted through the downward extension of the side walls of the furnace, and also inserted through the side legs respectively and riveted to hold the downward extension of the side walls against the leg, said bar being located near the mid-length of the floor.

711,555. BUCKET CONVEYOR.—Robert W. Christian, Bannack, Mont. The combination with bucket-chain links having aligned eyes of equal thickness and spaced apart distances substantially equal to their thicknesses, of bushings of substantially equal length arranged in the eyes, and a pivot-pin passing through the bushings.

711,643. MINING-MACHINE. Ralph E. Noble, Chicago, Ill. A frame carrying a toothed circular extension, a cutter-chain frame pivoted to said extension, a shaft carrying a gear engaging said toothed extension mounted in said cutter-chain frame, a shaft mounted in the said ex-



tension and having a gear-wheel keyed thereto, with means for driving the gear-wheel, means for intermittently actuating said first-named shaft operated by said last-named gear-wheel, and means operated by the shaft in the extension for moving the entire machine.

711,650. ORE-GRADING APPARATUS.—Frederick W. Wood, San Francisco, Cal., assignor to Crown Gold Milling Company, San Francisco, Cal. A grader comprising a frame, a box or casing, having plane bearing-surfaces at the corners, balls at the corners upon which said bearing-surfaces rest, plane or flat bearing-surfaces carried by the frame upon which said balls rest, and means adjustably connected with said box for imparting a gyrating movement thereto, said movement being varied by the adjustment of said connections.

711,689. COMPRESSOR.—Frederick Wittenmeier, Chicago, Ill., assignor to Kroeschell Brothers Ice Machine Company, Chicago, Ill. In a compressor, means for unloading the compressor-piston when the pressure-supply pumped by said piston is excessive, comprising a supplemental opening in the cylinder end, a valve at said opening and means for opening said valve comprising a chamber, a passage extending from the compression side of the compressor to said chamber, a movable diaphragm in said chamber operatively connected with said supplemental-opening valve, a weighted passage opening and closing a valve, and lever mechanism connected with said diaphragm and supplemental-opening valve.

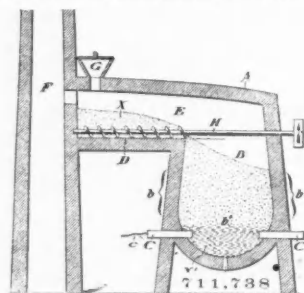
711,702. STEAM PUMPING-ENGINE.—John A. Groshon, New York, N. Y., assignor to one-half to Marshall T. Davidson, Brooklyn, N. Y. The combination in a steam pumping apparatus, of a plurality of steam-engines side by side, a corresponding number of single-acting pumps each

opposite one of the engines, one engine cross-head between each steam-engine and pump, a crank-shaft and bearings therefor between the pump chambers and cross-heads, the pump-chambers being situated in close proximity to the said crank-shaft and bearings.

711,703. AIR-COMPRESSOR.—Frank W. Gruschow, Kokomo, Ind., assignor to Charles T. Byrne, Chicago, Ill. A pump comprising a pair of main cylinders arranged end to end, a piston-rod connecting the two pistons, water pipes connected to the inner ends of the cylinders, and inlet and outlet valved air passages connected to the outer ends of the respective cylinders, a valve controlling said water pipes, a pair of auxiliary cylinders supported adjacent to the main cylinders and arranged end to end, connected pistons in these auxiliary cylinders and a valve controlling the admission of water to these pipes, a forked arm connected to each of said valves, a device on the main piston-rod operating a forked arm attached to the valve controlling the auxiliary cylinders, and a device on the auxiliary piston-rod adapted to operate the forked arm attached to the valve controlling the water-pipe of the main cylinders.

711,728. CAR-DUMPING APPARATUS.—Timothy Long, Cleveland, Ohio, assignor to the Browning Engineering Company, Cleveland, Ohio. The combination of a cradle, means for holding a car thereon, bars passing transversely under the cradle and pivoted thereto at their front ends, sheaves carried by the rear ends of said bars, cables passing under said sheaves for lifting the rear side of the cradle, means for lifting the front side thereof, and mechanism which stops the upward movement of said front side and serves as a pivot on which the cradle may turn as the rear side thereof is still further lifted.

711,738. PROCESS OF REDUCING METALS FROM THEIR ORES.—Marcus Ruthenburg, Philadelphia, Pa. A process of reducing iron ores to the metallic state, which is continuous and which consists in coating each particle of a mass of comminuted ore with reducing material sufficient to reduce that particle; fixing said coating separately



upon the respective particles, by detailing them for a definite time in a region heated to a determined degree less than reducing temperature; retaining said preheated material in granular form and progressing it at a determined rate into a region heated to reducing temperature; reducing the ore to the metallic state, without fusing it; progressing the reduced metal in granular form, at reducing temperature, into a region of fusing temperature; and fusing the reduced metal.

711,762. GRINDING-WHEEL.—James W. Forster, Chicago, Ill. A grinding-wheel formed of a base of fibrous pulp arranged and adapted to hold particles of grinding material without glue or other adhesive, and a finely-divided grinding material formed of emery and whiting mixed therewith and held thereby.

711,804. PUMP FOR DEEP WELLS.—Arthur J. Webster, Michael W. Hall and William E. Stadler, Bakersfield, Cal. A pump including a tubular plunger-rod and a plunger-head comprising a yoke secured to the end of said rod, a stem depending therefrom, a valve carried by said stem, a cylinder also depending from said rod, and a movable valve-seat guided therein.

711,806. HOISTING APPARATUS.—Albert E. White, Cleveland, Ohio. In hoisting apparatus, a substantially counterbalanced crane of triangular shape pivoted on its middle angle, and a rigid carrying-beam and bucket suspended from one side of its pivot, and balancing mechanism on the other side of its pivot comprising an engine for operating the crane.

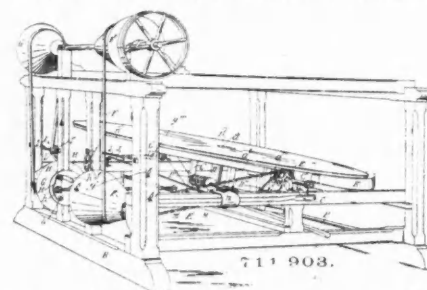
711,811. RETORT FOR SUBLIMING SULPHUR.—Alfredo Alonzo-Consoli, Catania, Italy. In a retort for refining and subliming sulphur, the combination with a melting vessel, of a sublimation-retort upon the same horizontal plane therewith, and a communicating tube, the extremity of which within the melting vessel is below the level of the liquid therein.

711,858. MEANS FOR PUMPING WATER UNDER HYDRAULIC POWER.—Joseph D. Hobbs, Mediapolis, Iowa. In combination, a pumping-cylinder, a pumping-piston therein having its piston-rod extending through the head of the cylinder, pressure-pistons on the ends of said piston rod, pressure-chambers in which said pressure-pistons operate, a valve controlling the inlet-ports to the pressure-chambers, said valve being of elongated form, a head fixed within the valve, means for holding the valve in the position into which it is set, said means being adapted to be controlled at the final movement of the said pressure-piston.

711,876. BOILER-CLEANING COMPOSITION.—Charles

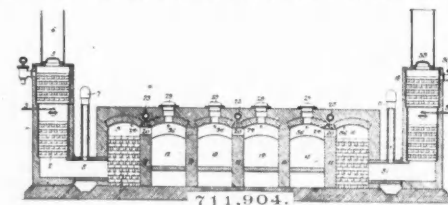
Nettleton, Des Moines, Iowa. A composition of matter containing Glauber salt, soda-ash, sulphate of lime and slippery-elm.

711,903. ORE-CONCENTRATOR.—Luther Look, Los Angeles, Cal. A concentrator comprising an inclined rotating table constructed to discharge at its margin and provided with a central discharge-opening and furnished around such opening with a slight elevation over which the ma-



terial may discharge from the surface of the table; means for rotating the table; means for feeding material onto the top of the table at the upper side of the table and on that side of the table which moves upward; and adjustable means for shaking the table in a horizontal plane.

711,904. APPARATUS FOR THE MANUFACTURE OF COKE AND THE RECOVERY OF GASES THEREFROM.—Thaddeus S. C. Lowe, Pasadena, Cal. The com-



binator of two or more coke-ovens with passages connecting them in series above the coke-line, and means for passing air through the ovens and the passages.

711,910. METHOD OF MAKING SODIUM CYANIDE.—Fritz Roessler, Frankfort-on-the-Main, Germany, assignor to the Roessler & Hasslacher Chemical Company, New York, N. Y. A method of obtaining sodium cyanide which consists in treating a mixture of sodium cyanide and sodium carbonate with sufficient water to bring all the salts into solution, forming a lye, evaporating the lye in a vacuum to a degree of concentration at which only sodium carbonate is precipitated, and separating the precipitated sodium carbonate from the solution.

711,927. ROLLING-MILL.—Rudolf Mengelbier, Andernach, Germany. In a rolling-mill, a continuous series of pairs of forming-rolls, the two members of each pair out of peripheral contact, the opposing faces of the groove on each member of a pair varying from a non-circular groove with elongated extremities in the case of the initial pair of rolls to a true circle in the case of the final pair of rolls, and a mandrel adapted to pass through the series of rolls.

#### 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 9, 1902.

14,363 of 1901. REVERBERATORY FURNACE.—W. W. Fyfe, London. Improved arrangement of hearth and flues of reverberatory furnaces to utilize to the full the heat of the gas.

20,410 of 1901. LEACHING TANK.—E. Boyer, Paris, France. A leaching tank made on the same principle as diffusers used in sugar manufacture.

23,260 of 1901. FUEL BRIQUETTE.—H. Schild, Rendsburg, Germany. Improved method of making fuel blocks with coal dust and the lye obtained from sulphite cellulose manufacture.

7,542 of 1902. SAFETY LAMP CLEANER.—T. H. Morgan, Abertillery. Improved machine for cleaning miner's safety lamps.

12,122 of 1902. BLAST FURNACE TOP.—P. Meehan, Lowellville, Ohio, U. S. A. Construction of blast furnace tops, to allow a free expansion of the masonry without disturbing the top.

14,387 of 1902. ELECTROLYSIS OF CHLORIDES.—P. L. E. Lederlin, Chedde, France. Electrolytic production of chlorates by electrolyzing chlorides kept non alkaline by continual additions of hydrochloric acid.

14,970 of 1902. TREATING IRON ORES.—R. Renard and A. Becker, Lipetsk, Russia. Treating poor iron ores in a roasting furnace and then cooling so as to render them magnetic and then concentrating.

16,993 of 1902. COPPER COATING STEEL.—S. Vanstone, Providence, R. I., U. S. A. Making steel ingots coated with copper by casting the steel in an inner mould and the copper between the inner and outer moulds and then withdrawing the inner mould.



## PERSONAL.

Mr. August Mattez, of Denver, has been on a visit to New York.

Mr. A. C. Beatty is at Butte, Mont., engaged in an important inspection.

Mr. J. E. Bamberger, after a month's absence in the East, has returned to Salt Lake City, Utah.

Mr. John B. Farish, of Denver, is in California. He is expected in New York about November 17.

Mr. J. A. Czizek, a prominent mining man has returned to Salt Lake City, Utah, from a trip to Idaho.

Mr. John Driscoll has been appointed superintendent of the Silver Shield Mining Company, of Utah.

Mr. Hartwig A. Cohen, interested in Utah mines, recently arrived at Salt Lake City from San Francisco.

Mr. T. J. Warren, operating mines in Mullan, Idaho, recently returned to Butte, Mont., from a tour of inspection.

Mr. Eben E. Olcott, president of the American Institute of Mining Engineers, is about to take a holiday in Europe.

Mr. J. P. Turner has resigned as superintendent of the Ima Mining Company in Idaho, and is now in Salt Lake City.

Mr. Henry F. Lefevre is now in New York, after having made a lengthy trip through the Rio Balsas country in Mexico.

Dr. R. W. Raymond leaves on November 15 for Italy, in order to obtain two months' rest from his unremitting labors.

Mr. A. F. Holden, manager of the United States Mining Company, of Salt Lake City, Utah, has gone to Boston on business.

Mr. W. F. Mitchell, manager of the Shasta Gold and Copper Company, in Shasta County, Cal., is in Salt Lake City, Utah.

Mr. L. S. Rowe, president of the Veneta Gold Mining and Smelting Company, recently visited the property at Bossburg, Wash.

Col. Henry Altman, of Salt Lake City, Utah, has gone to Denver, Colo., and New York, in the interest of a new mining enterprise.

Mr. Forbes Rickard, of Denver, has gone to Shoshone County, Idaho, on a mine examination. He expects to be absent a month.

Mr. R. L. Edwards, of Ulysses, Idaho, general manager of the Kittie Burton Gold Mines Company, was a recent visitor to Butte, Mont.

Dr. S. A. Goldschmidt, president of the Columbia Chemical Company, Brooklyn, N. Y., has returned from a few months' trip in Europe.

Mr. W. R. Kirk, of Chicago, who is interested in the Majestic and Imperial mining companies of Utah, was a recent visitor in Salt Lake City.

Mr. George R. Hancock, superintendent of the White Knob Copper Company's mines at Mackay, Idaho, has been in Salt Lake City, Utah.

Capt. Joshua D. Hosking, superintendent of the Franklin Mine, in the Lake Superior copper district, has returned from a month's visit in Boston.

Mr. James Skeaff, general manager of the Mohawk Mining Company, of Prescott, Ariz., recently inspected mining property near Angels Camp, Cal.

Mr. W. H. Coolidge, who is interested in the United States Mining Company, has left Salt Lake City, Utah, for Boston, to attend to official business.

Dr. W. A. Rickard, of Muncie, Ind., president of the Practical Gold Mining and Leasing Company, is visiting the property in the Cripple Creek District, Colo.

Dr. F. L. Ransome has made a comprehensive report on the geology and ore deposits of the Globe copper district, Ariz., for the United States Geological Survey.

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

Mr. Charles Butters, the eminent metallurgical engineer, was recently in Salt Lake City, Utah, en route to Nevada, to inspect his large cyanide mill at Virginia City.

Mr. Edwin M. Clark, for many years connected with the Butte, Mont., smelters, is now in Sonora, Mex., on the properties of the Bufa Mining, Milling and Smelting Company.

Mr. William H. Smith, consulting engineer, is now in Kansas City en route to New York, in the interests of the Mount Bross Consolidated Gold mining Company, of Alma, Colo.

Messrs. Davis and Evans, two Welsh colliery engineers, connected with the Prollbach Colliery Company, of Swansea, New South Wales, are in the West examining machinery.

Mr. J. W. Young has resigned as secretary of the Allis-Chalmers Company, to become general foreign

manager of the company, with headquarters in London. Mr. Young will leave for England in about a month.

Mr. W. D. Williamson, of the Big Reef Reduction Works at Castleton, Queensland, is leaving Australia, for a visit to Great Britain. His address for the present is care of W. D. Moir, Lily Bank, Gourrock Road, Glasgow, Scotland.

Mr. W. Randolph Van Liew, in charge of the blast furnace plant of the new Washoe Smelter at Anaconda, Mont., has resigned to accept the superintendency of the smelter of the Old Dominion Copper Company, at Globe, Arizona.

Mr. Howard A. Wright, metallurgist of the Washoe Works at Anaconda, has resigned his position, and leaves at once for Douglas, Ariz., to become assistant manager of the new smelter building at the latter place for the Calumet & Arizona Copper Company.

Mr. A. Van der Nailen, Jr., who has for some years past been at the head of the engineering and mining school in San Francisco, founded by his father, has been appointed a member of the Board of Public Works of San Francisco to fill the vacancy caused by the death of Col. George H. Mendell.

Messrs. Kern Dodge and Charles Day, of the firm of Dodge & Day, engineers, have just returned from an extensive trip through the middle West, where they visited many of the principal machine shops and foundries, gathering data on shop efficiency and critically comparing factory methods.

Messrs. E. W. Nash, Daniel Guggenheim, Solomon R. Guggenheim, Simon Guggenheim, Edgar L. Newhouse, S. G. Ehrlich, Anton Eilers, H. P. Whitney, F. A. Nash, Jr., G. S. Field, E. O. Holter and S. W. Eccles, recently visited the large smelting plant at Murray, Utah, owned by the American Smelting and Refining Company.

Mr. J. W. Duntley, president of the Chicago Pneumatic Tool Company, sailed for Europe on November 4 on business. He expects to establish a new plant in England or Scotland, to supply pneumatic appliances to European users. This plant will be designed on the principles of the one being operated by the company at Detroit, Mich.

Mr. John D. McGillivray, mining engineer, who went to the Klondike region at the time of the first excitement in 1897, on the steamer *Excelsior*, has returned to San Francisco, and is on his way to London on business matters connected with the mines at Dawson. Mr. McGillivray was formerly editor of the *Mining and Scientific Press*, of San Francisco, and went to the Klondike as special correspondent for the *New York Herald*. Since that time he has been examining and reporting on mines in that region and working some in which he owns an interest. After a brief visit to London Mr. McGillivray intends returning to Dawson.

Mr. Edward F. Pittman has been appointed Under Secretary for Mines, New South Wales, in succession to Mr. Duncan C. MacLachlan, who has been transferred to the Federal service. Mr. Pittman is a graduate of the Royal School of Mines, London. In 1887 he was appointed mining surveyor in New South Wales, and from 1878 to 1881 he had the appointment of geological surveyor to the New South Wales Government. From 1881 to 1882 he ranked as lecturer in geology at the School of Mines, Bendigo, and in 1882 to 1883 was geological surveyor, New South Wales. In the year last named he was appointed chief mining surveyor, New South Wales, which position he held till 1891, when he was appointed government geologist, as well as that of lecturer in mining at the Sydney University, to which position he was appointed in 1893. In 1896 Mr. Pittman was one of the members of the Royal Commission on the spontaneous heating of coal cargoes.

## OBITUARY.

William Stuart, superintendent of the Caledonia Mine at American Bar, near Josephine, El Dorado County, Cal., is dead. He had been mining on the river over 30 years, and was considered one of the best river miners in California.

## SOCIETIES AND TECHNICAL SCHOOLS.

**SOUTHWEST MINERS' ASSOCIATION.**—This branch of the California Miners' Association is accumulating gradually a valuable collection of minerals. At the rooms of the association in Los Angeles the exhibits have now reached the number of 3,000 specimens, and this is constantly increasing.

## INDUSTRIAL NOTES.

The Engineering Company, of America, has removed its New York office from 141 Broadway to 74 Broadway.

The Norwalk Foundry and Machine Company's shops at Norwalk, O., have resumed work under the receiver, F. L. Stein.

The Carnegie Steel Company will rebuild stack No.

4 at its Duquesne plant, Duquesne, Pa., on a larger and more modern scale.

The Dayton Coal and Iron Company, Limited, has removed its offices to the northwest corner of Third and Walnut streets, Cincinnati, O.

The Apollo Cement Manufacturing Company, of Pittsburg, Pa., has been incorporated with \$500,000 capital to erect a cement manufacturing plant near Apollo, Pa. Armin Schotte is president and K. J. Hendricks secretary and treasurer.

The Three Rivers Foundry and Machine Company, of Three Rivers, Mich., has organized, with the following officers: W. W. French, president; L. B. Place, vice-president and general manager; George T. Wolf, treasurer, and H. H. King, secretary.

The Temple Iron Company, of New York, George T. Baer, president, which operates a small blast furnace north of Reading, Pa., will increase its funded debt, \$500,000 on December 19, for the purpose of purchasing additional coal property in the anthracite region.

The Morgan Iron Works, of Spartansburg, S. C., and now operated by a receiver, which consists of a foundry, pattern shop and large machine shop, occupying a site 320 by 300 ft., will be sold by order of the court on December 1. The upset price for the property is \$27,000.

The Burt Manufacturing Company, of Akron, O., has equipped a number of mills of the American Sheet Steel Company with Cross oil filters and Burt exhaust heads. The large new plant of the Allis-Chalmers Company, at West Allis, Wis., has also recently been equipped with the Cross oil filters.

The Mt. Union Silica Brick Company, of Mt. Union, Pa., has received a contract to furnish all the silica brick to the Dominion Iron and Steel Company, Sydney, N. S., during the coming year. A contract has also been closed with the Colorado Fuel and Iron Company, for 500,000 silica brick to be delivered within the next few months.

The American Car and Foundry Company shows net earnings of \$1,804,122 for the quarter ending August 31. Deducting \$675,000 for dividends paid on November 1, there are surplus earnings for the quarter of \$1,129,122, which added to the balance of \$6,514,047, makes a total surplus on August 31 of \$7,643,169.

The Colorado Steel Casting Company, of Colorado City, Colo., has been incorporated with \$500,000 capital to manufacture railroad castings. The site has already been purchased, and the foundry and other buildings will cover about two acres. The incorporators are John I. Franklin, C. F. Springer, J. K. Vanatta, F. J. Hobbs and J. F. Sanger.

Recent orders booked by the engineering department of the Pittsburg Gage and Supply Company, of Pittsburg, Pa., include one 150-h.p. boiler for the Lincoln Fire Brick Company, Bolivar, Pa.; one 150-h.p. boiler for the American Porcelain Company, New Brighton, Pa.; one 150-h.p. boiler for the Keystone Mining Company, Leadville, Colo., and one 35-h.p. automatic engine for the Clearfield Steam Laundry Company, Clearfield, Pa.

After having been idle for 8 years, the blast furnace at Newbury, Mich., formerly operated by the Michigan Iron Company, will be put into blast as soon as repairs can be made. Berry Bros., varnish manufacturers of Detroit, are said to be largely interested in the new company. A contract has been let for the construction of 40 charcoal kilns, each of a capacity of 85 cords of wood, and plans for the erection of a chemical plant for the manufacture of wood alcohol are pending.

Recent sales of Renold patent chain by the Link-Belt Engineering Company include 9 line shaft drives from motors for the new works of the Patton Paint Company, Newark, N. J.; 8 drives from motors to line shafts and elevators in the new model plant which the Crompton & Knowles Loom Works are erecting in Philadelphia, and 8 60-h.p. drives for induced-draft blowers in the new Waterside Station of the New York Edison Company. There are now 61 Renold silent chains in use in the new building of R. H. Macy & Co., varying in capacity from 1 to 90 horsepower.

The Christensen Engineering Company, of Milwaukee, Wis., will hereafter manufacture the Christensen air compressors connected with air brakes exclusively. The manufacturer of air compressors for all other uses will be under the control of Mr. W. A. Christensen. The air compressors furnished by Mr. Christensen will be manufactured by the Christensen Engineering Company under his designs, specifications and inspection. There are now in use over 7,000 of these compressors. Mr. Christensen's engineering and sales offices are located in the Herman Building, corner of Wisconsin street and Broadway, Milwaukee, Wis.

The Salt Lake branch office of the Allis-Chalmers Company reports the principal sales for the month of September as follows: Three-plunger feeders for the Daly Judge Mining Company, Park City, Utah;

89-h.p. return tubular boiler for the Bear Gulch Mining Company, Montana; 1 car-load manganese wearing parts for Gates crushers for the Annie Laurie Mining Company; manganese roll shells for the Daly West Mining Company, Park City, Utah; 12 61ft. Frue Vanners for the Trent Engineering and Machinery Company; 6 improved Chilean mills, 1 lot of duplicate and repair parts for 1,000-h.p. compound engine, 2 No. 6 and No. 4 Gates crushers and 12 feeders for the Bamberger-De Lamar Gold Mines Company, De Lamar, Nev.; car-load roasting furnace parts for the Consolidated Mercur Gold Mines Company.

The new plant of the Jessop Steel Company, near Tylerdale, Pa., will be placed in operation early in November. The main building, which houses the melting department, is 225 ft. long and 110 ft. wide, and is of unique construction. The walls and roof are made of concrete. This department will contain three 36-pot crucible melting furnaces and 16 scrap shears. A large portion of the basement of this building will be used for storing ingots, which are to be finished in the rolling mill department. The rolling mill building is 270 by 110 ft., and is of steel throughout. The power house is 60 by 100 ft., and contains 4 Babcock & Wilcox boilers of 1,000 h.p. capacity. Two gas engines of 250 h.p. each operate the electric generators, while the rolling mills are operated by two separate engines.

The Pittsburg Filter Manufacturing Company, of Pittsburg, Pa., has had an unusually busy year. Besides having constructed the largest water softening plant in the world, of 2,500,000 gals., for the Tennessee Coal, Iron and Railway Company, Birmingham, Ala., it has installed the following additional plants: Colorado Fuel and Iron Company, Pueblo, Colo., 7,500 h.p.; Indianapolis Water Company, Indianapolis, Ind., 3,000 h.p.; Cleveland Furnace Company, Cleveland, O., 6,000 h.p.; Morey-La Rue Laundry Company, Elizabeth, N. J., 1,500 h.p.; Lafin & Rand Powder Company, Pompton Lakes, N. J., 1,000 h.p.; Hidalgo Mining Company, Parral, Mex., 500 h.p.; Delaware, Lackawanna & Western Railway Company, 300,000 gals. daily; Groveland and East Bethany, N. Y., 300,000 gals. daily; Keokuk Cereal Company, Keokuk, Ia., 600,000 gals. daily; Sharon Water Works Company, Sharon, Pa., 2,000,000 gals. daily; Waynesburg Water Company, Waynesburg, Pa., 1,000,000 gals. daily; Columbia Water Company, Columbia, Pa., 2,000,000 gals. daily; Upper Sandusky Water Company, Upper Sandusky, 1,000,000 gals. daily; United States Zinc Company, 600,000 gals. daily.

#### TRADE CATALOGUES.

"Imperial Air Compressors" is the title of a very neat catalogue issued by the Rand Drill Company, of New York. The use of compressed air in mining, quarrying, pumping, etc., is growing rapidly, while for manufacturing purposes its use is comparatively recent. The "Imperial" air compressor is made in two types. Type 10 is self-contained, self-oiling, and is built with four combinations of cylinders to meet different requirements. Type 11 compressor is built to be both belt-driven and gear-driven. The catalogue is well illustrated, and will interest all users of compressed air power.

#### GENERAL MINING NEWS.

**Pipe Line Returns.**—According to the Oil City Derrick the fields producing Pennsylvania oil shows 713 wells completed in October, with 176 of them dry, and a new output of 9,000 bbls. Compared with September there was a decrease of 17 wells completed, 18 dry holes and 776 bbls. production. At the close of October the new work was composed of 352 rigs and 617 wells drilling; a decrease of 17 rigs and 6 drilling wells from the figures of September 30.

In the Buckeye and Indiana fields the October statement shows 627 wells completed, 84 dry holes, and a daily production of 9,240 bbls. The September returns were 650 wells completed, 78 dry holes and 9,176 bbls. production. On October 31 there were 247 rigs, and 599 wells drilling, which compares with 247 rigs and 593 wells on September 30.

#### ALABAMA.

##### BLOUNT COUNTY.

(From Our Special Correspondent.)

**Lehigh Coal Company.**—This company, whose mines are on a branch railroad built by the Louisville & Nashville Railroad Company, is among the new companies now getting out coal regularly and shipping to market. Mr. Priestly Toulmin, manager of these mines, reports that the output will be increased right along.

##### JEFFERSON COUNTY.

(From Our Special Correspondent.)

**Alabama Steel and Wire Company.**—The coal mines at Virginia, managed by Messrs. Schuler for this company, will soon begin regular shipments.

**Ivy Coal and Coke Company.**—This company has a mine at Davis Creek, on the Southern Railway, which is being improved by the installation of mechanical haulage, and it is expected that the output will be increased to reach about 10,000 tons of coal per month.

#### WALKER COUNTY.

(From Our Special Correspondent.)

**Flat Top Mountain.**—The new coal mines, owned by the Sloss-Sheffield Steel and Iron Company at Flat Mountain, are having a good run now. The last of the several hundred convicts have been removed from Coalburg to the new place, and regular mining is on in earnest. The construction of 25 coke ovens at Flat Top is also being pushed, and, without any unlooked-for delays, they should be completed by January next.

#### ALASKA.

(From Our Special Correspondent.)

**Berners Bay.**—On the Kensington Mine, at Berners Bay, the tunnel is now in 1,000 ft., and has still to be run as far again.

**Coal.**—A. J. Collier has returned from an investigation of the coal deposits along the Yukon River. Two mines are being worked on the Canadian side, one at Five Finger Rapids and the other at Cliff Creek. On the American side one mine is opened 12 miles above Nulato and another 9 miles below that place. Yukon steamers are using the coal from these mines.

**Copper.**—A party of men, including Robert Hanley, of San Francisco, have returned from an examination of copper properties in Alaska. They landed at the head of Prince William Sound, and went 200 miles inland. They saw large bodies of copper ore, mostly, however, of low grade, and the claims opened were not sufficiently developed to give much idea of the extent of the ore bodies.

**Copper River Region.**—Webster Brown, who recently returned from the Copper River region of Alaska, thinks that Slate Creek will next year make a very large yield. Some gold has been taken this year from the Nizina. He thinks that Valdes will be one of the best sections of Alaska next season. Geo. Kishlingbury, of Los Angeles, has returned to that city after examining copper mines in the Copper River region. He says that there are many copper properties, but most of them are too low grade for working under present conditions. Even the largest and richest deposits are practically worthless without railroad facilities.

**Nome District.**—It is expected that about 3,000 people will winter at Nome this season, or about 500 less than last winter.

The Pioneer Mining Company and the Nome Exploration Company are building a pumping plant to take water to the summit of King Mountain, thence it will be delivered to mining claims. The Wild Goose Company's pumping plant has been delivering 250 miners' inches from Snake River to Anvil Mountain, whence it is delivered to the mines.

**Oil.**—Marcus Anderson, of San Francisco, has opened several oil wells on Cook Inlet. The oil-field extends some 30 miles inland from Cook Inlet. Thus far very little development has been done.

**Sheep Creek.**—At this place, near Juneau, a 30-stamp mill is kept running steadily.

**Silver Bow Basin.**—At this place on the Perseverance group, owned by W. J. Sutherland, of San Francisco, they have 16 miners at work on a cross-cut tunnel. The croppings show in places 1,200 ft. wide.

#### CALIFORNIA.

##### EL DORADO COUNTY.

(From Our Special Correspondent.)

**Golden Gate.**—At this mine the buildings are nearly completed. Mr. Richards, the superintendent, is pushing the work of development.

**Twin Brothers.**—A company has been organized at Folsom, Sacramento County, to work this mine, which is at Salmon Falls, El Dorado County, 9 miles from Folsom. The directors are P. C. Cohn, president; J. H. Batcher, vice-president; W. T. Phipps, secretary; J. E. Burke, J. Imhoff, G. R. Bauer and J. W. Orr. Mr. J. M. Crowder has charge of development, and has started work on the tunnel. A 15-stamp mill is to be erected. The office of the company is at Folsom.

**Zimmerman.**—At this mine, near Pacific House, 18 miles from Placerville, 20 men are working on a 3,000-ft. bedrock tunnel. A site for the compressor is being graded.

##### FRESNO COUNTY.

(From Our Special Correspondent.)

**Minarets.**—This group of mines is about 75 miles northeast of Fresno, near the Mono County line. A number of locations for iron, copper and silver have been made in that region, but no production has ever been made. It is proposed, however, to utilize the iron deposits. At present 11 men are doing development work under superintendent John Beck. Two tunnels are to be started to connect many of the claims of the group. The deposits are large.

#### HUMBOLDT COUNTY.

(From Our Special Correspondent.)

**Orleans Bar Gold Mining Company.**—At this property at Orleans, Mr. H. De C. Richards, manager, the men are moving the plant to a new bar owned by the company. They will soon be ready for the winter's run.

#### INYO COUNTY.

(From Our Special Correspondent.)

**Golden Argus Mining Company.**—At the mines of this company, 20 miles from Ballarat, John C. Cress, superintendent, the 5-stamp mill has been started up.

**Radcliff Consolidated Mining Company.**—At this mine, Ballarat, W. W. Godsmark, manager, they have 25 men at work, and are running the 20-stamp mill steadily.

#### KERN COUNTY.

(From Our Special Correspondent.)

**Keyesville.**—Shaft sinking continues on the Lady Bell and Big Blue at Keyesville, and work is being done on the Mammoth and Capital. About 300 men, mostly Japanese and Indians, are working on the canal for the Electric Power and Development Company.

#### MADERA COUNTY.

(From Our Special Correspondent.)

**Gambetta Mining Company.**—In this mine at Grub Gulch, Mr. John E. Porter, superintendent, the east drift on the 800 level is now in 440 ft. The ore holds about the same in value, and there is plenty in sight. The mine is now producing again.

#### NEVADA COUNTY.

(From Our Special Correspondent.)

**Litigation Ended by Compromise.**—On October 28, in San Francisco, the long-pending litigation between the Pennsylvania Consolidated Mining Company and the Grass Valley Exploration Company, of Grass Valley, was brought to an end. In two cases judgment had been given and there were three left, but all were dismissed by stipulation of the contending parties. The Pennsylvania Company is understood to have acquired the whole of the properties of the Grass Valley Exploration Company, and the group will be operated under one management. In February, 1900, the Pennsylvania Company sued its neighbor for \$600,000 damages for having taken ore from lodes and veins having their apices in Pennsylvania boundaries. Judge Morrow decided in favor of the Pennsylvania, and ordered the appointment of a referee to report on actual damage. No referee was appointed, however, as negotiations looking toward a compromise were commenced. The whole matter is thus settled and suits and cross-suits are dismissed as stated, the Grass Valley Exploration Company having sold whatever interests it had to its successful neighbor, the Pennsylvania Consolidated Company. The details of the compromise have not yet been made public.

**Sixteen-to-One.**—At this mine, near Washington, a large stamp mill is to be erected at once. The ledge is wide and ore of low grade, but the facilities for working are good. The ore will be taken out through tunnels, and they expect to be able to do the mining for about 25c. per ton. There is a large amount of ore in sight. The enterprise is a private one.

**South Idaho.**—Capt. Carter expects to begin operations on this mine at Grass Valley very shortly. The new company has been fully organized.

#### PLACER COUNTY.

(From Our Special Correspondent.)

**Boulder.**—This mine at Ophir is being opened under management of G. F. Dyer.

**Crater.**—This mine, which the Eclipse Mining Company, of Ophir, has bonded, has not been worked since 1880, but before that it was quite a producer. Operations are to be carried on on a large scale.

#### SAN BERNARDINO COUNTY.

(From Our Special Correspondent.)

**Smelter.**—New management has taken hold of the smelter recently built at Oro Grande, and more money is to be raised to put the plant in condition for custom work. Ore from the Copper Mountain Mine is to be worked.

#### SAN DIEGO COUNTY.

(From Our Special Correspondent.)

**Iron Ore.**—Samples of the iron ore found near Campo on the line of the survey of the San Diego Eastern Railroad, have been sent East for careful examination.

#### SHASTA COUNTY.

(From Our Special Correspondent.)

**California King Gold Mining Company.**—Assistant Manager J. E. Ridgeway, Jr., of this company, at Picacho, has filed on five 20-acre placers, known as Railroad Nos. 1, 2 and 3, River Quail and Riverview claims. This company is to have a very large cyanide plant, now nearing completion. It is supposed that



when the water is brought from the Colorado River the surface dirt may be worked at a profit. The company was, however, organized to work large deposits of low-grade quartz near Picacho.

**California Prospecting and Mining Company.**—This company, composed of Napa, Napa County, men, is opening a claim at Centerville, near Redding. J. O. Royer, vice-president of the company, reports in favor of another issue of stock to continue development work on the mine.

**Mountain Copper Company.**—At the mines of this company, Lewis T. Wright, manager, more men are needed and the right kind of labor is reported as scarce. The mines are at Fielding, and the smelters are at Keswick, the two points being joined by a private railroad of the company. The capacity of the smelter has been increased with the advent of new machinery. A new steel bridge across Spring Creek is being built for the matte conveyor from No. 4 furnace.

**Peerless.**—This group of seven claims near Copley, owned by J. H. Sherman and Louis Heller, has been bonded to C. G. White, of Redding, for other parties. Building will be put up at once to house the miners who are to do the development work.

## SIERRA COUNTY.

(From Our Special Correspondent.)

**Colombo.**—Mr. W. L. Watts took hold of this mine near Sierra City for Los Angeles parties recently, and began the work of reopening the lower tunnel. Before this was completed, however, he received orders to stop work, and operations have ceased.

## SISKIYOU COUNTY.

(From Our Special Correspondent.)

**Chinese.**—The Chinese miners near Honolulu on the Klamath River are taking out considerable gold.

**Golden Seal.**—On this mine near Oro Fino, J. B. Chaplin, superintendent, a Merralls mill is to be placed.

**Jilson.**—At this mine, near Hornbrook, an extensive ledge is being opened up.

**Jumbo.**—This mine, on White's Gulch, is to be worked this year by H. J. Eldredge & Co., of Sayers Bar.

**Siskiyou Mining and Development Company.**—This company, which is opening the coal mine at the Herr ranch, proposes to do work on a more extensive scale. They will shortly commence work on a three-compartment shaft. A 300-ft. incline shaft has also been contracted for. R. R. Denny, of Etna, is secretary of the company. The mine is between Yreka and Ager stations. About \$20,000 is to be expended in putting the property in good shape. B. A. Cardwell is superintendent.

**Tyrer Group.**—This group is on the Klamath River, 4 miles below Klamathon. It is owned by an Oregon company, with H. D. Kelley, of Portland, as president; H. B. Goodall secretary, and C. W. Tyrer superintendent. The property is equipped with a 10-stamp mill, Jacobs concentrator, assay office, etc. There are three tunnels on the mine, the longest about 500 ft. in.

## TEHAMA COUNTY.

(From Our Special Correspondent.)

**Basler Mine.**—A boiler, drill and other machinery are being shipped to this mine, 30 miles west of Red Bluff and about 9 miles northwest of Lowreys.

## TRINITY COUNTY.

(From Our Special Correspondent.)

**Fairview Mining Company.**—The new 10-stamp mill of this company near Minersville, Joseph Porter, superintendent, has been started up. This company has built a road from a junction with the French Gulch and Trinity Center road on the summit of Trinity Mountain, to the mine. The new mill is arranged for either water or steam power.

## TUOLUMNE COUNTY.

(From Our Special Correspondent.)

**Arbona.**—It is understood that this mine, at Tuttle-town, will soon be started up.

**Bastian Ranch.**—Mr. E. C. Loftus has bonded the Bastian Ranch near the Santa Ysabel mines at Stent. It is supposed the ranch is valuable for mining purposes, as is the case with many agricultural holdings in the Mother Lode region.

**Don Pedro Gold Mines.**—This company, W. H. McClintock, manager, has acquired the Don Pedro quartz mine, and has bonds on the Pay Day and Stokes mines, in Don Pedro Bar District, near Cloudman. The gulches and bars on and along the Tuolumne River in this section paid very well in early day mining, and it is supposed were enriched by gold from these quartz mines and others near by. The mines are in what is known as the West Belt. Complete surveys have been made preliminary to commencing active work on the properties.

**Mazeppa Gold Mining Company.**—Timbers are being prepared for the mill in this mine at Stent, Henry Moore, superintendent. An assessment has been levied to pay for the new mill.

**Santa Ysabel.**—These mines at Stent are being examined with a view to purchase. The group consists of the Santa Ysabel, Knox & Boyle, Eagle, Nyman, Miller and Holmes.

## YUBA COUNTY.

(From Our Special Correspondent.)

**Good Title.**—This mine, near the little town of Indiana Ranch, has been bonded by J. B. Crocker and T. Kirkpatrick, of San Francisco. There is a 30-stamp mill on the property, with good hoist, etc. John Russell is in charge of operations.

## COLORADO.

## BOULDER COUNTY.

**Livingston.**—The rich vein recently uncovered at this mine at Boulder, is now 40 ft. long and 12 ft. deep. About 3 ft. is milling ore, which is being treated at the cyanide mill on North Boulder Creek.

## CLEAR CREEK COUNTY.

(From Our Special Correspondent.)

**Dover Mining Company.**—All the claims belonging to this company have been transferred to the Pittsburg Consolidated Mining, Milling and Tunnel Company. W. L. Shaffer, of Idaho Springs, is the manager.

**England Gold Mining and Milling Company.**—C. T. England, manager, of Denver, has purchased a gasoline engine, dynamo and electric drills to operate on the group of claims owned by the company and adjoining the Stanley at Idaho Springs. It is stated drifting on the adit will continue.

**Fall River Electric Power Company.**—The claims belonging to this company have been sold at sheriff's sale. While the company owned some claims and water rights on Fall River, it sold stock in the East under representation that it owned mills and big mining works, showing photographs of the mill dam and mill. There was no mill nor mine. The dam which was claimed to have cost \$75,000 was built for \$100.

**Marshall-Russell.**—It is stated by W. C. Marshall, manager, Empire, that the seventh lode has been cut in the Marshall tunnel, making six blind lodes within 460 ft. One of the lodes now being followed with machine drills shows 10 ft. of \$14 ore. The new steam plant to work as auxiliary with the water power has been received, and the new buildings are enclosing the plant.

**Red Elephant Mountain.**—A. E. Reynolds, of Denver, has secured about 70 patented claims on Red Elephant at Lawson, and will bring a plant of machinery from the San Juan country and drive a cross-cut tunnel into the mountain for a distance of about 2,000 ft., opening up some of the silver mines which have lain idle for 10 years. The tunnel will drain the shafts which were sunk to a depth of 900 ft. Several million dollars worth of silver ore was produced from these mines.

**Stanley.**—This property is again in the courts, a receiver having been appointed to wind up the affairs of the old company. A. D. Bullis, of Idaho Springs, represents the old and new company. Operations in the mine continue, and it is reported construction of the new 100-ton concentrating mill will commence soon.

## TELLER COUNTY—CRIPPLE CREEK.

(From Our Special Correspondent.)

**Drainage Committee Meeting.**—The committee appointed by the mine owners at the meeting last Monday afternoon, to consider the Drainage Tunnel problem, has held its first meeting. No special plan was adopted, but several tunnel schemes were discussed. The committee has decided to give out no information for publication at present.

**Ajax.**—This company has started a new shaft on the property, but just to what depth it will be sunk is not known. It will probably depend upon what is developed in the first 50 ft. This section of the Ajax property has long been sought after by leasers, but to no avail.

**Anchoria Leland.**—Some prospecting is being done on this property, but not much ore is being taken out. Their shaft is now 1,100 ft. deep, and is down to the water level. They will probably make no attempt to go deeper until some agreement has been reached with regard to the water question.

**Golden Cycle.**—The regular monthly dividend checks of this company have been sent out. The dividend is, for the month of October, and is at the rate of  $\frac{3}{4}$ ¢ per share. All levels below the fourth are being worked, and the usual production is being maintained.

**Trachyte.**—Another rich strike has been reported recently on this property. A round of shots on the 300-ft. level opened up a vein, which assays on the average of \$75.

## CONNECTICUT.

## LITCHFIELD COUNTY.

**Connecticut Asbestos and Mining Company.**—This company has been formed by Hartford people under the laws of Maine, with a capital stock of \$300,000. The following officers have been elected: President, Dr. H. L. Riley; vice-president, H. P. Fox; secretary,

Frank B. Skiff; treasurer, George W. Wilson. The company has acquired options on a large tract of land in New Hartford, where it is claimed that deposits of asbestos have been discovered.

## GEORGIA.

## CHEROKEE COUNTY.

(From Our Special Correspondent.)

The old copper mine near Canton is being reopened by H. Rich, who has a shaft down 300 ft.

**Sixes.**—Development at this old gold mine, owned by Col. Thomas C. Crenshaw, shows rich ore. The mine is to be equipped with suitable machinery.

## IDAHO.

## CUSTER COUNTY.

**White Knob Copper Company.**—Operations at the smelter have been discontinued until the mine workings connect with the tunnel which is to tap the lower levels. This tunnel is in 850 ft., and another 650 ft. is expected to bring it face to face with a 1,500 ft. drift run out from the 700 level of the shaft workings. George R. Hancock, of Mackay, is superintendent.

## LEMHI COUNTY.

(From Our Special Correspondent.)

**Kittie Burton Gold Mines Company.**—The new mill containing 15 stamps, is completed, and will start running as soon as the aerial tramway bought of the Chas. A. Leschen & Sons' Rope Company is installed. The piers for the latter are in place, and the cable is about strung. A strike of gold ore in the Ulysses claim of the company has the appearance of being of good extent, it has been penetrated so far 21 ft., with a face the full width of the drift, and probably is much wider. The face is a mass of honeycomb quartz showing free gold. The quartz was found in following the plane of a normal fault similar to such as had been found in the mine before, but having less throw. This property is at Ulysses, 35 miles from Salmon. R. L. Edwards is general manager.

**Shoo Fly Group.**—This group of four patented claims, situated on Moose Creek, have been secured on a bond running a year from January 1, 1903, by Edwards & King, of Ulysses. Two men will be kept at work during the winter. Some 20 years ago a 4-stamp battery pounded out something more than \$100,000 from loose boulders of ore found on the surface, but no systematic work was ever done on the lead.

## ILLINOIS.

## PERRY COUNTY.

**Weaver Coal and Coke Company.**—This company, of Chicago, has purchased the mining plant together with 326 acres of land of the Brown Mining Company at Pinckneyville. The mineral rights on 50 acres of land adjoining this property have also been purchased from Mrs. Mary Sullivan. The company now has over 1,000 acres of land in the vicinity of Du Quoin and Jupiter.

## MICHIGAN.

## COPPER—HOUGHTON COUNTY.

(From Our Special Correspondent.)

**Calumet & Hecla.**—The hoisting plant at the Griot, Houghton and Seneca station, has been repaired. The work formerly done by three engines is now done by two. The third engine was changed from a hoisting engine to a driving engine, and installed at the Lake Linden stamp mills to run the electrical machinery. President Alexander Agassiz and Vice-President Livermore are at the mine on a regular trip of inspection.

**Lake Superior Concentrating Company.**—This company has enlarged its plant on the old Franklin tailings at Ripley. It now has a capacity for treating 1,000 tons of sand daily.

**Lake Superior Smelting Company.**—This company has installed a permanent plant for the granulation and disposition of waste slag at the Dollar Bay Works.

**Trimountain.**—At this mine the lode has been reached in the cross-cut east from the sand shaft. It was tapped at a depth of 175 ft., 33 ft. under the ledge. The 2d level drift from No. 3 shaft has reached the site of the shaft. Upraising will be started to meet sinking from surface.

**Wolverine.**—At this mine No. 4 shaft is sinking to the 20th level, and No. 3 to the 24th level; 25 power drills are in commission and drifting is under way on the 19th to 22d levels south, inclusive. Rock shipments are 1,000 tons daily.

## COPPER—KEWEENAW COUNTY.

(From Our Special Correspondent.)

The Kearsarge amygdaloid lode has been encountered on the Sibilsky-Chapman tract in section 4, township 57, range 31. The outcrop reveals richly mineralized rock.

## COPPER—ONTONAGON COUNTY.

(From Our Special Correspondent.)

**Adventure.**—H. A. Allen, of the Allis-Chalmers Company, of Chicago, Ill., has been appointed super-

intendent of this mine to succeed P. R. Roberts, who retires in December. The first shipment of mineral from the new stamp mill, 30 tons, was sent to the Quincy smelting works for treatment.

#### MONTANA.

##### BEAVERHEAD COUNTY.

(From Our Special Correspondent.)

**Bonanza Group.**—This property, situated on Steele Creek, 7 miles from Wisdom, is under active development by W. E. Sanders, of Butte. The property is being developed through three tunnels. Mr. Sanders recently installed an electric drill plant purchased from the Western Electric Drill Company, of Butte. The work of the first drill placed in the mine was so satisfactory to Mr. Sanders he has ordered the second drill. The plant to operate the drills consist of a Buffalo Forge Upright engine, an upright boiler and a 10-h.p. electric motor. Mr. Sanders will advance the development on the property to the point by spring, where a 10-stamp mill will be required to handle the ore. The ore is free milling gold with a plating value of about \$8.

##### LEWIS & CLARKE COUNTY.

**Empire.**—This cyanide plant, near Marysville, has resumed operations with a daily capacity of 500 tons. Malm, Morris & Leech are the owners. They have rebuilt the plant, installed a system of loading by automatic belt conveyors, and put in an electrical precipitation apparatus. About 125,000 tons of tailings are on the dumps ready for treatment.

##### MISSOULA COUNTY.

**Cedar.**—The second clean-up from these placer mines this season has yielded \$16,000 in gold. There will be another run of about 3 or 4 weeks before the season closes. Alphonse Lacasse, of Missoula, is manager.

##### PARK COUNTY.

**Emigrant Gulch Gold Mining Company.**—Receiver Worthy McKee has sold the property of this company in the Emigrant District to Dwight L. Wing and G. A. Winslow for \$6,020. The property has been in litigation for some time. Work will be resumed by the new owners.

##### POWELL COUNTY.

(From Our Special Correspondent.)

**Cable.**—This old mine, which helped make early history for Montana, after remaining idle for 15 years, has again been unwatered. The property is opened up to a depth of 400 ft. The underground workings are found to be in good condition. H. C. Bacorn and W. Dunraven Bohm have the work in hand. J. C. Savery, the owner, is also on the ground.

##### SILVER BOW COUNTY.

**Ophir.**—This company has resumed work on its property in Butte, after an idleness of 9 years. The purpose is to determine if the lower levels will warrant development.

(From Our Special Correspondent.)

**French Gulch Dredge.**—This boat having reached the upper end of the company's ground on its journey has been turned down stream, and has now three miles of work ahead of it. Lately the ground was found somewhat lean. The net weekly profit has been from \$500 to \$750. Next season the dredge should be in ground, which will show a better average of value. W. R. Allen promoted the enterprise.

#### NEVADA.

##### WASHOE COUNTY.

**Anna Bell.**—This claim has been purchased by the Consolidated Mining Company for \$25,000. The property is situated near the Reno Star, owned by the company. A shaft is to be sunk to cut the extension of the Wedekind vein which passes through the Anna Bell.

**Bull Run Mining Company.**—This company's property near Tuscarora, turned out \$100,000 in bullion during a mill run of 15 months. An electric power plant is proposed for the property. A. H. Smith is manager.

**Winnemucca.**—W. G. Adamson has purchased this mine near Reno. The property has been idle for some years.

#### NORTH CAROLINA.

##### CABARRUS COUNTY.

(From Our Special Correspondent.)

Veins of copper and silver are said to have been discovered by J. T. and M. L. Wyatt, who have been prospecting for several weeks over 350 acres of land, have been leased. A shaft 10 ft. deep has been sunk on the silver vein, near the old Pioneer Mine.

#### OREGON.

##### GRANT COUNTY.

**Cougar Gold Mining and Milling Company.**—Deeds have been filed in the county clerk's office for the transfer of the Cougar, Wildcat, Tomboy and the Modoc, to this company for \$1,999,500. The mines are situated 3 miles north of Granite. Messrs. D. R. Evans, John W. Larkin and L. P. Hale are interested.

#### TEXAS.

##### CHAMBERS COUNTY.

(From Our Special Correspondent.)

**Barbers Hill.**—The Higgins Standard Oil Company have a derrick up to start their No. 2 well south of the hill, and another well will be drilled between Nos. 2 and 1. No. 1 has been abandoned.

##### HARDIN COUNTY.

(From Our Special Correspondent.)

**Sour Lake.**—The J. M. Guffy Petroleum Company, No. 5, came in on October 23. It is 625 ft. deep, and is making a good showing, although its capacity has not yet been determined. Numerous parties have invested in property during October, and the Sour Lake Springs Company has contracted for five wells, and George E. Hart for one well. Work has been commenced on both contracts.

##### JEFFERSON COUNTY.

(From Our Special Correspondent.)

**Beaumont.**—The Penman Company reports that it struck a good flow of oil at 410 ft. while drilling for water in the northern part of the city. As yet nothing definite as to future exploration has been decided upon.

Several more fires have occurred on Spindletop. One on October 19 destroyed one or more outfits of the following companies: Producers Oil Company, Georgetown-Waco Oil Company, Hogg Swayne Syndicate, Apex Oil Company, Lucky Dime Oil Company, Martin Weiss Oil Company, R. E. Brooks, and the Texas Oil and Steamship Company. Total loss, \$9,000.

The recent heavy rains have conclusively shown that Southern tankage is neither safe nor satisfactory in the Beaumont field, and many tanks or reservoirs under construction and proposed will be abandoned, and steel tanks built. The danger of earthen reservoirs and their availability was fully set forth in this JOURNAL six months ago, and since then many thousands of dollars have been wasted in building such tanks, and in the loss of petroleum piped into them.

Two new rules have been promulgated by Judge Martin governing Spendthrift—no lights must be used except electric light, and the gas must be taken away from all producing wells and from settling tanks. As all the fires have occurred at night, the advisability of stopping all night work is being seriously considered. Shipments have been heavy in spite of the week's blockade in the Port Arthur canal. Prices are still very irregular.

New companies reported are the Scurlock Holcomb Syndicate, \$40,010 stock, Beaumont; Empire State Oil and Refining Company, \$800,000 stock, Beaumont.

#### PENNSYLVANIA.

##### ANTHRACITE COAL.

**Lehigh Valley Coal Company.**—This company makes the following statement for September and the three months of its fiscal year from July 1 to September 30:

	September	3 months.
Earnings .....	\$121,661	\$308,552
Expenses .....	283,131	846,182
Deficit .....	\$161,470	\$477,630

For the three months there was a decrease of \$4,414,133 in gross earnings; a decrease of \$4,234,577 in expenses; and an increase of \$179,556 in deficit.

**Philadelphia & Reading Coal and Iron Company.**—Seven new shafts are to be sunk on this company's property, and new breakers will also be erected. Work will begin on the Pine Knot shaft, which will produce 400,000 tons coal annually. The proposed new mines embrace a shaft at Coal Castle, 5 miles north of Pottsville, and 6 openings between Pottsville and Tamaqua. Surveys were made just prior to the strike. The Coal Castle shaft was started last spring, but the strike stopped work. The company has resumed work at its Pottsville repair shop on a day of 10 hours. Since the strike employees have been working but 8 hours. Over 350 machinists and molders who were suspended last May were ordered to report for work on November 3.

##### BITUMINOUS COAL.

The new Dilworth operations at Rice's Landing are about completed. A shaft 160 ft. deep has been sunk, and headings are being driven.

**Carnegie Coal Company.**—This company has recently purchased 1,000 acres of Pittsburg vein coal near McDonald, and is preparing to open a new mine with modern electric equipment and steel tipples. It will shortly be shipping 1,200 tons a day.

**Puritan Coke Company.**—This company has purchased 122 acres of coal land in German township, near Uniontown, for \$78,000. This corporation now owns 300 acres of coal land and will have 200 ovens in operation by next January.

**Riverview.**—These coal and coke works, near Bessemer, owned by J. C. Work and Francis Rock, have been sold to Isaac Brownfield, George Whyel and others for \$550,000, it is reported. At present 138 ovens are working, producing about 550 tons coke

daily. A company known as the Masontown Coal and Coke Company has been chartered to operate the plant on a larger scale.

#### SOUTH DAKOTA.

##### CUSTER COUNTY.

(From Our Special Correspondent.)

**Central Black Hills Copper Company.**—Machinery is on the ground for a 100-ton leaching plant. E. M. Barnes, of Drake, Barnes & Co., Cleveland, O., is installing it. The ore, carrying from 2 to 3 per cent copper carbonate, will be leached in a dilute solution of sulphuric acid and the copper precipitated on scrap iron.

##### LAWRENCE COUNTY.

(From Our Special Correspondent.)

**Carbonate Silver Extraction Company.**—The season's work on the tailings at the Iron Hill Mine and mill at Carbonate has been finished. Cyanide was used to extract silver values remaining in the ore, and the plant was operated all summer at the rate of 25 tons daily. Some of the tailings contained from 10 to 25 oz. silver to the ton.

**Clover Leaf Mining Company.**—The Uncle Sam shaft is over 600 ft. deep, and the sixth station has just been established. This is the second station to be cut this year, the fifth having been cut last spring and a cross-cut driven to the vein. The shaft is being continued. All water is being handled from the fifth level. The mill is dropping 30 of the 60 stamps.

**Golden Treasure Mining Company.**—A vertical vein of siliceous ore on which a shaft has been started is 7 ft. wide, and assays from \$46 to \$48 a ton. A tunnel has been started to intercept the vein below the bottom of the shaft, and ore will be taken out for shipment.

**Hidden Fortune Gold Mining Company.**—Nearly all of the machinery has arrived for the first section of the stamp mill section of the plant. This section will have 60 stamps. The hoisting plant has been set up on the Bingham, where a deep shaft has been started.

**Oro Hondo Mining Company.**—William A. Mears, of New York and Philadelphia, accompanied by Benjamin H. Tatem of Helena, Mont., and several prominent New York and Philadelphia men have recently examined the property. The hoist is about completed and ready to run. The shaft will be 2,000 ft. deep.

**Spearfish Gold Mining and Reduction Company.**—Dividend No. 1 of 1c. on preferred stock has been declared, payable at the main office of the company, Colorado Springs, Colo., November 10. There are 900,000 shares of preferred stock. The company is cleaning up \$25,000 a month.

**University Gold Mining and Milling Company.**—Ore is being mined on the claims recently purchased of the South Dakota Mining Company on Annie Creek, and is being stored preparatory to shipping. It has a general average better than \$20 a ton.

##### PENNINGTON COUNTY.

(From Our Special Correspondent.)

**Alta-Lodi.**—James Cochran has resumed possession, and announces that he will start the Huntington mill in the spring. He has recently disclosed a vein of free-milling ore.

**Eldora Group.**—J. J. McLaurin, formerly an oil operator, of Pittsburg, Pa., has bonded the group, and will continue the shaft from 200 to 300 ft. deep. Smith brothers are part owners.

**Mount Aetna Mining Company.**—A steam hoist has been installed and is running. A shaft is sinking on a fissure vein of free-milling ore that yields good average returns. John G. Mattes, Keystone, is manager.

**Tycoon Mining Company.**—Experiments are being conducted with cyanide by C. J. Sine on the low-grade ore, and the process will probably be used for these ores as well as to re-treat tailings from stamp mill. A new hoist has lately been installed.

#### TENNESSEE.

##### CUMBERLAND COUNTY.

**Cumberland Realty, Coal, Iron and Manufacturing Company.**—This company, composed of Kansas capitalists and incorporated under the laws of Kansas, has purchased for immediate development 18,000 acres of coal and iron land in the northern portion of Cumberland County.

#### UTAH.

##### JUAB COUNTY.

(From Our Special Correspondent.)

**Victor.**—This property in the Tintic district has closed down owing to the conflict with the Boss Tweed.

**Snowflake.**—This mine now shows 12 to 18 inches of galena.

##### SALT LAKE COUNTY.

(From Our Special Correspondent.)

**Bingham & New Haven Copper and Gold Mining Company.**—This company purchased the Zelnora, Stars and Frisco groups, situated on the copper zone in the Bingham camp. Eastern and Salt Lake capital



is interested. The territory consists of 148 acres. The company has a capital of 2,000,000, divided into 400,000 shares of \$5 par. E. L. Stoddard, of New Haven, is president; William M. Bradley, of the Centennial-Pureka and United States mines, vice-president, and D. W. Farmun, of New Haven, secretary and treasurer. The work will be in charge of I. M. Benedict and J. E. Beveridge.

## FOREIGN MINING NEWS.

MEXICO.  
SONORA.

*Bufo Mining, Milling and Smelting Company.*—The general manager reports to the Los Angeles, Cal., office that a number of mules are on the road to station on Sonora Railroad with first-class ore, and that there will be a continuous shipment from now on, until next rainy season (June); also reports shipment of upwards of 17,000 oz. bullion from Santa Rose Mill, and that work on the new 700-ft. shaft is progressing very satisfactorily, it now having reached a depth of 190 ft.

## MINING STOCKS.

(Complete quotation will be found on pages 638 and 639.)

## New York. Nov. 5.

Interest in politics has helped to narrow the market so that dealings this week have been on a small scale. The absence of investment orders has also cast a temporary shadow over speculation.

In the copper section a little interest was shown on Monday when it was learned that metal exports during the 10 months ending October 31 were considerably larger than last year, though the figures for the month of October were less than September this year. Amalgamated strengthened subsequently, gaining  $1\frac{1}{2}$  points on Monday, the buying being attributed to inside interests. During the week the stock fluctuated between \$63 and \$65 $\frac{1}{2}$ , while the daily transactions were small. Anaconda sales are insignificant. For the week 95% to 97 per cent (\$23.47 to \$24.25) were the extreme quotations. The curb coppers were neglected. Greene Consolidated, of Mexico, sold at \$25@24, while the rights brought \$80@\$85 per hundred. United, of Montana, made sales at \$29 $\frac{5}{8}$ @\$33 $\frac{1}{2}$ . Tennessee is stationary at \$16 $\frac{1}{2}$ . British Columbia hangs around \$6@\$7, and Montreal & Boston, \$2 $\frac{3}{4}$ @\$2 $\frac{1}{2}$ .

Bamberger-De Lamar Gold, of Nevada, changed hands at \$10@\$10 $\frac{1}{2}$ , but little of the stock comes on the market. Keystone Gold, of Utah, was introduced on curb on Monday, when 8,100 shares were reported sold at 62 $\frac{1}{2}$ @75c., par being \$1. This company is capitalized at \$500,000, and is a consolidation of the Silver Key and Keystone properties, consisting of 12 patented claims, in Park City, Utah. Utah and New York people are interested.

Several small trades were made in Ontario Silver, of Utah, at \$8 $\frac{1}{2}$ @\$8 $\frac{1}{2}$ .

California shares show a slight improvement, but three is still an unwillingness to sell. Standard Consolidated, after a long absence, reappeared at \$3.40, and is strong at this figure, as the company has just declared the usual quarterly dividend of 10c. per share, payable this month. Standard stockholders have received 40c. per share, or \$71,356 this year, making the total to date \$4,106,814, which is equal to more than twice the capitalization of the company.

Cripple Creek, Colo., stocks tend to hardness, as the October gold output of the district shows an improvement. Portland rose to \$2, and Isabella gained 1c. to 31c.

Recent auction sales were \$7,000 Tanite Company first mortgage 6 per cent bonds, due 1913, \$500 each, at \$305 for lot, 100 shares Colorado Coal and Iron Development Company, \$100 each, at \$16 for lot, and 254,000 shares Davidson Gold Mining Company, of Arizona, \$1 each, at \$25 for lot.

The New York Stock Exchange recently listed the \$2,750,000 first mortgage 50-year 5 per cent sinking fund coupon gold bonds of the Continental Coal Company. These bonds are part of an authorized issue of \$3,500,000, and their principal and interest is guaranteed by the Hocking Valley and Toledo & Ohio Central railways. The Continental Coal Company will pay J. P. Morgan & Co., the sinking fund trustees, 5c. per ton on all coal produced, to be used in these bonds, if obtainable at not over 110 and accrued interest. The net income of the coal company for the 5 months ending August 31 amounted to \$115,188, while the net earnings were \$208,364.

## Colorado Springs. Oct. 31.

(From Our Special Correspondent.)

The market was dull and apathetic all during the week, and shows but little sign of improvement today. The conditions at camp are quite contrary to the feeling on the Exchange, for a number of good strikes have been recorded since our last letter.

The old-time leaders were listless, and when traded in went at lower prices during the first days of the

week, showing a little improvement here and there later on. El Paso was decidedly weak, selling down to 66c. and recovering to 68c. to-day, at which figure it closed. The company has just acquired additional property at an expenditure of \$50,000, and this action seems to be the cause for the lower prices. Elkton sold this week at 34c., and was in very little demand. Isabella gave promise of becoming a bright spot in the market and sold from 32 to 34 $\frac{1}{2}$ c. on rumors of a good strike. The report, however, lacks official confirmation, and is in all probability no more than a creation of the stock brokers.

Mollie Gibson, the old-time silver bonanza of Aspen, developed some mysterious strength this week, selling from 6 to 6 $\frac{1}{2}$ c., closing to-day with 6 $\frac{1}{2}$ c. bid at 7c. Reports are current both in Aspen and in this city that the company has opened a splendid body of silver ore as the result of the recent development, which, it is said, has been going on in one of the upper levels of the mine. All knowledge of such a discovery is strenuously denied by the officers in this city. Nellie V., a preferred prospect, declined to 1 $\frac{1}{2}$ c. this week on the announcement that the company intends to mortgage the property to raise \$50,000 with which to carry on new development work.

## Salt Lake City. Oct. 31.

(From Our Special Correspondent.)

Prices have dropped a little this week, but to no alarming extent. The amount of business done amounted to 437,151 shares, which brought \$213,704.

The heaviest trading was done in the May Day, which handled 111,600 shares at 25@20 $\frac{1}{4}$ c., a drop of 4c. from last week. Carisa put out 63,300 shares at 22 $\frac{3}{4}$ @20c. Lower Mammoth sold 4,900 shares at \$1.63@\$1.53. While Star Consolidated advanced 1c., handling 18,700 shares at 23 $\frac{3}{4}$ @20c. Victor is off 2c., with 7,200 shares sold at 18@16 $\frac{1}{2}$ c. California ran out 63,000 shares at 36 $\frac{1}{4}$ @33 $\frac{1}{2}$ c. Century placed 34,420 at 1.05@72 $\frac{1}{2}$ c.

Of the unlisted stocks Little Bell sold 900 at \$6.25, which is a retreat of \$2 from last week's prices. Nail-driver sold 6,300 at \$2.15@\$1.75, a loss of 30c. Wabash placed 21,025 at \$1.90@\$1.58 $\frac{1}{2}$ . This stock for some reason has been steadily dropping.

## San Francisco. Nov. 1.

(From Our Special Correspondent.)

Stock quotations are at low-ebb, causing speculators to buy more freely. In fact, some of the higher-priced Comstocks are making low records in quotations, while several of the cheaper shares are selling at their assessments and less. Present purchases are for fractional profits, as it is not thought outsiders are increasing their holdings.

Some quotations noted are: Consolidated California & Virginia, 77@88c.; Ophir, 86@92c.; Caledonia, 96c.; Sierra Nevada, 17c.; Mexican, 41c., and Union Consolidated, 16c.

Oil shares are less active. Reede Crude sold at 25c.; Junction, 13@12c., and Independence, 5c.

## London. Oct. 25.

(From Our Special Correspondent.)

The amount of business done in the mining market continues to be very small. This week there have been fewer bear rumors circulated on the South African market, and some of the heads of banks and other commercial houses have been speaking more optimistically of the future of the country. Consequently the share market has been a good deal brighter, though, as a matter of fact, hardly any actual business has been done. The West Australian and British Columbian markets have also been quite devoid of activity.

The British Columbian market has been further depressed by the issue of the report of the Hall Mining & Smelting Company. The shareholders of this company have known for six months now that the ore bodies have given out at the lower levels and that the directors thought it best to abandon development work, but the publication of the failure in the yearly report of the company was really the first intimation to the general public that another British Columbian company had ceased to be remunerative. The mine has been leased to Mr. Davys, a former superintendent, who is going to explore it for a year at his own expense. The smelting business of the company continues depressed on account of the fall in the prices of metals, and operations have been irregular, owing to the falling off in the supplies of the companies' own ores and the difficulty of purchasing in the open market. The future of the company is not bright, but operations will be continued in the hopes that circumstances may change for the better. The Ymir Gold Mines Company has decided to raise further capital by means of reconstructing the new company to have a nominal capital of £200,000 in £1 shares, 17s. being credited as paid up, leaving a liability of 30 per share. This will provide £30,000, and will be sufficient to pay for the cyanide plant recently erected, repay the bank loan, and furnish funds for development. The new tunnel at the 1,000-ft. level is now in payable ore, and there is every expectation of there being a large amount of ore available. During the four years the company has been in existence £46,000 has been

spent out of profits on plant and permanent work, and £60,000 has been distributed as dividends. The directors originally wished to raise new capital by the issue of new shares, but no offers came forward, nor could they be expected to in the present state of the mining market. There was no alternative therefore but to resort to assessment.

## COAL TRADE REVIEW

New York, Nov. 6.

## ANTHRACITE.

Anthracite is coming forward in some quantity, but still very slowly in comparison with the demand. The operators claim that they are doing everything in their power, but matters are not fully adjusted by any means. The celebration of "Mitchell day" last week by a general stoppage of work, which meant the loss of one full day—in many cases two—at a time when it was important to rush work, shows the general spirit prevailing. It will be some time before we have a full supply of coal.

In New York, at least, consumers are rather inclined to take matters easily, and not to rush the coal dealers so much for deliveries. This disposition has been helped by the very mild weather, which has prevented people from feeling any pressing necessity. A cold snap would increase the demand, and cause a rush of orders. Dealers generally are doing the best they can, but no reduction can be reported in retail prices for domestic sizes, which range from \$6.50 to \$7.50 per ton.

The report of the proceedings of the Strike Commission, given on another page, is necessarily brief. The Commission seems determined to learn actual conditions and to proceed cautiously. The statement filed by Mr. Mitchell for the miners' side of the case has been published, but contains nothing new.

## BITUMINOUS.

The Atlantic seaboard soft coal trade is comparatively quiet, considering the shortage in anthracite and car supply. Consumers have believed that they were responsible for the high prices and shortage in the available coal in sight, whereas the Eastern railroads were largely the cause of this situation.

In the speculative markets prices are \$5 f. o. b. New York harbor shipping ports, though purchasers are scarce. Certain consumers would rather curtail manufacturing, rather than pay above \$4, f. o. b. New York harbor ports.

The main line railroads are only giving producers about 50 per cent or under of the cars desired, and this condition has prevailed for some time. Shippers with all their representations do not seem to alter the situation, and so have concluded that it is inability on the part of the railroads to supply cars or move them. At the mines the question is being debated whether the railroads could not do better by side-tracking less important outside freight.

Consumers in some quarters are taking their full contract quotas, and are also buying some speculative coal. During the past week or 10 days much foreign coal has been received, thus easing the market somewhat.

Trade along Long Island Sound is short of coal. At New York harbor points consumers are fairly well taken care of, as they are in a better position to complain personally to the headquarters of the railroad if shipments are lax.

All-rail trade has only a small coal supply, causing apparently more suffering than at other centers.

Car supply, as noted above, is about 50 per cent what producers actually need.

Transportation from mines to tide occupies from 10 days to two weeks, and arrivals being irregular are not to be depended upon.

In the coastwise market vessels of large size are in fair supply, but those of 1,000 tons and under are scarce. Freight rates from Philadelphia are as follows: Boston and Salem, \$1.15; Portland, \$1@1.05; Providence, New Bedford and the Sound, 65@75c.; Wareham, 80c.; Lynn and Bath, \$1.10@\$1.15; Newburyport, \$1.25; Portsmouth, \$1.05@\$1.10; Saco, Gardiner and Bangor, \$1.25 and towages. The farther lower ports carry rates 10c. above those quoted.

## Birmingham. Nov. 3.

(From Our Special Correspondent.)

With some of the newly organized coal companies in the State already securing some output at their mines and old companies making new openings in the coal fields of the State, the coal production of Alabama is on the increase. The shortage of railroad cars is the only thing interfering with the coal production and prompt delivery thereof. The railroads not only have not enough cars with which to move the product as promptly as is desired, but there is a great shortage in power to move the cars after they have been loaded. There is an extraordinary demand for coal. The transportation companies of Alabama and adjoining States are looking to this district for much of their fuel, and as a consequence representatives of these companies are constantly in Birmingham looking after their orders. The Tennessee Coal, Iron and

Railroad Company is getting out its normal output. The strike among the miners of a few weeks since has been forgotten, and there is general satisfaction on all sides. The Sloss-Sheffield Steel and Iron Company is getting out a good amount of coal, but could do better were the railroads able to supply more cars.

The demand for coke is still very strong and a big price is being asked for the product. The production in the State is far from being enough to satisfy demands, and every effort is being made to rush work on the new ovens being built in the State. From \$5 to \$6 is the price at which coke is being quoted.

The Louisville & Nashville Railroad Company has let the contract for the construction of 27 miles of road through some undeveloped coal fields in Jefferson, Blount and Walker counties, and the contractors have started a work on the job. It is given out that several coal companies will be organized to open mines along the new line. The road is to be completed within six months, and by that time it is very probably several coal mines will have been opened, too.

Chicago Nov. 3.

(From Our Special Correspondent.)

With the resumption of anthracite mining there has come about a drop in prices of bituminous coal for the Chicago District. Illinois and Indiana grades are 50c. to \$1 lower; smokeless has dropped \$1@\$.150; Hocking is 50c. lower. The mild weather of the last week has caused something of a lull in the briskness of the market, coupled with the hope of consumers and retailers that anthracite will soon be plentiful. Yet the retailers have large stocks of bituminous to get rid of, and no considerable amount of anthracite can be looked for within two months. Dribbles of the first output of the anthracite mines are reaching the city; a few cars are coming along and anthracite has a nominal quotation, for car-load lots, of \$10.50. Boat-loads are reported on the way to Milwaukee and Duluth, but no supply by water is expected in Chicago this season. Retailers report a fairly good sale of Illinois and smokeless; wholesalers report the same grades still forming the bulk of their business. Today's prices are for Indiana and Illinois lump, \$2.50; Indiana and Illinois run-of-mine, \$2@\$.2.10; Hocking, \$5; smokeless (New River), \$4.50. The supply of Hocking is better, but still inadequate to the demand.

Retail dealers in anthracite are selling off their small hoarded stocks at \$8@\$.8.50.

Cleveland Nov. 4.

(From Our Special Correspondent.)

The market this week has been somewhat easier than it has been for the last month. The equipment has been turned over to the coal shippers in greater quantities than heretofore, and the local demand at least has been met. This eased up the situation, especially as there was a heavier shipment of anthracite than heretofore. It is evident, nevertheless, that all of the dealers are hungry for anthracite, and are willing to pay a good price for it. The lake situation has not been relieved in the least. The material is coming forward as slowly as ever, or even more so, if possible. The first of the week shows a fairly liberal supply while toward the latter part of the week the shipments subside. The increased movement of hard coal through Buffalo has affected the local market as far as tonnage is concerned, as the Buffalo market has been taking a small supply, while Erie has been getting a little. The shipment up the lakes is remarkably slow, and shows signs of falling even below what it is now as compared with the movement of last year to even dates. The only portion of the coal market which seems to be active is that from which the factories are supplied, as they seem to have any quantity of it. The prices have not changed in the least during the last week, although a scheme was overturned which had for its object a general boosting of the rates on the railroads.

Pittsburg Nov. 4.

(From Our Special Correspondent.)

Coal.—Operations in the railroad coal mines were practically suspended on Saturday, and yesterday and to-day but few mines are producing any coal. Production has been curtailed to about 25 per cent of the normal capacity of the mines, owing to a scarcity of cars. On the Monongahela division of the Pennsylvania Railroad not more than 5 per cent of the cars needed has been furnished, and on the Panhandle road the supply was not more than 10 per cent. Last Saturday out of the 46 mines in the Panhandle field but 6 were in operation. Railroads say they cannot get the prompt return of empty cars from their connections. It is estimated that the supply of coal in the Northwest will be about 2,000,000 tons short when the lake season closes. Negotiations for a consolidation of the Pittsburg Coal Company and the Monongahela River Consolidated Coal and Coke Company, the two combinations, have been opened and indications are that satisfactory terms will be reached. Prices are firm and premiums above the new prices are being paid for early delivery.

Connellsville Coke.—Production is being restricted, owing to the inability of the railroads to move the

coke and the yards are crowded. High prices continue to be offered for prompt shipment, but many orders are rejected, as it is impossible to take care of urgent contracts. Many furnaces were forced to bank on account of a shortage of coke. The Courier, in its last issue, gives the production for the previous week at 251,321 tons, a decrease of 4,991 tons, compared with the previous week. The shipments aggregated 10,252 cars, distributed as follows: To Pittsburg and river tipples, 3,675 cars; to points west of Pittsburg, 4,880 cars; to points east of Connellsville, 1,679 cars. This was a decrease of 330 cars.

San Francisco Nov. 1.

(From Our Special Correspondent.)

No change is reported in the coal market here, and matters are very quiet. Supplies are abundant and quotations unchanged.

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

Foreign Coal Trade Nov. 5.

Coal recently bought in Great Britain continues to arrive freely. Purchases have, of course, been stopped, and the rush of imports will soon be over.

Under instructions from Washington, the customs authorities are passing free of duty all coal billed as anthracite, without requiring analyses to show the actual percentage of fixed carbon.

Exports of coal and coke from the United States for the 9 months ending September 30 are reported as follows:

	1901.	1902.	Changes.
Anthracite .....	1,607,415	629,589	D. 977,826
Bituminous .....	4,126,014	4,090,741	D. 35,273
Total coal, .....	5,733,429	4,720,330	D. 1,013,099
Coke .....	294,375	290,869	D. 3,506
Total .....	6,027,804	5,011,199	D. 1,016,605

The decrease in anthracite was 60.8 per cent; in bituminous, 0.9 per cent. The coke exported went chiefly to Mexico. The coal exported was distributed as follows:

	1901.	1902.	Changes.
Canada .....	3,974,186	3,365,045	D. 609,141
Mexico .....	451,640	415,043	D. 36,597
Cuba .....	273,703	304,935	I. 31,232
Other West Indies .....	268,131	243,955	D. 24,176
Belgium .....	8,269	4,116	D. 4,153
France .....	174,652	29,328	D. 145,324
Germany .....	7,069	14,808	I. 7,739
Italy .....	95,776	86,530	D. 9,246
Holland .....	610	305	D. 305
Other Europe .....	148,860	44,523	D. 104,337
Other countries .....	330,533	212,042	D. 118,491
Total .....	5,733,429	4,720,330	D. 1,013,099

The falling off this year was in large part in anthracite to Canada. The decrease in shipments to France and other European countries shows that the demand from those countries in 1901 was chiefly a temporary one.

Imports of coal into the United States for the 9 months ending September 30 are reported as follows:

	1901.	1902.	Changes.
Canada .....	1,110,393	1,195,869	I. 85,476
Mexico .....	19,259	7,903	D. 11,356
Great Britain .....	35,440	73,243	I. 37,803
Other Europe .....	1,987	668	D. 1,319
Japan .....	2,170	8,176	I. 6,006
Australia .....	264,723	259,951	D. 4,772
Other countries .....	22,102	302	D. 21,800
Totals .....	1,456,074	1,546,112	I. 90,038

Of the total this year only 503 tons were graded as anthracite. These imports were chiefly on the Pacific Coast; the coal bought in England for the East did not begin to arrive until nearly the end of September.

Messrs. Hull, Blyth & Co., of London and Cardiff, report under date of October 24, that the weakening in prices reported the previous week has not been checked, although tonnage has arrived up much more plentifully. The market is, however, firmer for more backward positions. Quotations are: Best Welsh steam coal, \$4.08@\$.4.20; seconds, \$4.02; thirds, \$3.90; dry coals, \$4.20@\$.4.32; best Monmouthshire, \$3.54; seconds, \$3.48; best small steam coal, \$2.64; seconds, \$2.40; other sorts, \$2.16.

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.

Tonnage for the near trades has been scarce, and rates have had to be advanced to secure suitable steamers, but other markets have shown a weakening tendency. Some rates quoted are: Marseilles, \$1.45; Genoa, \$1.25; Naples, \$1.26; Singapore, \$2.88; Las Palmas, \$1.62; St. Vincent, \$1.92; Rio Janeiro, \$2.88; Santos, \$3.21; Buenos Aires, \$2.64.

## IRON TRADE REVIEW.

New York, Nov. 5.

The iron and steel trades show no material change, except that matters are a little quieter, and there is apparently an increasing disposition in some lines to make small concessions. On the other hand, some large concerns seem inclined to increase their contracts for next year, showing confidence in the future demand for finished products.

Production continues to be disturbed by the railroad troubles and by slow deliveries of fuel. While the railroad companies claim to be making all possible efforts to remedy these difficulties, but little improvement is apparent.

Birmingham Nov. 3.

(From Our Special Correspondent.)

The iron market conditions are most satisfactory. There is a fairly good production. Several of the companies have sold well ahead for the first half of the coming year, and some of them are selling for the last half of the year. All sales of iron to be delivered during the last half of 1903, will be on a minimum basis of \$18.50 per ton. Indications point to \$20 as a price for Nos. 1 and 2 foundry for the last half of the coming year. For the first half of the year \$20, \$21 and \$22 flat is being asked for the product, and a still higher price has been paid for delivery before March. The agreement arrived at in the East among Southern manufacturers placed the minimum at \$18.50 per ton for No. 2 foundry iron, but this does not mean that the product is going to be sold at that price. It is announced that the Tennessee Coal, Iron and Railroad Company has sold out up to July 1, 1903. The Sloss-Sheffield Steel and Iron Company has sold two-thirds of the make for the first half of the year. The Lacey-Buek Company has sold ahead pretty well to July 1, 1903, also while other concerns in the district are in the same conditions. The Sloss-Sheffield Steel and Iron Company will be within 5,000 tons of its orders by January 1, so it is stated, but other companies in this district are further behind than that. The Sloss-Sheffield Company has all seven furnaces in operation.

Quotations are firm. The little iron that is being sold for delivery during the first half of the coming year is quoted at more than \$20 per ton for No. 1 foundry. Spot iron is yet bringing \$25 per ton, and iron to be delivered within two or three months is bringing between \$21 and \$23 per ton.

The following figures are given: No. 1 foundry, \$22 @\$.23; No. 2 foundry, \$21@\$.22; No. 3 foundry, \$20; No. 4 foundry, \$18.50@\$.19; gray forge, \$16.50 @\$.17.50; No. 1 soft, \$22@\$.23; No. 2 soft, \$20@\$.21.

Rumor prevails here that the properties of the Southern Car and Foundry Company, which concern has general offices in Birmingham, with plants in Memphis, Tenn.; Lenoir City, Tenn.; Gadsden and Anniston, Ala., have been sold to some Eastern concern. J. M. Elliott, president of the company, has been in the East for some little time, and his return is anticipated this week. It is denied that negotiations have been had with the Pressed Steel Car Company, of Pittsburg.

Chicago Nov. 3.

(From Our Special Correspondent.)

The pig iron market continues to be characterized by light sales. Hardly anybody is buying heavily for future deliveries, the furnaces being practically sold out to July 1. Nearly everybody wants spot iron; that is, material that can be delivered in 30 to 60 days. For this there is a premium of \$2 to \$3 a ton over the nominal quotations for the first half of next year. These quotations are: No. 1 Northern, \$23.50 @\$.24; No. 2 Northern, \$23@\$.23.50; No. 3 Northern, \$22.50@\$.23; No. 1 Southern, \$24.15@\$.24.65; No. 2 Southern, \$23.65@\$.24.15; No. 3 Southern, \$23.15 @\$.23.50. Apparently there will be no increase in the sales of pig iron for two or three months. The furnacemen are becoming conservative, and prefer to hold their iron rather than sell it, with the coke market in such a doubtful condition as exists. Coke continues to be the thorn in the flesh of the producers of pig iron. Furnaces sell for \$11@\$.12, and foundry brings \$12 @\$.14, and nobody can get anywhere nearly enough. The winter is certain to increase the transportation difficulty, and that is the main difficulty. Buyers are willing to pay the high price for coke, provided they can get the fuel, but they cannot get it.

Cleveland Nov. 4.

(From Our Special Correspondent.)

Iron Ore.—The figures showing the movement of ore down the lakes during the month of October have not been compiled as yet. Enough have come in, however, to indicate that 3,300,000 tons were shipped. This will bring the total to November 1 up to 24,000,000 tons which is as much as was at first expected would be moved during the entire season. The rate controversies have about disappeared under a partial victory for the shippers, who are paying now 65c. from Escanaba to Ohio, an advance of 5c., and 75c. to Buffalo, a new rate altogether, as it reintroduces the



differential on the rate between other Lake Erie ports and Buffalo. The other rates are 70c. from Marquette and 80c. from Duluth. A few sales of low-grade ore have been made of late at the old prices of \$4.25 for bessemer old range; \$3.25 for non-bessemer old range and bessemer Mesabi; and \$2.75 for non-bessemer Mesabi.

**Pig Iron.**—The coke supply is shorter than ever and four furnaces that were in blast a week ago have banked, and some of the others, while hoping to begin operations soon, are still engaged in collecting their coke. A week's supply is about the best that can be done now. This is depriving the market of any material from these furnaces either for this year or for the first half of next year's delivery at any price, thus throwing all of this business into the hands of the foreign furnaces. The only possible relief can come from the new furnaces that are scheduled to be blown in about next March. The prices have not changed in the least. They are as follows: No. 2 foundry, \$23, Valley furnace, for delivery during the first half of next year, and \$21 for the second half; No. 2 foundry, \$18@21, Birmingham, for Southern iron for first half delivery and the same for second half; Bessemer, \$23 for first half delivery, Valley furnace, and \$21 for second half delivery; basic, \$20.50@21 for first and second half delivery; Scotch No. 1, \$25.50 delivered; Nova Scotia No. 1, \$23.50 delivered for spot shipment.

**Finished Material.**—Plates still lead the market in the amount of material sold, and were it not for the fact that a new force is governing the steel market it would lead in the price paid also. The material is not only sold up for first half delivery, but it is said now that most of the possible product for the entire year has been disposed of. Small mills are doing a large business as far ahead as they are willing to take orders, but are confining themselves mostly to the present needs of consumers, out of which they are reaping a rich harvest in premium prices. The jobbers are getting 2.50c. out of stock, the smaller mills 2.10c., while the larger mills are demanding 1.60c. at the mill. The bar iron situation is stronger, as is also bar steel, and this formed one of the brightest spots in the market. The possible output for the remainder of this year has been sold up at 1.80c. Pittsburgh, the universal quotation now, and on that basis some inquiries have been made on material for future delivery. Structural shapes have also been strong during the week with, however, the productive capacity not so heavily cumbered with orders as they have been in times just recently past when nothing was to be had for a considerable time in the future. The larger mills are, in fact, obtaining orders now for material for delivery early in next year, and expect to fill them. Sheets are still weak, but the prices have not changed. They hold at 3.10@3.25c. out of stock for No. 27 as a base on all gauges. There has been a reduction on the price of tubes which was thought to indicate a weakness in the market, but which proved to be a competitive measure on the part of the trust with a possibility that some further reductions will have to be made to either meet or wipe out the competition. This week 1,000 tons of bessemer slabs were sold at a price ranging about \$29.50 at the mill.

**Old Material.**—The price of cast scrap has been advanced to \$19 from \$17.50. Other prices remain as they were.

Philadelphia. Nov. 5.

(From Our Special Correspondent.)

**Pig Iron.**—During the past two or three days pig iron people have been hearing some rumors which lead them to believe that large contracts will be placed for late delivery for domestic irons. It is not very clear just where this iron is to come from for every representative says that capacity is sold up and in some cases farther than the furnace owners think advisable. In inquiring around as to the probable basis for these rumors it is learned that a number of large consumers in this territory have about decided to increase their contract supply. This would go to show that they at least have no apprehension as to any declining tendency. The action of the Alabama furnace people has had its influence here. The shortage of the pig iron supply in this locality due to deficient fuel has created a stringency, but this is only temporary. Users of pig iron have been gathering in a good deal of work, and they simply want to cover and be safe. This explains the rumors. The actual business done from day to day in this market does not amount to much. Quite a number of buyers are just about out. Quite a lot of foreign iron is due in the next few weeks. Latest reports from abroad by cable are that foreign iron will move up a little. Special brands of iron are receiving most attention, and the owners of these furnaces are crowded with urgent orders, but they are not accepting all of them. Quotations for American iron are No. 1 X, \$23.50@25; No. 2 X, \$22.50@23.25; No. 2 plain, \$22; standard gray forge, \$21; basic, \$20.50.

**Billets.**—Importers are between two fires, and are not accepting all the business that is within their grasp. They hope their difficulties will be cleared up within a few days. The marked difference in prices

between American and German billets has piled up quite a number of inquiries, and importers feel quite certain that they will scoop in a large amount of business before the close of the year. German billets are quoted as low as \$27.50, duty paid.

**Bars.**—A little increase in merchant iron capacity is at hand; some mill capacity that has been idle resumes on Monday. The fuel question will soon be forgotten. Steel bars can be had at \$1.75c., and buyers hope to do better. Refined bars are 2c., though in a large way a better quotation is offered.

**Muck Bars.**—Muck bars have weakened about 50c., and considerable business is promised.

**Plates.**—This branch of the iron trade shows no sign of weakness, and there are buyers big and little, some of them in a hurry and some not, but all anxious to be taken care of. Manufacturers are making no concessions, although rumors are heard occasionally that a big buyer has made exceptionally favorable terms. Small lots are 2.15c.; car lots, 2c.; universals, 2@2.10c.; flange, 2.20@2.25c.; fire-box, 2.30@2.40c. These figures do not refer to big transactions.

**Structural Material.**—Business has been done in a large way at 1.75c., and mill people are more amenable to reason, and are quite willing to talk on the subject of concessions for late deliveries.

**Old Rails.**—Old iron rails are occasionally picked up, but the owners of them appear unwilling to tear up their old rails even where they have been condemned.

**Scrap.**—Everything of the scrap kind sells without any trouble. Low phosphorus scrap is being looked after, but buyers think \$26.50 enough to pay for it; wrought turnings are taken up at \$16; heavier stuff, \$17; machinery cast, \$20; country scrap is coming along at \$21. Railroad scrap seems to be all under contract, but it is nominally \$24.

Pittsburg. Nov. 4.

(From Our Special Correspondent.)

There was no movement of coke on Sunday, and as a result all the blast furnaces in the Valleys were reported idly yesterday and to-day. The shortage was so serious that a number of furnaces did not have enough to bank, and were blown out. There have been no deliveries of pig iron this week, and prices are stiffening. The furnaces will be unable to fill contracts taken for this year, and a heavy tonnage will go over into next year. Prices for early delivery have advanced to almost prohibitive figures. An offer of \$25, Valley furnace, for bessemer pig iron for spot shipment, is reported to-day. A broker declared that an order for immediate shipment could not be accepted at any price. The discouraging condition of affairs has delayed the closing by the United States Steel Corporation of negotiations with the Bessemer Furnace Association for its pig iron requirements after April 1. As the price of coke has been fixed by the leading producer at \$3 a ton it is likely that a deal will be concluded shortly for probably 300,000 tons. The scarcity of pig iron has affected the operation of rolling mills and steel plants, and while none in the Pittsburgh district has been forced to suspend operations all are more or less crippled. A shortage of coal is threatened and may result in the shutting down of a number of mills before the end of the week. Reports for the week ending to-day indicate that on all roads leading to Pittsburgh the average number of cars for coal shipment was not more than 10 per cent. There are 46 mines on the Panhandle road, and of this number but 6 were in operation Saturday and yesterday. When running full these mines require about 1,500 railroad cars daily, but less than 200 are being furnished. The Monongahela and Valley divisions of the Pennsylvania Railroad are in as bad shape and less than 10 per cent of the cars needed were supplied yesterday. The president of one of the large companies that supplies the bulk of the coal consumed by the great McKeesport plant of the National Tube Company said to-day that unless more cars are sent to the mines this week it will be impossible to deliver the necessary supply of coal, and that the works will be forced to close. Mills along the river front will not be affected, as they can secure all the fuel needed from the Monongahela River Consolidated Coal and Coke Company, which has from 15,000,000 to 20,000,000 bush. loaded in boats and barges, and can make quick delivery. All the mines of this company are in full operation.

The steel market is quiet, and bessemer billets are down, being quoted at \$28 delivered at Pittsburgh. The demand for structural material is increasing, but deliveries are very bad. A large tonnage of finished material loaded in cars are tied up. Independent pipe and tube mills have been shading prices, and it was reported to-day that the National Tube Company will announce a reduction this week. The report was denied by an official of the company, but it was admitted that all prices made would be met before any trade was lost. Charcoal iron is very scarce, and the advanced price of boiler tubes established two weeks ago will not be changed.

A cut in the price of tin plate has just been an-

nounced by the American Tin-Plate Company of 40c. a box, making the new rate \$3.40. The price of \$4 a box for 100-lb. coke plates, f. o. b. mill, has continued since the fall of 1900, and was a reduction from \$4.65 a box. That a change in price was contemplated by the company was indicated when it made the last quotation to extend only to December 1 instead of up to the close of the quarter, as has always been customary. The cut having been anticipated caused a delay in buying, and as a result about one-half of the mills of the American Tin-Plate Company have been closed. The favorable action taken by the Amalgamated Association of Iron, Steel and Tin Workers which will enable the company to bid for the export trade has not resulted as satisfactorily as was expected in the starting of the idle mills. The large plant at Elwood, Ind., was put in operation yesterday, and others are expected to start this week. It is believed that all will be in full operation when the lower price goes into effect on the first of next month. There is some doubt as to whether the independent tin-plate mills can meet the reduction and continue to operate their plants. It will be possible, it is believed, if the price of steel is kept down to \$28, but there will be little profit in the business.

**Pig Iron.**—The heavy curtailment of pig iron production due to the lack of coke will necessitate heavier importations. Quotations of bessemer iron for delivery this year are merely nominal. Transactions are limited. For the first quarter \$22@22.50, Valley furnaces, is quoted, and \$21.50 for the second quarter. Gray forge is \$21@22, Pittsburg, according to delivery, and No. 2 foundry is quoted at \$23, Pittsburg, for next year.

**Steel.**—The steel market is quiet. Bessemer billets are quoted at \$28, Pittsburg. Heavy buying of plates continues and the market is strong. For this year's delivery it is impossible to do better than 2c. For late delivery, 1.60c., the pool price, is quoted. Steel bars continue at 1.60c., and the mills are all busy on old contracts.

**Sheets.**—There is a good demand for sheets, and the outlook is encouraging. The American Sheet Steel Company is still quoting black sheets, No. 28 gauge, at 2.75c., and galvanized at 75 and 10 per cent off.

**Ferro-manganese.**—Domestic, 80 per cent, is still out of the market, and the foreign product is held at \$51.50@52.50, in large lots.

#### CHEMICALS AND MINERALS.

(See also wholesale prices on page 640.)

New York, Nov. 5.

**Heavy Chemicals.**—Contracts are still being made over next year at recent prices. Spot business is moderate. The receiver of the American Alkali Company has made an agreement whereby a 50 per cent interest in the Canadian Electro Chemical Company, whose stock is owned by the Alkali Company, is transferred to the Consolidated Lake Superior Company in settlement of the latter company's claim for \$80,000. Under the same agreement the American Alkali Company relinquishes its claim against the Canadian Electro Chemical Company for advances made to it. What the American Alkali Company, capitalized at \$30,000,000, will do without a plant may be conjectured. Preparations are said to be under way for another large alkali plant in Michigan. A Detroit company with \$1,000,000 capital is to push the enterprise. Advices from abroad state that the Castner-Kellner Alkali Company has declared an interim dividend at the rate of 6 per cent per annum for the six months ended September 30 last. The third annual report of the Electrolytic Alkali Company, Limited, operating the Hargreaves-Bird process, shows a net profit for the year of £6,420 (\$32,101), ending August 31, 1902. To this has to be added £1,242 (\$6,210) brought forward, making an available balance of £7,662 (\$38,310), which the directors propose to apply to the payment of the cumulative dividend. This will absorb £7,331 (\$36,653), leaving a balance of £331 (\$1,655) to be carried forward. The process continues to work well, and the bleaching powder and alkali are good.

We quote domestic chemicals, per 100 lbs., f. o. b. works, as follows: High test alkali, in bags, 82½@87½c., for prompt shipment, and 77½@85c. for forward; caustic soda, high-test, \$1.90@1.95 for early delivery, and \$1.50@1.87½ for futures; bicarb. soda, ordinary, \$1, and extra, \$3; sal soda, 60@65c.; chlorate of potash crystals, \$7.50@7.75, for immediate shipment, and \$6.87½@7.12½ for contracts; bleaching powder, next year's delivery, \$1@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@7.75 for prompt, and \$7@7.25 for forward; bleaching powder, prompt, prime brands, Liverpool, \$1.75; Continental, \$1.55@1.65; contracts at \$1.12½@1.25, according to seller and time of delivery.

**Acids.**—Sulphuric acid showed a marked improvement in the October deliveries, and although produc-

tion was larger than September, stocks have not accumulated to any great extent. Oxalic acid and blue vitriol are unsettled, owing to second-hand trading. Prices for 1903 contracts of oxalic acid are not expected to exceed \$5.50 per 100 lbs. on large orders, and even a lower range is likely to be decided on.

Exports of copper sulphate from the United States in September amounted to 177,826 lbs., making 29,908,104 lbs. in the 9 months this year. In the corresponding period last year the exports totaled 47,081,121 lbs., showing a falling off in 1902 equal to 17,173,017 lbs., or 36.5 per cent. This decrease is due principally to the smaller purchases by the vineyards in Italy and Austria.

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.....	\$4.50@5.10	Oxalic com'l.....	\$5.62½@5.75
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

**Brimstone.**—Spot is scarce, and nearby arrivals are \$23.50@24 per ton for best unmixed seconds. Shipments held at \$23@23.25. Best thirds are quiet at \$1.75 less than seconds.

Brimstone imports into the United States in September were 19,571 tons, making a total of 131,449 tons in the 9 months this year. This shows an increase of 11,968 tons as compared with the 9 months last year, and 14,555 tons over 1900, credited to the paper trade. We re-exported 1,152 tons this year, as against 151 tons in 1901.

**Pyrites.**—Domestic production is increasing, and is nearly all under contract. Importers of Spanish pyrites are also doing a good business at firm prices.

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 into the United States in September were 49,197 tons, making a total of 335,941 tons in the 9 months this year, as against 303,286 tons in 1901, and 256,625 tons in 1900. The increase of 32,665 tons in 1902 is equivalent to over 15,000 tons of sulphur, and is credited chiefly to acid manufacturers. The average value of the imports this year was \$3.81 per tons, which is 20c. better than 1901, and 52c. higher than 1900. It is also noteworthy that lower ocean freights have ruled this year, as importers made long time contracts whenever possible.

**Nitrate of Soda.**—The market continues to improve, and numerous orders from small powder manufacturers have been closed. On spot importers ask around \$1.90 per 100 lbs., while futures vary from \$1.82½@1.92½, according to position. The Santiago Nitrate Company has declared a final dividend of 6s. (\$1.44) per share from last year's earnings, making a total of 18 per cent for the year. The company has placed £20,000 (\$100,000) to reserve, and carries forward £329 (\$1,645).

Imports of nitrate of soda into the United States in September were 33,171 tons, making a total of 147,980 tons this year, as against 152,518 tons in 1901. The decrease of 4,538 tons is due chiefly to the curtailed consumption by powder makers, owing to the coal strike.

**Sulphate of Ammonia.**—Shipments continue to ease off, and \$2.92½@2.95 per 100 lbs. for good gas liquor, is obtainable. Spot shows little interest around \$2.95.

**Phosphates.**—In Tennessee there is marked activity in phosphate mining, and some valuable land has recently changed hands. New companies have been formed to work these deposits, and with the present satisfactory demand, both here and abroad, there seems little reason why new operators should not be successful.

Florida and South Carolina districts show little change, as the largest operations are in comparatively few hands.

On the whole, prices are unchanged, while low freight rates favor exporters.

Exports of phosphates from all United States ports in September amounted to 101,126 tons, which shows an increase of 32,256 tons over the same month last year. In the 9 months this year the exports totaled 597,114 tons, as against 576,483 tons in the corresponding period in 1901. The increase of 20,631 tons, or 3.6 per cent this year is credited chiefly to the heavier consumption in Germany and Great Britain. Of the total exports this year the Florida mines furnished 460,709 tons, or over 77 per cent, while the balance of 136,405 tons, or 23 per cent is credited to Tennessee and South Carolina.

Phosphates.	Per ton F. o. b.	United Kingdom or European Ports.	
		Unit.	Long ton.
*Fla. hard rock (78@80%)..	\$3.50@7.00	6½@d.	\$10.07@10.27
*Fla. land pb. (68@73%)..	3.00@ 3.25	4½@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 .....	.....	.....
‡So. Car. land rock.....	@ 3.25	4½@5d.	5.67@ 6.30
‡So. Car. river rock.....	2.75@ 3.00 .....	.....	.....
Algerian (63@68%).....	.....	5½@6½d.	7.15@ 8.13
Algerian (58@63%).....	.....	5@5½d.	6.00@ 6.90
Algerian (53@58%).....	.....	4½@5d.	5.32@ 5.58

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

METAL MARKET.

New York, Nov. 5.

GOLD AND SILVER.

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

Metal	September.		Year.	
	1901.	1902.	1901.	1902.
Gold:				
Exports.....	\$163,362	\$514,501	\$32,680,569	\$30,980,761
Imports.....	11,905,431	3,012,385	35,460,042	22,937,72
Excess. I. \$11,742,069	E. \$2,497,864	E. \$2,719,473	E. \$8,043,064	
Silver:				
Exports.....	4,934,683	4,635,803	41,487,929	35,580,539
Imports.....	2,195,327	2,397,640	22,491,144	18,702,977
Excess. E. \$2,639,456	E. \$2,238,163	E. \$18,996,785	E. \$16,878,462	

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

Gold and Silver Exports and Imports, New York.

For the week ending November 5, and for years from January 1:

Period.	Gold.		Silver.		Total Excess, Exports or Imports.
	Exports.	Imports.	Exports.	Imports.	
Week ...	\$4,014	.....	\$422,329	.....	E. \$426,343
1902.....	24,759,532	\$3,258,326	22,942,458	\$900,416	E. 42,883,218
1901.....	28,986,047	4,325,656	26,529,721	3,280,277	E. 47,909,835
1900.....	36,644,609	7,319,722	34,107,136	4,117,431	E. 59,313,986

Gold exports were to the West Indies, and silver, chiefly to London. Import figures have been delayed, owing to the holiday, and will appear next week.

Financial Notes of the Week.

Business generally has been quieter than for some time past, and the speculative markets have been dull. Money is a little more plentiful. In spite of the apparent trade balance, there is a general expectation that gold will go out to Europe before long.

The statement of the New York banks, including the 59 banks represented in the Clearing House, for the week ending November 1, gives the following totals, comparison being made with the corresponding weeks of 1901 and 1900:

	1900.	1901.	1902.
Loans and discounts..	\$792,330,300	\$891,922,900	\$878,509,700
Deposits .....	841,775,200	958,062,400	893,791,200
Circulation .....	30,717,800	31,875,900	42,093,900
Specie .....	158,043,100	178,459,700	174,524,000
Legal tenders .....	58,351,100	71,538,700	70,262,900
Total reserve .....	\$216,394,200	\$249,998,400	\$244,786,900
Legal requirements ..	210,443,800	239,515,600	223,447,800
Balance, surplus ..	\$5,950,400	\$10,482,800	\$21,339,100

Changes for the week this year were increases of \$7,532,100 in loans and discounts, \$11,105,900 in deposits, \$1,965,000 in circulation, \$5,491,500 in specie, \$842,600 in legal tenders, and \$3,557,625 in surplus reserve.

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

	1901.		1902.	
	Gold.	Silver.	Gold.	Silver.
N. Y. Ass'd.	\$178,459,700	.....	\$174,524,000	.....
England .....	178,272,615	.....	170,453,070	.....
France .....	475,146,785	\$219,293,745	507,043,750	\$221,758,090
Germany .....	161,305,000	62,730,000	164,510,000	60,845,000
Spain .....	70,030,000	84,810,000	71,510,000	97,245,000
Neth'lds .....	28,781,500	29,042,000	23,456,000	32,261,000
Belgium .....	15,233,335	7,616,665	15,543,335	7,771,665
Italy .....	79,665,000	9,849,500	81,465,000	10,202,000
Russia .....	332,970,000	29,190,000	359,995,000	33,435,000

The returns of the Associated Banks of New York

are of date November 1, and the others October 30, 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.

Shipments of silver from London to the East for the year up to October 23 are reported by Messrs. Pixley & Abell's circular as follows:

	1901.	1902.	Changes.
India .....	£6,367,910	£5,223,730	D. £1,144,180
China .....	590,212	162,500	D. 427,712
The Straits .....	366,001	492,120	I. 126,119
Totals .....	£7,324,123	£5,878,350	D. £1,445,773

Receipts this week were £140,000 in bar silver from New York, and £5,000 from the West Indies; total, £145,000. Shipments were £102,700 in bar silver to Bombay and £16,200 in coin to Australia; total, £118,900.

Indian exchange continues steady, and all the Council bills offered in London were taken at an average of 15.96d. per rupee. Buying of silver for India is on a small scale only.

The coinage executed at the mints of the United States in October is reported by the Bureau of Statistics, Treasury Department, as below:

Denomination.	October, 1902.		October, 1901.	
	Pieces.	Value.	Pieces.	Value.
Double-eagles ..	\$62,000	\$1,240,000	.....	.....
Eagles .....	.....	.....	\$358,000	\$3,580,000.00
Half-eagles .....	80,000	400,000	434,000	2,170,000.00
Quart.-eagles .....	100,000	250,000	.....	.....
Total gold ..	\$242,000	\$1,890,000	\$792,000	\$5,750,000.00
Dollars .....	\$1,010,000	\$1,010,000	\$1,086,000	\$1,086,000.00
Half-dollars ..	1,546,000	773,000	2,195,044	1,097,522.00
Quar.-dollars ..	1,196,000	299,000	1,504,000	376,000.00
Dimes .....	2,050,000	205,000	2,319,665	231,966.50
Total silver ..	\$5,802,000	\$2,287,000	\$7,104,709	\$2,791,488.50
Five c.-nickels ..	\$3,817,000	\$190,850	\$2,382,000	\$119,100.00
One c. bronze ..	9,170,000	91,700	6,828,000	68,280.00
Total minor ..	\$12,987,000	\$282,550	\$9,210,000	\$187,380.00
Total coinage ..	\$19,031,000	\$4,459,550	\$17,106,709	\$8,728,868.50

The total coinage in October this year shows a falling off of \$4,269,318, owing to the small mintage of gold.

The Treasury Department's estimate of the money in the United States on November 1 is as follows:

	Total.	In Treasury.	In Circula.
Gold Coin (inc. bullion in Treasury) .....	\$1,230,672,772	\$263,542,933	\$624,373,645
Gold Certificates .....	.....	.....	342,756,194
Silver Dollars .....	545,527,822	4,840,226	77,517,158
Silver Certificates .....	.....	.....	463,170,438
Subsidiary Silver .....	98,809,323	6,909,608	91,899,715
Treas. Notes of 1890 ..	25,796,000	47,722	25,748,278
U. S. Notes .....	346,681,016	3,041,934	343,639,082
Nat. Bank Notes .....	380,476,334	13,468,852	367,007,482
Total .....	\$2,627,963,267	\$291,851,275	\$2,336,111,992

Population of the United States, November 1, 1902, estimated at 79,572,000; circulation per capita, \$29.36. For redemption of outstanding certificates an exact equivalent in amount of the appropriate kinds of money is held in the Treasury, and is not included in the account of money held as assets of the Government. This statement of money held in the Treasury as assets of the Government does not include deposits of public money in national bank depositaries, to the credit of the Treasurer of the United States, and amounting to \$139,487,590. The total amount in circulation shows an increase of \$60,425,341 over the October report; and an increase of \$89,811,450 over November 1, 1901.

The foreign merchandise trade of France for the 9 months ending September 30 is reported by the Ministry of Commerce as below:

	1901.	1902.
Imports .....	Fr. 3,268,715,000	Fr. 3,269,221,000
Exports .....	2,948,451,000	3,099,771,000
Excess of Imports .....	Fr. 320,264,000	Fr. 169,450,000

This shows an increase of 506,000 fr. only in imports; an increase of 151,320,000 fr. in exports; and a decrease of 150,814,000 fr. in the excess of exports.

Prices of Foreign Coins.

	Bid.	Asked
Mexican dollars.....	\$0.39½	\$0.41½
Peruvian soles and Chilean pesos.....	39½	42
Victoria sovereigns.....	4.85	4.88
Twenty francs.....	3.85	3.88
Twenty marks.....	4.74	4.80
Spanish 25 pesetas.....	4.78	4.82



MISSOURI ZINC ORE MARKET.

Joplin. Nov. 1.  
(From Our Special Correspondent.)

There was a great slump in the shipment of zinc this week, and as a consequence the amount of money that came into the Joplin mining district was less than usual by over \$40,000. The fact was not due to any decline or intermission in mining operations for the output last week was equal to if not above the average, but was due entirely to the shortage of cars. Many thousands of tons of ore were bought for immediate delivery, which the purchasers were unable to ship, and it consequently remains in the bins of the district, which are now in a plethoric condition, while the smelters have not sufficient ore on hands to supply their needs. Failure to secure cars caused a cessation of buying in the middle of the week, and the buyers immediately cut down the prices they had been offering, making a total slump in price of from 50c. to \$1 a ton. It is freely asserted among mine operators that the price of ore would have reached \$40 per ton if the car shortage had not occurred just at the time when the market was in the brightest possible condition. Lead made an advance of 50c. a ton, selling strong at \$50 per ton all the week.

The top price was \$39, and this was paid for the output of the Carnegie Company. The assay basis was generally at \$35 per ton for 60 per cent ore, but some sales were reported as low as \$34 for the standard quality. The bear tone of the market was also largely influenced by a weakening in the New York price of spelter.

Following are the sales in pounds from the various camps of the Joplin mining district for the week, ending November 1, 1902:

	Zinc.	Lead.	Tot. Val.
Joplin	2,698,260	408,930	\$57,443
Cartersville	1,482,130	496,490	36,867
Galena-Empire	890,700	129,820	17,675
Aurora	900,110	7,720	10,993
Zincite	311,650	11,710	5,697
Spurgeon	150,540	40,570	3,272
Duenweg	615,700	29,180	9,966
Prosperity	273,600	426,860	15,324
Cave Springs	171,620	10,210	2,918
Neck City	55,130	10,210	909
Oronogo	212,330	5,870	3,383
Carthage	165,440	.....	2,895
Carl Junction	162,280	.....	2,921
Granby	425,000	37,000	6,075
Fortuna	123,850	.....	2,224
Raymond	47,070	.....	847
Springfield	.....	44,000	1,056

District value, week ending November 1, 1902, zinc \$140,868, lead \$41,643; total, \$182,511. Total 44 weeks, zinc \$453,761,830, lead \$4,829,280; value, \$8,122,941.

OTHER METALS.

Daily Prices of Metals in New York.

Oct. - Nov.	Silver		Copper		Spelter				
	Oct. Exchange	Nov. Exchange	Oct. Exchange	Nov. Exchange	Oct. Exchange	Nov. Exchange			
30	4.86 1/2	50 3/8	23 1/8	11 1/2	52	26 3/4	4.05 @ 4.10	5.30	5.15
31	4.86 1/2	50 3/8	23 1/8	11 1/2	51 3/4	26 3/4	4.05 @ 4.10	5.30	5.12 1/2 @ 5.15
1	4.86 1/2	50 3/8	23 1/8	11 1/2	52	26 3/4	4.05 @ 4.10	5.30	5.12 1/2 @ 5.15
2	4.86 1/2	50 3/8	23 1/8	11 1/2	52	26 3/4	4.05 @ 4.10	5.30	5.12 1/2 @ 5.15
3	4.86 1/2	50 3/8	23 1/8	11 1/2	52	26 3/4	4.05 @ 4.10	5.30	5.12 1/2 @ 5.15
4	.....	.....	.....	.....	52 1/2	.....	.....	.....	.....
5	4.86 1/2	50 3/8	23 1/8	11 1/2	52	26 3/4	4.05 @ 4.10	5.30	5.12 1/2 @ 5.15

London quotations are per Long Ton (2,240 lbs.) standard copper, which is now the equivalent of the former g. m. b's. The New York quotations for electrolytic copper are for cakes, ingots or wirebars; the price of electrolytic cathodes is usually 0.25c lower than these figures.

**Copper.**—Owing to the elections we have again to report a very dull market. Prices have remained steady, but transactions have been few and far between. At the close we quote lake copper, 11 1/2c.; electrolytic in cakes, wirebars or ingots, 11 1/2c.; cathodes, 11 1/4c.; casting copper, 11 3/4c.

The foreign market for standard copper, which closed last Friday at £52, opened on Monday at the same figure, and the closing quotations are cabled as £52@£52 2s. 6d. for spot, and £52 5s.@£52 7s. 6d. for three months prompt.

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

Statistics for the second half of October show a decrease in the visible supplies of 1,300 tons.

Exports of copper from New York in the week ending November 3 were: Great Britain, 444 tons; Germany, 240; Holland, 463; Belgium, 10; Austria, 125; Italy, 232; Turkey, 50; Manila, 2; Panama, 24;

total, 1,590 tons. Last week the copper exports from Baltimore aggregated 314 tons.

Imports of copper in all forms into the United States for the 9 months ending September 30, with re-exports of foreign copper, are reported by the Bureau of Statistics of the Treasury Department as below, in long tons of 2,240 lbs.

	1901.	1902.	Changes.
Figs. bars, etc.:			
Imports	25,103	30,367	I. 5,264
Re-exports	4,858	3,518	D. 1,340
Net imports	20,245	26,849	I. 6,604
Ores and matte:			
Imports	66,046	119,359	I. 53,313
Re-exports	7,788	10,244	I. 2,456
Net imports	58,258	109,115	I. 50,857

As ores and mattes are not reported separately the copper contents can only be estimated approximately. Making such an estimate it appears that the total net imports of fine copper for the 9 months of this year were equal to 58,430 long tons, approximately. Of the imports of metallic copper this year, 15,776 tons, or 52 per cent of the total, came from Mexico, and 13,303 tons, or 40 per cent, from Great Britain. Of the ores and matte, 94,787 tons, or 80 per cent, were from Canada, and 21,237 tons, or 18 per cent, from Mexico.

Exports of domestic copper for the 9 months are reported by the Bureau as follows, in long tons:

	1901.	1902.	Changes.
Fine Copper	65,629	126,790	I. 61,170
Ores and matte	10,673	14,637	I. 3,964

Mr. John Stanton's estimate, heretofore published, puts the total exports in fine copper this year at 135,311 tons, against 68,110 tons last year.

**Tin** ruled very firm last week, but after the elections a somewhat weaker tendency developed.

A cut in the price of tin-plates is reported, which will no doubt tend to stimulate consumption to a large extent, and a continued good consumptive demand is looked for in well-informed circles. At the close we quote spot, 26 3/4c.; November, 26 3/4c.; December, 26c.

The foreign market, which closed last Thursday at £120 5s., opened on Monday at £120 10s., and the closing quotations on Wednesday are cabled as £118 12s. 6d.@£118 15s. for spot, and £117@£117 2s. 6d. for three months prompt.

Statistics for the month of October show a decrease in the visible supplies of 1,600 tons.

Imports of tin into the United States for the 9 months ending September 30 are reported as below, in long tons of 2,240 lbs.:

	1901.	1902.	Changes.
Straits	14,028	16,092	I. 2,064
Australia	332	220	D. 112
London	10,006	11,777	I. 1,771
Holland	898	1,055	I. 157
Other countries	142	391	I. 249
Totals	25,406	29,535	I. 4,129

The total increase this year was 16.2 per cent; one-half of the gain being in direct imports from the Straits.

Visible stocks of tin on November 1 are reported as below, in long tons of 2,240 lbs.:

	Store.	Afloat.	Totals.
U. S., exc. Pac. ports	3,459	2,024	5,483
London	5,357	3,905	9,262
Holland	880	428	1,308
Totals	9,696	6,357	16,053

This shows a total increase of 58 tons, as compared with November 1, 1901.

**Lead** has again been in good demand, but the quotations are unchanged at 3.97 1/2 @ 4.05c., St. Louis, and 4.05 @ 4.10c., New York.

The foreign market is steady, Spanish lead being quoted £10 12s. 6d.@£10 13s. 9d., with English lead 2s. 6d. higher.

Imports of lead in all forms into the United States, with re-exports of foreign lead, for the 9 months ending September 30, are reported as below by the Bureau of Statistics of the Treasury Department; the figures given in the table being in short tons of 2,000 lbs.:

	1901.	1902.	Changes.
Lead, metallic	144	2,175	I. 2,031
Lead in ores and base bullion	86,014	75,695	D. 10,349
Total imports	86,158	77,840	D. 8,318
Re-exports	77,844	62,037	D. 15,807
Balance	8,314	15,803	I. 7,489

Of the lead imported this year 67,901 tons, or 87.2 per cent of the total, came from Mexico, and 7,149 tons, or 9.2 per cent, from Canada. In addition to the re-exports given above, there were 3,238 tons of lead of domestic production exported this year, against 2,363 tons in 1901; an increase of 875 tons.

**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,

**Spanish Lead Market.**—Messrs. Barrington & Holt report from Cartagena, Spain, under date of October 18, as follows: The price of silver during the week has been 12.25 reales per ounce. The exchange has gone down by 55 centimos, making it 33.05 pesetas to £1. The local quotations for pig lead on wharf has been 56.25 reales per quintal, which, on above exchange, is equal to £9 10s. 9d. per ton of 2,240 lbs. f. o. b. Cartagena. Exports of pig lead have been 508,000 kgs. to Newcastle; 399,029 kgs. to London; 212,032 kgs. to Marseilles; 100,000 kgs. to Liverpool; total, 1,219,061 kgs.

**Spelter** has been rather dull and neglected. The closing quotations are 5 1/2 @ 5.15c., St. Louis, and 5.30c., New York.

The foreign market is firmer; good ordinaries are quoted £19 7s. 6d., and specials, 5s. higher.

Exports of spelter, or metallic zinc, from the United States for the 9 months ending September 30, were 2,991 short tons, against 2,691 tons for the corresponding period in 1901; increase of 300 tons, or 11.1 per cent. Exports of zinc ore were 38,977 tons, against 28,286 tons in 1901; an increase of 10,691 tons, or 37.8 per cent.

**St. Louis Spelter Market.**—The John Wahl Commission Company telegraphs us as follows: Spelter is quiet, selling at 5.12 1/2 @ 5.15c., basis East St. Louis.

**Spanish Zinc Ore Market.**—Messrs. Barrington & Holt write from Cartagena, Spain, under date of October 18, reporting shipments from that port of 600 tons blende and 200 tons calamine to Antwerp.

**Antimony** has been in fair demand and at somewhat lower prices; Cookson's, 9 @ 9 1/2c.; Hallett's, 7 3/4 @ 7 1/2c.; Hungarian, Japanese, Italian and U. S. Star, 7 @ 7 1/4c.

Imports of antimony into the United States for the 9 months ending September 30 are reported as below, in pounds:

	1901.	1902.	Changes.
Metal and regulars	3,033,577	4,276,013	I. 1,242,436
Antimony ore	1,618,896	663,227	D. 955,669

The increase in metal was 40.9 per cent; but there was a decrease of 59 per cent in ore.

**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.

Exports of nickel, nickel oxide and nickel matte from the United States for the 9 months ending September 30 were 2,319,425 lbs., against 4,451,215 lbs. for the corresponding period in 1901; a decrease of 2,131,790 lbs., or 47.9 per cent.

**Platinum.**—Consumption continues good, and prices are firm. Ingot platinum in large lots brings \$19 per oz. in New York.

Chemical ware (crucibles and dishes), best hammered metal from store in large quantities, is worth 73 1/2c. per gram.

Imports of platinum into the United States for the 9 months ending September 30 were 5,506 lbs., against 4,955 lbs. for the corresponding period in 1901; an increase of 551 lbs., or 11.1 per cent.

**Quicksilver.**—The New York price continues \$48 per flask for large orders, with a slightly higher figure for small lots. In San Francisco prices are steady, and the quotations are \$45.50 @ \$46.50 per flask for domestic orders. For export orders \$44 per flask is quoted. The London price remains £8 15s. per flask, with the same figure is quoted from second hands.

Exports of quicksilver from all United States ports for the 9 months ending September 30 were 702,439 lbs., against 589,753 lbs. for the corresponding period in 1901; an increase of 112,686 lbs., or 19.1 per cent.

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

	Per lb.	Per lb.	
Aluminum	.....	.....	
No. 1, 99% ingots	33 @ 37c.	Ferro-Tungsten (37%)	28c.
No. 2, 90% ingots	31 @ 34c.	Magnesium	.....
Rolled Sheets	4c. up	Manganese, pure (N.Y.)	60c.
Alum-bronze	20 @ 23c.	Mangan' Cop. (20% Mn)	32c.
Nickel-alum	33 @ 39c.	Mangan' Cop. (30% Mn)	38c.
Bismuth	.....	Molybdenum (Best)	1.82
Chromium, pure (N.Y.)	80c.	Phosphorus	.....
Copper, red oxide	50c.	American	.....
Ferro-Molyb'dum (50%)	1.25	Sodium metal	50c.
Ferro-Titanium (10%)	90c.	Tungsten (Best)	62c.
Ferro-Titanium (20 @ 25%)	.....		
N. Y.)	55c.		

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

Average Prices of Metals per lb., New York.

Month.	Tin.		Lead.		Spelter.	
	1901.	1902.	1901.	1902.	1901.	1902.
January	23.54	26.51	4.000	4.350	4.27	4.19
February	24.07	26.69	4.075	4.350	4.15	4.01
March	26.32	26.03	4.075	4.350	4.28	3.91
April	27.77	25.93	4.075	4.350	4.37	3.94
May	29.85	27.12	4.075	4.350	4.47	4.04
June	29.36	28.60	4.075	4.350	4.96	3.99
July	28.38	27.85	4.075	4.350	5.27	3.96
August	28.23	26.78	4.075	4.350	5.44	3.90
September	26.60	25.31	4.075	4.350	5.49	4.08
October	26.07	26.62	4.075	4.350	5.38	4.23
November	.....	26.67	.....	4.350	.....	4.29
December	.....	24.88	.....	4.183	.....	4.51
Year	.....	26.54	.....	4.334	.....	4.08

Average Prices of Copper.

Table with columns: Month, New York (Electrolytic, Lake), London Standard (1902, 1901). Rows: January to December, Year.

New York prices are in cents, per pound; London prices in pounds sterling, per long ton of 2,240 lbs., standard copper.

Average Prices of Silver, per ounce Troy.

Table with columns: Month, London, N.Y. (1902, 1901, 1900). Rows: January to December, Year.

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, Latest Dividend (Per Share, Total), Total to Date.

ASSESSMENTS.

Table with columns: Name of Company, Location No., Delinq., Sale, Amt.

STOCK QUOTATIONS.

NEW YORK.

Table of stock quotations for New York, including companies like Acacia Colo., Amalgamated, Anaconda, etc.

\*Per cent. †Holiday.

Coal, Iron and Industrial Stocks.

Table of stock quotations for Coal, Iron and Industrial Stocks, including companies like Am. Agr. Chem., Am. Agr. Chem. pf. U.S., etc.

Total sales, 200,417 shares. †Holiday.

BOSTON, MASS.\*

Table of stock quotations for Boston, Mass., including companies like Adventure Con., Actna Con., Allonez, etc.

\* Total sales, 58,944 shares. † Holiday.

PHILADELPHIA, PA.‡

Table of stock quotations for Philadelphia, Pa., including companies like Am. Alkali, Mich., Am. Cement, etc.

‡Reported by Townsend, Whelen & Co., 309 Walnut St., Philadelphia, Pa. Total sales 9,285 shares.



STOCK QUOTATIONS.

COLORADO SPRINGS, COLO.\*

LONDON.

Oct. 22.

Table of stock quotations for Colorado Springs, Colo. listing companies like Acacia, Alamo, Am. Con., Anaconda, etc., with columns for par value, high/low prices, and sales.

\*Colo. Springs Mining Stock Exchange. All mines are in Colorado. Total sales 163,450 shares.

COLORADO SPRINGS (By Telegraph.)

Table of stock quotations for Colorado Springs (By Telegraph) listing companies like Acacia, Alamo, Anaconda, etc., with columns for par value, high/low prices, and sales.

\*Holiday.

PARIS.

Oct. 16.

Table of stock quotations for Paris listing companies like Acieries de Creusot, Huta-Bank, Anzin, etc., with columns for country, product, capital stock, par value, latest dividends, and prices.

ST. LOUIS, MO.\*

Nov. 1.

TORONTO, ONT.

Nov. 3

Table of stock quotations for St. Louis, Mo. and Toronto, Ont. listing companies like Am.-Nettie, Colo., Catherine Lead, etc., with columns for shares, par value, bid/ask prices, and sales.

\*From our Special Correspondent.

Total sales, 19,400 shares.

Table of stock quotations for London listing companies like Anaconda, Arizona, Arizona, etc., with columns for name and country, authorized capital, par value, last dividend, and quotations.

c.—Copper. d.—Diamonds. g.—Gold. l.—Lead. s.—Silver.

MEXICO.

Oct. 24.

Table of stock quotations for Mexico listing companies like Durango, Guanajuato, Angustias, etc., with columns for name of company, shares, last dividend, bid/ask prices, and price.

SALT LAKE CITY.\*

Oct. 31.

Table of stock quotations for Salt Lake City listing companies like Ajax, Ben Butler, Bullion-Bank, etc., with columns for name of company, shares, par value, high/low prices, and sales.

All mines are in Utah. \*By our Special Correspondent. Total sales, 323,616 shares.

**CHEMICALS, MINERALS, RARE EARTHS, ETC.—CURRENT WHOLESALE PRICES.**  
(See also Market Reviews.)

ABRASIVES—		Cust. Meas.	Price.	BARIUM		Cust. Meas.	Price.	GRAPHITE—Am. f.o.b. Prov.		Cust. Meas.	Price.	PAINTS AND COLORS—		Cust. Meas.	Price.	
Carborundum, f.o.b. Niagara Falls, Powd., F.F.F.F.F.	lb.		\$0.08	Oxide, Am. hyd. cryst.	lb.		\$0.02½	Idence, R. I., lump	sh. ton		\$8.00	Metallic, brown	sh. ton		\$19.00	
Grains	"		.10	Sulphate (Blanc Fixe)	"		.02	Pulverized	"		30.00	Red	"		16.00	
Corundum, N. C.	"		.07@.10	<b>BARYTES—</b>				German, com. pulv.	lb.		.01¼@.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.	"		.02¼@.03½	Dutch, washed	lb.		.04¼	
Mont., f.o.b., Chicago	"		.07@.07½	Crude, No. 3	"		7.75	Best pulverized	"		.04@.08	French, washed	"		.01½@.01¾	
Crushed Steel, f.o.b. Pittsburg	"		.05½	German, gray	"		14.50	Italian, pulv.	"		.01¼	Orange mineral, Am.	"		.07¼@.08	
Emery, Turkish flour in kegs	"		.03½	Snow white	"		17.00	GYP-SUM—Ground	sh. ton		8.00@8.50	Foreign, as to make	"		.08¼@.11¼	
Grains, in kegs	"		.05@.05½	<b>BAUXITE—Ga. or Ala. Mines:</b>				Fertilizer	"		7.00	Paris green, pure, bulk	"		.12	
Naxos flour, in kegs	"		.03½	First Grade	lg. ton		5.50	Rock	lg. ton		4.00	Red lead, American	"		.05¼@.06	
Grains, in kegs	"		.05@.05½	Second grade	"		4.75	English and French	"		14.00@16.00	Foreign	"		.06¼@.08	
Chester flour, in kegs	"		.03½	<b>BISMUTH—Subnitrate</b>				INFUSORIAL EARTH—Gr'd.	"			20.00	American, in oil	"		.05¼@.05¾
Grains, in kegs	"		.05@.05½	lb.			1.40	American best	"		37.50	Foreign, in oil	"		.06¼@.09¼	
Peekskill, f.o.b. Easton, Pa., flour, in kegs	"		.01½	Subcarbonate	"		1.65	German	"		40.00	Zinc, white, Am., ex dry	"		.04¼@.04¾	
Grains, in kegs	"		.02½	<b>BITUMEN—"B"</b>				IODINE—Crude	100 lbs.			2.45	American, red seal	"		.06¼
Crude, ex-ship N. Y.: Abbott (Turkey)	lg. ton		26.50@30.00	"A"	"		.05	IRON—Muriate	lb.		.05	Green seal	"		.07	
Kuluk (Turkey)	"		22.00@24.00	<b>BONE ASH</b>				Nitrate, com'l	"		.01¼	Foreign, red seal, dry	"		.05¼@.08¼	
Naxos (Greek) h. gr.	"		26.00	BORAX	"		.07¼@.07½	True	"		.04	Green seal, dry	"		.06¼@.09¼	
Garnet, as per quality	sh. ton		25.00@35.00	<b>BROMINE</b>				Oxide, pure copperas color	"		.05@.10	<b>POTASH</b>				
Pumice Stone, Am. powd.	lb.		.01¼@.02	CADMIUM—Metallic	"		1.40	Purple-brown	"		.02	Caustic, ordinary	"		.04¼@.05	
Italian, powdered	"		.01¼	Sulphate	100 lbs.		2.00@2.50	Venetian red	"		.01@.01½	Elect. (90%)	"		.06¼	
Lump, per quality	"		.04@.40	<b>CALCIUM—Acetate, gray</b>				Scale	"		.01@.03	<b>POTASSIUM—</b>				
Rottenstone, ground	"		.02¼@.04½	Carbide, ton lots f.o.b. Niagara Falls, N. Y., for Jersey City, N. J.	sh. ton		70.00	KAOLIN—(See China Clay.)	"			Bicarbonate cryst	"		.08¼	
Lump, per quality	"		.06@.20	Carbonate, ppt.	lb.		.05	KRYOLITH—(See Cryolite.)	"			Powdered or gran.	"		.14	
Rouge, per quality	"		.10@.30	Chloride	100 lbs.		.70@.90	LEAD—Acetate, white	"		.07¼@.08	Bichromate, Am.	"		.08¼@.08¾	
Steel Emery, f.o.b. Pittsburg	"		.07	<b>CEMENT—</b>				Brown	"		.06	Scotch	"		.08¼@.09	
<b>ACIDS—</b>																
Boric, crystals	"		.10¼@.11	Portland, Am., 400 lbs.	bb. l.		1.70@1.90	Nitrate, com'l	"		.06½	Carbonate	"		.03¼@.03¾	
Powdered	"		.11¼@.11½	Foreign	"		1.65@2.25	" gran.	"		.08¼	Chromate	"		.35	
Carbonic, liquid gas	"		.12½	"Rosendale," 300 lbs.	"		.75	Finishing	"		.90	Cyanide (98@99%)	"		.23	
Chromic, crude	"		.20	Slag cement, imported	"		1.65	<b>MAGNESITE—Greece.</b>				Kainit	"		6.05	
Hydrofluoric, 30%	"		.03	<b>CERESINE—</b>				Crude (95%)	lg. ton		6.00@6.50	Manure salt, 20%	100 lbs.		.66	
48%	"		.05	Orange and Yellow	lb.		.12	Calcined	sh. ton		17.50@18.00	D'le Manure Salt, 48@53%	"		1.12	
60%	"		.11	White	"		.13¼	Bricks	M		170.00	Muriate, 80@85%	"		1.83	
Sulphurous, liquid anhyd.	"		.05	CHALK—Lump, bulk	sh. ton		2.50	Am. Bricks, f.o.b. Pittsburg	"		175.00	95%	"		1.86	
<b>ALCOHOL—Grain</b>																
Refined wood 95@97%	gal.		2.47	Ppt. per quality	lb.		.08¼@.06	<b>MAGNESIUM—</b>				Permanganate	lb.		.00¼@.10	
Purified	"		1.20@1.50	CHLORINE—Liquid	"		.30	Carbonate, light, fine pd.	lb.		.05	Prussiate, yellow	"		.13¼@.14	
<b>ALUM—Lump</b>																
Ground	100 lbs.		1.80	Water	"		.10	Blocks	"		.07@.09	Red	"		.36	
Powdered	"		8.00	<b>CHROME ORE—</b>				Chloride, com'l	"		.01¼	Sulphate, 90%	100 lbs.		2.11	
Chrome, com'l	"		2.75@3.00	(50% ch.) ex-ship N. Y.	lg. ton		24.75	Fused	"		.20	96%	"		2.14	
<b>ALUMINUM—</b>																
Nitrate	lb.		1.50	Bricks f.o.b. Pittsburg	M		175.00	Nitrate	"		.60	Sylvinit	unit		.39¼	
Oxide, com'l, common	"		.08¼	<b>CLAY, CHINA—Am. com. ex-dock, N. Y.</b>				70@75% binoxide	lb.		.01¼@.01½	<b>QUARTZ—(See Silica.)</b>				
Best	"		.20	dock, N. Y.	lg. ton		8.00	Crude pow'd.	"			SALT—N. Y. com. fine	sh. ton		2.00	
Pure	"		.80	Am. best, ex-dock, N. Y.	"		9.00	75@85% binoxide	"		.01¼@.02¼	N. Y. agricultural	"		1.50	
Hydrated	100 lbs.		2.60	English, common	"		12.00	85@90% binoxide	"		.02¼@.03¼	<b>SALTPETRE—Crude</b>				
Sulphate, pure	"		1.50@2.00	Best grade	"		17.00	90@95% binoxide	"		.03¼@.05¼	Refined	"		4.25@4.62½	
Com'l	"		1.15@2.00	Fire Clay, ordinary	sh. ton		4.25	Carbonate	"		.16@.20	SILICA—Best foreign	lg. ton		10.00@11.00	
<b>AMMONIA—</b>																
Aqua, 16°	lb.		.03	Best	"		6.00	Chloride	"		.04	Ground quartz, ord.	sh. ton		6.00@8.00	
18°	"		.03¼	Slip Clay	"		5.00	Ore, 50%, Foreign	unit		.18@.19	Best	"		12.00@13.00	
20°	"		.03¾	COAL TAR PITCH	gal.		.08	Domestic	"		.30	Lump quartz	"		2.50@4.00	
26°	"		.05¼	COBALT—Carbonate	lb.		1.75	MARBLE—Flour	sh. ton		6.00@7.00	Glass sand	"		2.75	
<b>AMMONIUM—</b>																
Carbonate, lump	"		.08¼	Nitrate	"		1.50	MERCURY—Bichloride	lb.		.77	SILVER—Chloride	oz.		.65	
Powdered	"		.09	Oxide—Black	"		2.26@2.30	MICA—N. Y. gr'nd, coarse	sh. ton		33.00@38.00	Nitrate	"		.35	
Muriatic, grain	"		.05¼	Gray	"		2.28@2.40	Fine	lb.		.00¼@.02	Oxide	"		.85@1.11	
Lump	"		.08¼	Small, blue ordinary	"		.08	Sheets, N. C., 2x4 in.	"		.30	<b>SODIUM—</b>				
Nitrate, white, pure (90%)	"		.12	Best	"		.20	3x3 in.	"		.80	Bichromate	lb.		.06¼	
Phosphate, com'l	"		.09	Slip Clay	"		6.00	3x4 in.	"		1.50	Chlorate, com'l	"		.07¼@.08	
Pure	"		.12	COAL TAR PITCH	gal.		.08	4x4 in.	"		2.00	Hyposulphite, Am.	100 lbs.		1.60@1.65	
<b>ANTIMONY—Glass</b>																
Needle, lump	"		.30@.40	COBALT—Carbonate	lb.		1.75	6x6 in.	"		3.00	German	"		1.70@1.90	
Needle, lump	"		.05¼@.06	Nitrate	"		1.50	<b>MINERAL WOOL—</b>				Peroxide	lb.		.45	
Powdered, ordinary	"		.05¼@.07¼	Oxide—Black	"		2.26@2.30	Slag, ordinary	sh. ton		19.00	Phosphate	"		.02¾	
Oxide, com'l white, 95%	"		.09¼	Gray	"		2.28@2.40	Selected	"		25.00	Prussiate	"		.11@.11¼	
Com'l white, 95%	"		.12	Small, blue ordinary	"		.08	Rock, ordinary	"		32.00	Silicate, conc.	"		.05	
Com'l gray	"		.07	Best	"		.20	Selected	"		40.00	Com'l	"		.01	
Sulphuret, com'l	"		.16	COPPERAS—in bulk	100 lbs.		.37¼	NICKEL Oxide, No. 1	lb.		1.00	Sulphate, com'l	100 lb.		.75@.82¼	
<b>ARSENIC—White</b>																
	"		.02¼@.03¼	COPPER—Carbonate	lb.		.18@.19	No. 2	"		.60	Sulphide	lb.		.01¼	
Red	"		.06¼@.07	Chloride	"		.42¼	Sulphate	"		.20@.21	Sulphite crystals	"		.02¼	
<b>ASPHALTUM—</b>																
Ventura, Cal.	sh. ton		\$2.00	Nitrate, crystals	"		.25	<b>PAINTS AND COLORS—</b>				Sulphur—Roll	100 lbs.		1.85	
Cuban	lb.		.01¼@.03¼	Oxide, com'l	"		.19	Chrome green, common	"		.05	Flour	"		1.90	
Egyptian, crude	"		.05¼@.06	CEYOLITE	"		.08¼	Pure	"		.16	Flowers, sublimed	"		2.15	
Trinidad, refined	sh. ton		\$5.00	EXPLOSIVES—	"			Yellow, common	"		.10¼	TALC—N. C., 1st grade	sh. ton		13.75	
San Valentino (Italian)	lg. ton		16.00	Blasting powder, A.	25 lb. keg		.65	Best	"		.25	N. Y., Fibrous, best	"		10.20	
Seyssel (French), mastic	sh. ton		21.00	Blasting powder, B.	"		1.40	Zero	"		.11¼@.12¼	French, best	100 lbs.		1.25	
Gilsonite, Utah, ordinary	lb.		.03	"Backarock," A.	lb.		.25	Summer	"		.09¼@.09¾	Italian, best	"		1.62¼	
Select	"		.03¼	"Backarock," B.	"		.18	Cylinder, dark steam ref.	"		.08¼@.10¼	TAR—Regular	bb. l.		2.20	
<b>BARIUM—</b>																
Carb. Lump, 80@90%	sh. ton		25.00@27.50	Judson R. R. powder	"		.10	Oil barrels	"		2.30	TIN—Crystals	lb.		.42	
92@98%	"		26.00@29.00	Dynamite (20% nitro-glycerine)	"		.13	Oxide	"		.25	Zero	"		.10¼@.11¼	
Powdered, 80@90%	lb.		.01¼@.02	(30% nitro-glycerine)	"		.14	Dark, filtered	"		.11¼@.15¼	URANIUM—Oxide	"		2.25@3.00	
Chloride, com'l	100 lbs.		1.67¼@1.76	(40% nitro-glycerine)	"		.15	Light, filtered	"		.14¼@.17¼	ZINC—Metallic, ch. pure	"		.07@.09	
Chem. pure cryst.	lb.		.05	(50% nitro-glycerine)	"		.16¼	Extra cold test	"		.21¼@.26¼	Carbonate, ppt.	"		.09	
Nitrate, powdered	"		.05¼	(60% nitro-glycerine)	"		.18	Gasoline, 88°@90°	"		.15@.20	Chloride solution, com'l	"		.02¼	
<b>FLUORSPAR—</b>																
Am. lump, 1st grade	sh. ton		14.40	(75% nitro-glycerine)	"		.21	Naptha, crude, 68°@72°	bb. l.		9.05	Chloride granular	"		.04¼@.04¾	
2d grade	"		13.90	Glycerine for ultra, (32-2-10° Be.)	"		.13¼@.13¾	"Stove"	gal.		.12	Dust	"		.04¼@.04¾	
Gravel and crushed, 1st gr	"		13.40	FELDSPAR—Ground	sh. ton		8.00@9.00	<b>THE RARE EARTHS.</b>				Sulphate	"		.02¼@.02¾	
2d grade	"		12.40	FLINT PEBBLES—Dan. Best	lg. ton		14.75	BORON—Nitrate	lb.		\$1.50	CALCIUM—Tungstate	"		.60	
Ground, 1st grade	"		17.00	French, Best	"		11.75	(Scheelite)	"			CERIUM—Nitrate	"		10.00	
Ground, 2d grade	"		16.50	<b>FULLER'S EARTH—Lump</b>				Calcutta, raw	"		.75	DIDYMIUM—Nitrate	"		35.00	
Foreign, lump	"		8.00@12.0													