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A SERIOUS TIME seems to be in prospect in France, where the long-standing discontent among the miners has at last resulted in a decision in favor of a general strike. It is believed that such a large proportion of the district syndicates or unions have voted in favor of the movement that the others will probably follow, and already this week 70,000 miners have stopped work in the Pas-de-Calais, one of the chief mining districts in the country. This means that practically the entire district is idle. The situation is so serious that the Government has ordered out a large force of cavalry and infantry to the neighborhood of the mines.



LONG ISLAND SOUND has not usually been considered a coal mining field, but in the present scarcity of anthracite in the East no possible source is neglected. The Sound has been for many years a highway for coal barges, and from time to time some of these barges have been wrecked or sunk with their loads. A wrecking company located at Bridgeport, Conn., has been utilizing part of its plant in hunting for these submerged wrecks, and has succeeded in saving some of them and dredging up the coal. It is said that the company has found the work quite profitable at the present panic prices of coal which prevail in Connecticut towns.



THE ANTHRACITE strike is bringing about strange—if temporary—conditions. Among these is the purchase of coal abroad in quantities which are large under the circumstances though small compared with our total consumption. It is not consoling to the buyers for whose use this coal is intended that its cost to them will be increased by the duty imposed on coal. The way in which this duty—which has served no particular purpose heretofore, either in producing revenue or in checking imports—suddenly becomes burdensome, is a singular illustration of the way in which tariffs sometimes work in an unexpected emergency or under changed conditions.



THE FOLLOWING table, from the latest Treasury Department report, shows the sources from which have been derived the gold imports into the United States for the eight months ending August 31. The statement, of course, does not include the gold which has been brought in during September, which was not a very large amount, nor that which is now coming in on the movement recently started by the special demand for money in New York. The figures are as follows:

	1901.	1902.	Changes.
France.....	\$204,425	\$434,347	I. 229,922
Germany.....	.....	15	I. 15
Great Britain.....	11,290	14,145	I. 2,855
Canada.....	10,181,474	11,597,252	I. 1,415,778
West Indies.....	774,243	208,609	D. 565,634
Mexico.....	5,007,721	5,915,101	I. 907,377
Central America.....	427,069	495,621	I. 68,552
South America.....	723,322	1,092,972	I. 369,650
Australia.....	3,431,604	.....	D. 3,431,604
Japan.....	2,659,800	7,100	D. 2,652,700
Other countries.....	73,460	160,200	I. 86,740
Totals.....	\$23,494,611	\$19,925,362	D. \$3,569,249

It will be seen that during the period covered by this report we obtained practically no gold from Europe, the amount shown from that source being very small. Our principal supply of foreign gold was drawn from Canada, Mexico and South America, the imports from those countries showing a considerable increase. The Canadian gold comes mostly from the

Yukon Territory, although British Columbia had something to add to the total. The Mexican gold, which was largely imported in the shape of ore and base bullion, also shows a large increase, which was due chiefly to the active operation of the mines under American control.

It will be noted that there were no imports from Australia during the eight months. These imports are generally made on London account. Some gold, however, is now on the way from Melbourne, although a much smaller amount than was received last year. The imports from Japan were also very small this year compared with a considerable amount for 1901. The movement with that country has, in fact, set in the opposite direction, a considerable amount having gone from San Francisco in June and July.



A STRIKE which seems to have very little if any cause has suspended work at a number of mines belonging to the Tennessee Coal, Iron and Railroad Company, in Alabama. It appears that the representatives of the United Mine Workers demanded that the company's paymasters should withhold from its miners' wages the sum of \$1 each month, the amount which had been assessed upon them as a contribution for the aid of the striking anthracite miners. The company stated that it was willing to do this in all cases where the miners themselves presented an order or request that the paymaster should do so, but that it had no legal or moral right to withhold the money in any case unless such an order was received from the individual miner. The answer to this representation, which seems to be entirely just, was an order to strike which called out 4,000 men. This strike seems to be one of the most unreasonable on record, and it is especially so as the company recently closed contracts with the men, fixing the wage rates and other details of the miners' agreement for another year. The strike is not only causeless, but in direct violation of the contract, and will not tend to strengthen the miners' union with the public.



THE SILVER refiners of the United States have so long been the chief sellers of the metal that the predominance of London in the market has become somewhat of an anomaly. Not only is our own production the largest in the world, but a very considerable proportion of the silver from Mexico—the second producer in rank—passes through the hands of our refiners, and is sold by them. London has remained the chief market because of its control of the Eastern trade, and because the commercial world had become accustomed to go there when silver was needed. For several years past, however, large shipments have been made from San Francisco to China, and recently arrangements have been made under which India also will be, at least in part, supplied directly from New York. The first shipments of this kind were made in August by way of San Francisco, as we recently noted in our market report. It is probable that future shipments of this kind may be made by way of an English port, as better freight rates can be obtained in that way. They will, however, be through shipments from New York to Bombay, touching England only in transit, and not passing through the London market in any way.

THE PUBLICATION OF TRANSACTIONS OF BRITISH TECHNICAL SOCIETIES.

Every now and then the question arises as to the desirability of technical societies giving facilities for the distribution of their transactions among the public interested in the subjects discussed. The original policy of such societies was to restrict the distribution of papers and transactions to the members. It was argued that members should enjoy the sole privilege of possessing these transactions and that if people were sufficiently interested in the papers read it was their duty to join the society and not to purchase the publications as outsiders. This was a valid and proper argument when the membership was easy to obtain, but when membership became restricted and entry could only be obtained by qualifying in some special manner the question of the manner of issuing the transactions had to be reconsidered. The technical societies have important public functions to serve. Those which make membership a test of the standing of members in the particular profession have also to remember that the dissemination of knowledge, without as well as within the charmed circle of membership, is a laudable object to strive for.

We have referred to this subject because it has been brought to our notice that the Institution of Mining and Metallurgy of London is offering every facility for the widest distribution of both individual papers and yearly transactions. Copies of papers can be obtained for one shilling each, and yearly volumes at 21 shillings. They can be bought either from the Institution direct or from a firm of publishers in London, which has undertaken their distribution through the book trade. In making inquiries among similar English societies, we find that the Institution of Mining Engineers, whose headquarters are Newcastle-on-Tyne, sells the yearly volumes at £3 12s. to outsiders and deals with the book trade, but make no special provision for the sale of individual papers. The Iron and Steel Institute follows the same system and sells the half-yearly volumes at 16 shillings each, the supply to the book trade being in the hands of the same firm that deal in the transactions of the Institution of Mining and Metallurgy. The only society in England that does not allow a free trade in its transactions is the oldest and most influential of all, the Institution of Civil Engineers. This Institution supplies the transactions only to its members, associates and students and a few public libraries, but not to outsiders at all. This rule, we think, might be relaxed without doing any injury to the society as a corporate body or to the members individually. Membership is difficult to obtain, and many people interested in certain subjects discussed are not eligible for membership or even associate-ship. At various times important papers dealing with metallurgical science have been read, and metallurgists and chemists who collect literature on their particular subjects have been disappointed in finding that there are difficulties in obtaining the papers in question. We think that in the interests of the advancement of science the rule might be modified and a point of view adopted more approximating to that of the Institution of Mining and Metallurgy.



MARKET CONDITIONS.

Iron and Steel.—The conditions of the iron and steel markets show little change, except so far as there is uncertainty in connection with the public excitement over the coal strike and its accompanying complications. Production of pig iron is still much unsettled, caused by the delay in securing supplies of coal and coke at the furnaces. The railroads claim that they are making every effort to handle the ma-

terial, but are still handicapped by the short supply of cars and motive power. Importations of foreign material still forms the basis of a good deal of talk, but few new contracts are reported from abroad, although there has been a good deal of inquiry, and options have been taken for a considerable lot of British and German iron.

Copper.—The copper market continues quiet, with a tendency to weakness rather than to improvement. The uncertainty in the stock market has had but little effect, but the trouble and distrust caused by the serious aspect of the anthracite strike is being felt. In some cases manufacturers are short of coal and have been obliged to close down portions of their works, while in others the prospect of continued difficulty in obtaining fuel has excited a degree of caution which is not favorable to any improvement in business.

Other Metals.—Tin continues somewhat dull, with but little change in prices, although it is evident that the large consumers must be upon the market before long and that an improvement ought to be expected.

The demand for lead continues steady at unchanged prices. Details of the combination of lead manufacturers are still lacking, and further comment must be postponed until they are available.

Spelter continues strong and in good demand. Consumption continues on a large scale, and the smelters are not pressing metal for sale. The ore producers have succeeded in obtaining a slight advance in the Joplin market this week.

Silver remains dull and depressed. The demand from the East shows little or no improvement. The prices would doubtless go lower still if it were not that the chief producers are apparently carefully regulating supplies with a view to preventing any further break. The prospects for this metal are not encouraging.

Coal.—The Western coal market continues at the mercy of the railroads, and a great deal of complaint is heard in all quarters with regard to transportation. The season for the close of Lake navigation is rapidly approaching, with shippers still far behind on their contracts for coal. In the Northwest there is every indication that a considerable amount of coal will have to go by rail this year unless the lakes remain open until an unusually late date. In Chicago and other large cities the demand for coal is increasing, and dealers are laying in unusual stocks of the better grades of bituminous coal to take the place of their usual winter supply of anthracite.

The Seaboard bituminous coal trade continues to be unsettled by the extraordinary demand. Here complaints are heard about the slowness of transportation and the difficulties of obtaining supplies from the mines in any reasonable time.

Little real progress has been made towards the settlement of the anthracite strike, and there is practically no market for anthracite in existence for the time being. The questions in relation to the strike are treated at length in another column.



THE NEW MINE INSPECTION LAW IN PENNSYLVANIA.

The last session of the Pennsylvania legislature made an unenviable record by the passage of many reckless and even outrageous acts, but it is doubtful if, among all the measures jammed through that machine-controlled body, any offers greater possibilities for increasing the chances of loss of life and damage to property than the act amending Article 2 of the anthracite coal mining act of 1892. This amendment makes radical changes in the number and mode of choosing mine inspectors. By the original act the coal-fields were divided into six districts without much regard to county lines, but with some

reference to the territory each inspector might be expected to cover efficiently. The new act makes the county the inspection district, though the number of districts is unchanged, and also increases the number of inspectors from 8 to 16. Four counties—Sullivan, Wayne, Susquehanna and Dauphin—for some reason, are not mentioned in the act, and the only provision that is made for examining mines in these counties is that the Chief of the Bureau of Mines is ordered to direct the inspectors to inspect collieries in counties not mentioned. But, as the Chief of the Bureau of Mines points out, this provision is practically nullified by another clause which takes away the legal right of any inspector to examine mines outside the county in which he is elected. Luzerne County is to have five inspectors, Schuylkill four, Lackawanna four, and Carbon, Northumberland and Columbia one each. While the additional inspectors named by the act are to be elected this fall, the amendment, through a queerly worded clause, provides that it shall not take effect in Carbon County until January, 1907. Had the duties of the 16 inspectors been equalized the amendment in one respect would have improved on the old act, but the practical effect will be that the number of mines under each inspector will vary from 9 to 29, the coal produced from 1,571,300 tons to 4,188,340 tons and the number of employees from 4,239 to 15,105. Thus the inspectors who will have the lesser number of mines and employees can easily live up to the letter of the law, which requires a personal visit to each working face of the collieries once every two months, while the other inspectors cannot by any possibility come near complying with this requirement.

The worst feature of the new law is that it calls for the election of inspectors by popular vote. Under the original act the inspector was appointed by a board of examiners composed of three reputable coal miners and two reputable mining engineers appointed by the Judges of the Court of Common Pleas. The men thus appointed have proved to be capable, painstaking and honest. They have commanded the respect of all unprejudiced citizens in the anthracite region and almost without exception have been men who have worked in the mines from boyhood up, and consequently had a most exact and intimate knowledge of anthracite mining.

Under the new law the office of mine inspector will be practically a political one, and anyone familiar with politics in Pennsylvania can understand what this will mean. The only qualifications required are that the candidates shall have been residents of Pennsylvania over three years, shall be over 30 years of age, shall have a knowledge of the different systems of coal mining and shall produce satisfactory evidence before an examining board of five years' experience in anthracite mining in Pennsylvania, and shall have had experience in mines where noxious and explosive gases are evolved.

As the present boards of examiners in Pennsylvania are in the hands of the Miners' Union, it will be seen that no man, whatever his qualifications, who was objectionable to the Union would have any chance of qualifying as a candidate. Worst of all, to secure election he would have to use methods incompatible with the highest efficiency. He would virtually have to promise to obey the commands of the Union. He would have to be a "good fellow," with all that term implies; in fact, as an old inspector once said to the writer, the candidate "would have to be a man who would be drunk three times a night."

The powers of the mining inspectors are very broad, particularly as regards the inspection of timbering, ventilation, etc., in the mine gangways, in air passages and headings, the act virtually placing the

working of any anthracite mine under the control of the local inspector. If an inspector abuses his power the act provides that he may be cited to appear before the Court of Common Pleas whenever a petition signed by 50 or more miners or by 15 coal operators is filed setting forth that the inspector is incompetent, negligent or guilty of malfeasance in office. This reservation practically amounts to little, since, to take a concrete example, if some mining company had offended the local union, the inspector could declare that the air-current in a certain gangway was insufficient and order the mine closed until ventilation was better. It would be always possible, if the company could get 14 other companies to agree with it and to demand that the inspector be removed, for the inspector to allege that he had not neglected his duty nor been guilty of malfeasance, since it was his belief that the conditions were unsafe, and if he erred at all it was on the side of caution. Thus the act not only does not provide for more thorough mine inspection, but may actually lower the grade of men who will be inspectors; since so far as the actual wording of the act is concerned a man who had been a mule-driver and who knew absolutely nothing of civil or mining engineering, but was satisfactory to the Union, could be an inspector. In addition, the act opens a wide field for blackmail and for all manner of interference with the orderly working of the mines.

Our attention has been called to this matter by the filing of a suit in the Northumberland County Court by Mine Inspector Edward Brennan, of Shamokin, to test the constitutionality of the law. Mr. Brennan is the first inspector who would be replaced under the new law, his term expiring in March, 1903. It is our opinion, that whether constitutional or unconstitutional, a more mischievous act was never passed by a Pennsylvania legislature and it should be repealed at the earliest opportunity. Its phraseology is inexact, it contains conflicting clauses, it is vicious in principle and it actually promises to make the miners' work more hazardous than ever.



THE CONFERENCE ON THE ANTHRACITE STRIKE.

While every one familiar with the inconvenience, distress and even suffering caused by the strike in the anthracite fields of Pennsylvania may sympathize with the impulse which prompted President Roosevelt to take a hand in the matter, yet any one who has followed the course of the strike and knows the causes which lie back of it felt that the conflicting parties would not accept even such methods of mediation as the President might be able to suggest.

However, the conference at Washington between the presidents of the coal-carrying roads and Mr. Mitchell has had one good result. It has brought out pretty plainly that the real issue between the operators and the miners is not any question of shorter hours, higher wages or a better standard of living, but simply recognition of the United Mine Workers. The *ENGINEERING AND MINING JOURNAL*, as all its readers know, pointed out months ago, even before the strike was ordered, that recognition was the real issue between the miners and operators, but Mr. Mitchell, in his public statements, has based his plea for the miners on other grounds, has enlisted the sympathy of well-meaning but ill-informed men, and even denied that recognition was the main thing his organization sought. Our news columns give considerable space to the conference at Washington, and it is unnecessary to elaborate the chief argument of the operators or to discuss in detail Mr. Mitchell's arbitration offer, which he cleverly presented at the conference. Mr. Baer's offer to have all questions of

hours and wages referred to the Court of Common Pleas in that district is a thoroughly practical one, but it was declined by Mr. Mitchell as emphatically as his offer of arbitration was refused by the representatives of the coal mining companies. The conference consequently terminated without having accomplished any definite results. In the meantime, supplies of anthracite at many points have been exhausted, prices have reached a very high figure and public opinion has reached a point where an immediate supply of coal is considered of greater importance than the rights or wrongs of either operators or miners.

Governor Stone has finally shown some appreciation of the gravity of the situation by ordering out all the militia in the State. It remains to be seen, however, whether the troops will be used to suppress every act of intimidation and to insure the safety of every miner and every miner's family, or whether, as has been the case with some of the regiments already in the anthracite region, companies known to contain striking miners and strike sympathizers will be placed where it can be said beforehand that they will not do effective service.

As the United Mine Workers are showing in the present strike in Alabama that they will not live up to an agreement with a coal mining company, we cannot blame the presidents of the anthracite coal-carrying roads from refusing to have anything to do with the union, however much we may criticize the rather dictatorial attitude they have assumed at times. If Mr. Mitchell and the other union leaders do not accept President Roosevelt's offer to have all the issues raised investigated by a commission, providing the miners return to work immediately, we fail to see why he and his organization are entitled to the sympathy of any person able and willing to look facts in the face. If the President's offer is accepted, we hope that the commission appointed will contain at least one man who has lived in the anthracite region and from practical experience is familiar with the many and intricate questions which must be considered in mining, preparing and marketing its output. The latest news is that Mr. Mitchell has refused to comply with the President's request, saying that the responsibility for continuing the strike should rest on those who refused arbitration.



THE ELECTROLYTIC REFINING OF BASE LEAD BULLION.

BY TITUS ULKE.

Important changes in lead refining practice are bound to follow, in my opinion, the late demonstration on a large scale, of the low working cost and high efficiency of Betts' electrolytic process of refining lead bullion. It was my good fortune recently to see this highly interesting process in operation at Trail, British Columbia, through the kindness of the inventor, Mr. A. G. Betts, and Messrs. Labarth and Aldrich, of the Trail Works. As I have not noticed any account in the technical press of Betts' refining process and plant, notwithstanding their novel character and prospective commercial importance, I will describe these as fully as my incomplete notes and regard for the inventor's interests will permit.

A plant of about 10 tons daily capacity, which probably cost about \$25,000 although it could be duplicated for perhaps \$15,000 at the present time, was installed near the Trail Smelting Works. It has been in operation for about 10 months, I am informed, with signal success, and the erection of a larger plant, of approximately 30 tons capacity and provided with improved handling facilities, is now contemplated.

The depositing room contains 20 tanks, built of wood, lined with tar and approximately of the size

of copper refining tanks. Underneath the tank-room floor, is a basement permitting inspection of the tank bottoms for possible leakage and removal of the solution and slimes. A suction pump is employed in lifting the electrolyte from the receiving tank and circulating the solution. In nearly every respect the arrangement of the plant and its equipment is strikingly like that of a modern copper refinery.

The great success of the process is primarily based upon Betts' discovery of the easy solubility of lead in an acid solution of lead fluosilicate, which possesses both stability under electrolysis and high conductivity, and from which exceptionally pure lead may be deposited with impure anodes at a very low cost. With such a solution, there is no polarization from formation of lead peroxide on the anode, no evaporation of constituents except water, and no danger in its handling. It is cheaply obtained by diluting hydrofluoric acid of 35 per cent HF, which is quoted in New York at 3 cents per pound, with an equal volume of water and saturating it with pulverized quartz according to the equation



According to Mr. Betts, an acid of 20 to 22 per cent will come to about \$1 per cubic foot, or to \$1.25 when the solution has been standardized with 6 pounds of lead. One per cent of lead will neutralize 0.7 per cent H_2SiF_6 . The electrolyte employed at the time of my inspection of the works contained, I believe, 8 per cent lead and 11 per cent excess of fluosilicic acid.

The anodes consist of the lead bullion to be refined, cast into plates about 2 inches thick and approximately of the same size as ordinary two-lugged copper anodes. Before being placed in position in the tanks, they are straightened by hammering over a mould and their lugs squared. No anode sacks are employed as in the old Keith process.

The cathode sheets which receive the regular lead deposits, are thin lead plates obtained by electrodeposition upon and stripping from special cathodes of sheet steel. The latter are prepared for use by cleaning, flashing with copper, lightly lead-plating in the tanks, and greasing with a benzine solution of paraffin, dried on, from which the deposited lead is easily stripped.

The anodes and cathodes are separated by a space of 1½ to 2 inches in the tank and are electrically connected in multiple, the tanks being in series circuit. The fall in potential between tanks is only about 0.2 of a volt, which remarkably low voltage is due to the high conducting power of the electrolyte and to some extent to the system of contacts used. These contacts are small wells of mercury in the bus-bars, large enough to accommodate copper pins soldered to the iron cathodes or clamped to the anodes. Only a small amount of mercury is required.

Current strengths of from 10 to 25 amperes per square foot have been used, but at Trail 14 amperes have given the most satisfactory results as regards economy of working and the physical and chemical properties of the refined metal produced.

A current of 1 ampere deposits 3.88 grams of lead per hour, or transports ¾ times as much lead, in this case, as copper with an ordinary copper refining solution. A little over 1,000 kilograms, or 2,240 pounds, requires about 260,000 ampere hours. At 10 amperes per square foot the cathode (or anode) area should be about 1,080 square feet per ton of daily output. Taking a layer of electrolyte 1.5 inches thick, 135 cubic feet will be found to be the amount between the electrodes and 175 cubic feet may be taken as the total quantity of solution necessary, according to Mr. Betts' estimate. The inventor states that he has worked continuously and successfully with a drop of potential of only 0.175 volt per tank, and that therefore 0.25 volt should be an ample allowance in regular refining. Quoting Mr. Betts: "260,000 ampere hours at 0.25 volt works out to 87 electrical horse power hours of 100 horse-power hours at the engine shaft, in round numbers. Es-

timating that 1 horse power hour requires the burning of 1.5 pounds of coal, and allowing say 60 pounds for casting the anodes and refined lead, each ton of lead refined requires the burning of 210 pounds of fuel." With coal at \$6 per ton the total amount of fuel consumed therefore should not cost over 60 cents, which is far below the cost of fire-refining base lead bullion, as we know.

In the Betts electrolytic process, practically all the impurities in the base bullion remain as a more or less adherent coating on the anode, and only the zinc, iron, cobalt and nickel present go into solution. The anode residue consists practically of all the copper, antimony, bismuth, arsenic, silver and gold contained in the bullion, and very nearly 10 per cent. of its weight in lead. Having the analysis of any bullion, it is easy to calculate with these data the composition of the anode residue and the rate of pollution of the electrolyte. Allowing 175 cubic feet of electrolyte per ton of daily output, it will be found that in the course of a year these impurities will have accumulated to the extent of a very few per cent. Estimating that the electrolyte will have to be purified once a year, the amount to be purified daily is less than 1 cubic foot for each ton of output. The amount of lead not immediately recovered in pure form is about 0.3 per cent., most of which is finally recovered. As compared with the ordinary fire-refined lead, the electrolytically refined lead is much purer and contains only mere traces of bismuth, when bismuthy base bullion is treated. Furthermore, the present loss of silver in fire refining, amounting it is claimed to about 1½ per cent of the silver present, and covered by the ordinary loss in assay, is to a large extent avoided, as the silver in the electrolytic process is concentrated in the anode residue with a very small loss, and the loss of silver in refining the slimes is much less than in treating the zinc crusts and refining the silver residue after distillation. The silver slimes obtained at Trail, averaging about 8,000 ounces of gold and silver per ton, are now treated at the Seattle Smelting and Refining Works. There the slimes are boiled with concentrated sulphuric acid and steam, allowing free access of air, which removes the greater part of the copper. The washed residue is then dried in pans over steam coils, and melted down in a magnesia brick-lined reverberatory, provided with blast tuyeres, and refined. In this reverberatory furnace the balance of the copper left in the slimes after boiling, is removed by the addition of niter as a flux, and the antimony with soda. The doré bars finally obtained are parted in the usual way with sulphuric acid, making silver .999 fine and gold bars at least .992 fine.

Mr. Betts treated 2,000 grams of bullion, analyzing 98.76 per cent Pb, 0.50 Ag, 0.31 Cu, and 0.43 Sb, with a current of 25 amperes per square foot in an experimental way, and obtained products of the following composition:

Refined Lead: 99.9971 per cent Pb, 0.0003 Ag, 0.0007 Cu, and 0.0019 Sb.

Anode Residue: 9.0 per cent Pb, 36.4 Ag, 25.1 Cu, and 29.5 Sb.

Four hundred and fifty pounds of bullion from the Compania Metalurgica Mexicana, analyzing 0.75 per cent Cu, 1.22 Bi, 0.94 As, 0.68 Sb, and assaying 358.9 ounces Ag and 1.71 ounces Au per ton were refined with a current of 10 amperes per square foot, and gave a refined lead of the following analysis: 0.0027 per cent Cu, 0.0037 Bi, 0.0025 As, 0 Sb, 0.0010 Ag, 0.0022 Fe, 0.0018 Zn and Pb (by difference) 99.9861 per cent.

Although the present method for recovering the precious metals and by-products from the anode residues leaves much room for improvement, the use of the Betts process may be recommended to our lead refiners, because it is a more economical and efficient method than the fire-refining process now in common use. I will state my belief in conclusion, that the present development of electrolytic lead refining, signalizes as great an advance over zinc desilverization and the fire methods of refining lead as electrolytic copper refining does over the old Welsh method of refining that metal.

GEOLOGICAL HORIZON OF THE PETROLEUM IN SOUTHEAST TEXAS AND SOUTHWEST LOUISIANA.

By P. J. FISHBACK.

At or near the base of the Frio clays division of the Grand Gulf formation, in these States, and extending at irregular intervals from Madison, Grimes and Walker counties, Texas, to the eastern part of Vernon Parish, La., are found areas of black waxy, limy lands, and of light green clays that weather either to a black soil or to tenacious, red, calcareous clays.

In February, 1902, the writer found five miles east of Leesville, Vernon Parish, La., and just to the southeast of Anacoco Prairie, a considerable body of thin bedded, non-fossiliferous, stratified limestones near the base of the Frio clays. These limestones were lying almost horizontal in their bedding. In the partings, and immediately beneath these limestones were light greenish clays; while above the limestones in the surrounding hills were tenacious, red, calcareous clays; and these in turn capped in places by patches of Lafayette or Orange sands.

As this Frio clays formation is followed Gulfward and under deeper cover, by the oil well drill, the intercalated clay seams gradually more and more assume the nature and partake of the character of the clays in the overlying Port Hudson formation. The black, calcareous land deposits also gradually blend into and change to limestone deposits similar to that described near Leesville, La. Near the present Gulf these limestone deposits reach a thickness varying from a few inches to as much as 200 feet. As yet no fossils have been found by the writer in any of these limestone deposits.

A number of deep wells in southeast Texas and southwest Louisiana, and far outside the developed oil pools, as well as in them, have found these limestones at their proper geological horizon.

That the oil pools at Beaumont, Sour Lake, and other points in Southeast Texas, and at Jennings, Sulphur Mine and other points in Southwest Louisiana are situated on uplifts, there is scarcely room for doubt. But the black land basins along the northern outcrop of the Frio clays are disconnected and irregular; just so are the limestone deposits into which they grade Gulfward and under deeper cover. Consequently the finding of this limestone in a well, and the failure to find it in another well perhaps only a short distance removed, does not by any means prove that the locality finding the limestone is on an uplift, while the one failing to find it is not.

A careful comparison and study of the clays and sands found immediately above these limestones where they are found in wells, and of the clays and sands at the same horizon in wells where the limestone is wanting, will almost invariably and conclusively show that all are from the same geological formation. A careful comparison of the limestone chippings from a number of widely separated wells, with each other, and the limestones from the Frio clays near Leesville, La., leads to the conclusion that all are from one and the same geological formation and horizon.

A number of deep wells to the southwest, west and northeast of Houston, Texas, show that in this region there is a considerable area underlaid with these limestones at a depth of 700 to 1,000 feet. Yet no oil in paying quantities has yet been found in or under them.

The finding of a limestone deposit in the Gulf Coast lands of Texas and Louisiana, at a depth of 700 to 1,200 feet does not necessarily imply that it is on an uplift any more than low elevations of "hills" or ridges that may be the remnants of erosion, or the product of early sea waves, are *prima facie* evidences of anticlines.

In conclusion, and from all the evidences obtained, the writer is of the opinion that the so-called cap rock in the oil fields of Southeast Texas and Southwest Louisiana is the Frio clays limestone; and that the principal oil stratum is the loose sands or the solidified sandstone, as the case may be, of the Grand Gulf formation.

Occasionally in some of the productive wells in some of the oil pools this cap rock of limestone is found very thin or entirely wanting; but where the limestone is wanting its place over the oil sands is almost invariably occupied by a bed of tenacious red, blue, or bluish green clays; and these the clays which normally belong in and over the limestones and black land basins of the Frio clays under deep cover and along their outcrops.

That the Grand Gulf sandstone is an oil bearing formation is well evidenced by the number of "gas leaks," "oil seeps," and "oil springs" that may be traced along its outcrops from the Trinity River in the vicinity of Trinity, Trinity County, Texas, to Bayou Torro in Vernon Parish, Louisiana.

That there has been a surprising amount of disturbance in the formations, and now partially or wholly buried under and obscured by a mantle of later deposits, in the Gulf Coast region of these States, is now very evident.

That buried or partially hidden and as yet undiscovered domes and anticlines will yet be found, is almost certain. That on some of these domes and anticlines additional oil pools will yet be found, is almost certain. That on some of these domes and anticlines additional oil pools will yet be found is also very probable. But as these pools are eventually found they will be found to be in isolated and limited areas, and the whole land will not be underlaid with oil, as many now seem to suppose.

THE UNITED STATES STEEL CORPORATION.

The statement issued this week by the United States Steel Corporation gives the net earnings for the quarter ending September 30 at \$36,764,643, which compares with \$28,063,843 for the corresponding quarter of 1901; showing an increase of \$8,100,800. For the nine months ending September 30 the income statement is as follows; the net earnings being the amount remaining after deducting, each month, the expenditures for ordinary repairs, renewals and maintenance of plants, also interest on bonds and fixed charges of the subsidiary companies:

January	\$8,901,016
February	7,678,583
March	10,135,858
April	12,320,766
May	13,120,930
June	12,220,362
July	12,041,914
August	12,972,729
September (estimated).....	11,750,000
Total net earnings, 9 months.....	\$101,142,158
Depreciation and reserve funds, etc.....	\$10,774,105
Interest on U. S. Steel Corp. bonds.....	11,400,000
Sinking fund U. S. Steel Corp. bonds.....	2,280,000
Total fixed charges.....	\$24,454,105
Net balance.....	\$76,688,053
Dividends declared.....	42,040,071
Undivided profits.....	\$34,647,982

The dividends include \$26,790,258, or 5¼ per cent, on the preferred stock; \$15,249,665, or 3 per cent, on common stock; and \$148 on outstanding stock of subsidiary companies. The undivided profits for the nine months are applicable for new construction; to increase depreciation and reserve fund accounts; or to surplus and working reserve.

COMPOSITION OF CAPE BRETON COAL.—

Mr. Alexander Dick, of the Dominion Coal Company, reports the following analysis of its coal, recently made by J. & H. S. Patterson, of Newcastle, England: Carbon, 80.18 per cent; hydrogen, 5.11; oxygen, 7.34; nitrogen, 1.16; sulphur, 0.56; ash, 2.30; moisture, 3.35.

COAL DISCOVERIES IN CHINA.—The acting British consul at Kiukiang reports that an office of mines has been opened at Nauch'ang which is believed to have in view the development and regulation of coal-mining in the Yüanchou prefecture. The consul further reports that in February the discovery of a deposit of coal in the mountains about 8 miles south of Kiukiang was reported to him, but from personal inspection of the place he came to the conclusion that the alleged mine had been salted with the intention of tempting foreigners to bid for the land.

THE CHANUTE OIL-FIELDS IN KANSAS.

BY ERASMUS HAWORTH.

Chanute, Kansas, is located on the west side of the Neosho River, in the northwestern part of Neosho County, on the Southern Kansas branch of the Santa Fe Railway, about 17 miles south of Iola and 30 miles north of Cherryvale. Years ago prospecting was done by the city and by those veteran prospectors, Guffey and Galey, but with such indifferent success that the field was abandoned. Later the city

fair representative of wells in the river valley. As it stopped in the oil sands the 40-foot shale bed and gas sand are not shown. It will be noted that the general geology of this field is practically the same as that of Neodesha, Coffeyville and Iola.

Drilling commenced April 3, 1900, and finished to a depth of 748 feet, and closed in April 18. July 25, well shot with 50 quarts of nitro-glycerine and put to producing. In September, 1900, well was drilled to gas sand and a gas well developed showing 6 inches

near the power house. The arrangement at each well is the same, and consists of a small oil tank 8 feet high and 8 feet in diameter, with a capacity of about 70 barrels, connected with the well and pump by a system of pipes, as shown in Figure 2. In drilling a well, an 8-inch casing about 25 feet long is used to shut off surface water. Inside this a 6-inch casing is put down 200 feet or more and afterward withdrawn. Lastly, a 5-inch casing is put in, which goes down 600 feet and which remains as long as the life of the well continues. At the upper end of the 5-inch casing a 5-inch T is screwed on, from which a 5-inch conduit leads to the tank. Through an opening in the top cap the 2-inch air pipe enters and passes down to the bottom of the well, as shown in Fig. 2. When valves are properly opened compressed air escapes at the lower end of the 2-inch pipe and literally blows the oil out through the 5-inch pipe and into the tank. The tank is placed on a little mound of earth about 3 feet high, partially to guard against damage from flood water, but principally to let gravity feed oil from the tank into the pump near by. A 2-inch pipe is inserted at the bottom of the tank, which leads to a small pump and ultimately to the large storing tank. The pipe carrying compressed air likewise leads to the same pump, supplying power for running it.

Wells producing but 2 or 3 barrels per day are blown once every 24 hours, while those producing 20 to 30 barrels are blown 6 times every 24 hours, experience having shown that more frequent blowing does not increase the production. Ordinarily the air pressure used is about 300 pounds, but it frequently runs down to 250 pounds. A Bristol recording press-

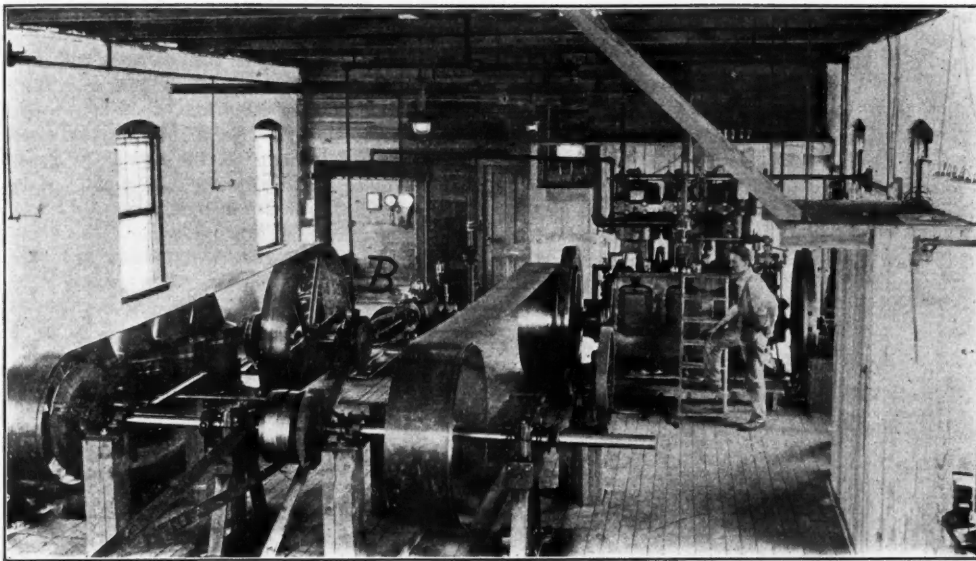


FIG. 1. POWER HOUSE OF I. W. KNAPP, CHANUTE, KANSAS.

began prospecting, seeking gas principally, and was rewarded by finding it in comparative abundance. In 1899 Mr. I. N. Knapp, of Omaha, attracted by a fair showing of oil in two wells drilled by the city, obtained leases and began drilling. His success was sufficient to allow him to begin shipping oil in June, 1900.

During the last six months other companies have begun operations, so that at the present time a number of incorporated stock companies are in the field with large lease holdings and the usual amount of treasury stock for sale. One company reports 17 wells drilled, all of which are oil producers; another company has 7 or 8 without a failure, and still others are doing well. Thus far the capacity of the new wells has been estimated only, as none of the companies are yet producing oil, Mr. Knapp being the only one who has actually tested wells by producing and marketing the oil.

An area lying in the southeast part of town is locally known as "gas ridge," throughout which every well is a producer. To the east in the river valley other gas wells have been obtained, and 3 or 4 miles to the southwest, on the uplands, what seems to be a distinct gas-field has been developed by 3 wells, each of which is a good producer.

The oil territory seems to be confined to the river valley east, northeast and north of the city, with present developments reaching to the northwest along the river valley, where, for a distance of 3 or 4 miles, oil is known to exist, but to what extent future developments alone can determine.

Mr. Knapp has drilled 51 wells, 28 of which are now producing oil, 3 others are ready to be connected with the pipe lines, and 3 are fair gas wells, leaving 17 failures. When we remember that he was practically the pioneer prospector, and that his territory was about 4 miles square, this is considered a fair showing. Since the productive area has been located the percentage of failures has been much less than the above.

Chanute lies in the Coal Measure shales. Oil and gas are found in the lower half of the Cherokee shales, the oil sands being about 40 feet above the gas sands and separated from them by a bed of fine-grained, compact, black shale. In a number of instances an oil well has been drilled deeper until gas was obtained from the gas sands. The following is a log of Knapp well No. 8, which may be taken as a

water pressure on open end of 5-inch casing, equal to a daily yield of about 3,000,000 cubic feet.

17	Soil	17
6	Gravel	23
87	Limestone	110
5	Shale	115
27	Limestone	142
2	Shale	144
16	Limestone	160
12	Sand	172
93	Shale	265
5	Limestone	270
10	Sand	280
40	Shale	320
15	Limestone	335
44	Shale	379
5	Sand	384
16	Shale	400
55	Limestone	455
5	Shale Water	460
14	Shale	474
8	Sand	482
7	Limestone	520
181	Shale	701
	(Steel line measure)	701
21	Sand, Making some gas	722
	(Steel line measure)	722
15	Sand, yielding oil	737
41	Black shale	778
6	Sand	784
14	Gas sand	798

Casing used as follows: 23 feet 8 1/4 inch; 174 feet, 6 1/4 inch; 604 feet 5 inch; which was drawn.

Well produced 208 barrels of oil first month and 1,377 barrels first year; last month of year, 91 barrels.

Mr. Knapp has installed a plant for pumping and handling oil by compressed air. He has built a central power house, in which is a Westinghouse gas engine and an air compressor, from which compressed air is conducted to all points desired. It is believed this is the second plant in America using compressed air to pump oil, the other being at Corsicana, Texas.

The power station is a 1-story brick building, used both for power house and office, an interior view of which is shown in Fig. 1. It shelters a 3-cylinder 11 by 12-inch Westinghouse gas engine of 85 horsepower capacity, and a Rand air compressor 11 by 5 by 16 inches, class D, belt driven, which, with 120 revolutions per minute, has a capacity of 210 cubic feet free air per minute raised to a pressure of 350 pounds, requiring from 65 to 70 horse-power to operate it. The excess power of the gas engine over that required for the air compressor is used in part to pump oil from the large tank into the oil cars, and in part for pipe threading and as a matter of safety.

The compressed air is conducted through 2-inch pipes all over the oil field. It is used to blow oil out of the wells, and also to run the pumps for pumping oil from the small local tanks into the larger tank

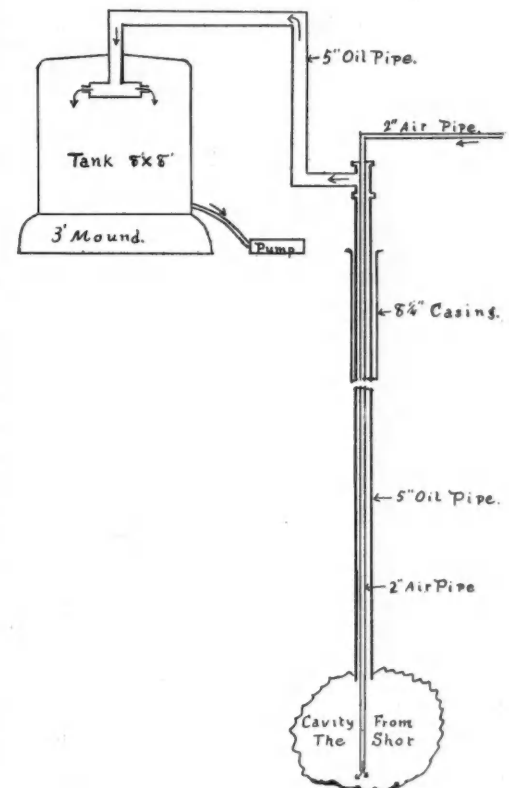


FIG. 2. DETAILS OF OIL WELL PUMPED BY COMPRESSED AIR.

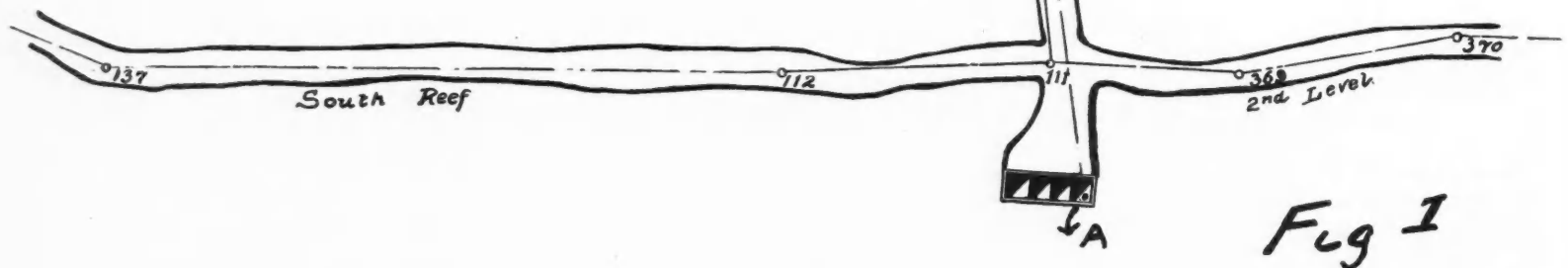
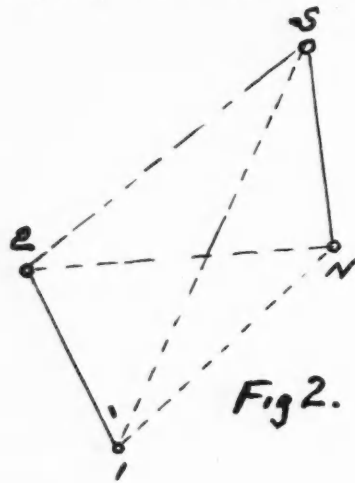
ure gauge is used, which automatically produces a continuous record.

The large central tank is 50 feet in diameter and 40 feet high, with a capacity of 14,000 barrels. It is situated in the angle between the Missouri, Kansas & Texas and the Santa Fe railroads. Near by, on each line, are the loading racks, where five oil cars may be stationed at a time. A 3-inch pipe leads from the large tank to each loading rack, and is so arranged that oil flows directly from the tank into the car. The racks of the Missouri, Kansas & Texas are on lower ground than the tank, so that loading is done by gravity, but those on the Santa Fe are on higher ground, loading being done by pumping.

The Chanute fields are interesting in a number of ways:

1. It is now known to a certainty that the oil and gas bearing sands are not very uniform, and not continuous over the entire area. A number of instances are known like the following: Three wells, 500 feet apart, are in a straight line. The two extremes are producers, showing a good amount of oil sand; the middle one, only 500 feet from each of the others, is a failure, showing practically no oil sand. In other instances the oil sand is entirely missing, but the lower gas sand is present, yielding large quantities of gas, and in two cases no oil nor gas sand was found at all.

2. In the Chanute field the gas bearing sands uniformly lie below the oil sands, and are separated from them by about 40 feet of shale. This is so different from conditions previously observed in other oil and gas regions that it is quite remarkable. Similar conditions have been reported from other Kansas areas, but probably nowhere else in the State are they so well shown. Here, in quite a number of in-



stances, a fair oil producer has been changed into a gas producer by drilling through the 40 feet of separating shale.

3. The Chanute field was pronounced a failure by the first prospectors, which resulted in the territory lying idle for a number of years. It is so spotted that here and there are barren areas. Unfortunately, the first few wells were in those places. How many other good localities in the State have been similarly abandoned cannot be known at present.

NORWAY APATITE MINES.—The production of apatite in Norway in recent years has been less than 2,000 tons. Recently several mines have consolidated with a capital of \$200,000. The mines are located at Bamle, near Kragerö, and the entire output is exported.

SALT IN INDIA.—In 1901 the production of salt in British India amounted to 1,102,546 long tons, which shows a substantial increase over previous years. More than half this output was made by the Government for sale to the public. Of the quantity annually consumed in India, the native production furnishes about three-fourths, the balance being imported from England, Germany and other countries.

SHAFT SURVEYING.

By T. LANE CARTER.

Some readers will probably declare this article devoid of anything new, but to others whose experience in vertical shafts—for I shall confine my attention to shafts of this kind—may be limited, I hope these notes will prove of use. He is a brave man in these days who declares anything under the sun to be entirely new, for it seems almost impossible to write of any experience or practice without receiving an intimation from a correspondent in some remote corner of the earth that he knew all about that 20 years ago. Notwithstanding this, I believe an article dealing with surveying practice on the Johannesburg gold-fields will not prove useless, even though it sounds like repetition to some.

The troubles of the mine surveyor are greater in shaft work than in any other part of the mine, and if a mistake is made any future accurate work is of small avail. There are few places in the world where the undertaking of plumbing a 1,500-foot shaft is more trying to the surveyor than here. If he

so uniform that if you follow it carefully and keep the levels absolutely correct, you cannot help running the tunnels together. There are unfortunate accidents which completely upset this simplicity. Sometimes the reef is thrown out of the property by a huge fault or big dike. Under such circumstances the shafts have to be plumbed with great care to get a good connection.

I may say that in a new mine the principal point in shaft surveying is to take the levels down accurately. When the first connection is made, say on the first level, the surveyor thinks seriously of taking the meridian into the mine, and the method he uses is so reliable and so much easier than plumbing both shafts that it is not surprising he gets such splendid ties with the outcrop companies when they reach the deep-level boundary. The method used as soon as the connection is made on the first level, generally six months or a year after the reef is first cut, is the "one-wire-in-each-shaft" method.

There is no comparison for accuracy between this method, where you work with a base line of 2,000

MINE SURVEYING ON THE WITWATERSRAND.

is fortunate, he might have the help of a white assistant, but frequently he is called upon to do this important work with only Kaffirs to help him. Compare this state of affairs with that in Michigan, for instance, when every one on the "plumbing job" is of high intelligence, and you will see that the South African surveyor is much worse off in this respect than his brother in Michigan.

In one sense we are fortunate, however, and that is, that in 50 per cent of the cases no great harm is done if a considerable error is made in the plumbing of the shafts. Of course you hear surveyors talk about the terrible apprehensive moments they spend over the connection of drifts running to meet each other, but that is a trick of the trade, and they talk in this way for the same reason that doctors use unintelligible words. The point of vital importance in most deep-level mines is to carry the levels into the mine accurately. Let me explain my assertion that the drifts can be made to meet perfectly and yet a considerable error occur in plumbing the two shafts. On a Witwatersrand deep-level gold mine, say of 200 claims, 2 shafts are put down, 2,000 feet or 2,500 feet apart. When the shafts are down far enough cross-cuts are driven to cut the reefs, and the drives along the reef from shaft to shaft are rushed as fast as possible. Now the reef is as a rule

feet, and the two wires in a single shaft, where the base line is from 6 feet to 20 feet long.

The best practice on these fields, therefore, is to wait for the first connection in the mine before the meridian is taken below for the last time.

I do not mean to say that the first plumbing of the two shafts is carelessly done, or guessed at, but that the surveyor relies on the other method for his final result. The question might be raised, "How about a mine with only one vertical shaft?" By law, no mine here can have only one outlet; there must be at least two.

The boundary lines of a Transvaal gold mine are determined by substantially built masonry beacons. In the title deed of each company the azimuths and distances of these lines are given, also the co-ordinates of the beacons, all this data being supplied by the Surveyor General of the Transvaal. The meridian, therefore, is carried from the most convenient boundary line to the shafts. Before the plumb-bobs are placed in the shafts a survey is made from Station 1 (see Fig. 3) to Station 6, the two stations in front of the shafts. Then the transit is taken into the mine, the instrument set on Station 101, a backsight taken to 100 and a survey made along the drive to 112. The bearing of 100 to 101 is assumed as anything approximate.

Now, then, you are ready to place a bob each in the shafts. After this is done the instrument is set over No. 1 and the sight to the bob in the shaft taken and distance measured. Then the transit is carried over to No. 6 and a sight taken to the bob in the shaft and distance measured.

After the surface work, you go into the mine and set up at Station 100 and sight to bob in shaft and also get the distance to bob. Then the instrument is moved over to No. 112 and a sight is taken to the bob in the other shaft, also the distance. This finishes the observations, and you are now ready for calculations.

First, the bearing of the imaginary line joining the two bobs is determined. This is done by the co-ordinates. Now, the bearing of the same line is determined by the assumed co-ordinates and meridian in the mine. Since we have this bearing and the bearing of the first line of the underground survey, we can easily calculate the angle between the imaginary line joining the bobs and the first line in the tunnel. For instance, suppose we find that on the assumed meridian the line joining the two bobs is S. 45° W. and the bearing of the line from the bob

had to be done as rapidly as possible, for the shaft was idle for only a few hours. So much dirt and timber was at the shaft landing that I found it impossible to get the instrument in the same line as the bobs in the shaft, and so the following method was used:

A convenient base line 1-2 (see Fig. 2) was determined in the cross-cut. A day before the plumbing operations I went down and measured the line 1-2 with a levelling rod, 6 or 8 readings being taken, and the mean of the lot used in the calculations. At night the bobs were placed in the shaft, as S and N, the instrument set up at 1 and then at 2 and the angles 21N and 21S and 12N and 12S taken. From these triangles the bearing of 1-2 was found from S-N, which was worked out by the same system of triangulation on the lower level. The meridian tie with a line of the old survey was 5 minutes, sufficiently close for my purpose.

This experience has assured me of one thing, and that is the great difficulty of obtaining the correct meridian in plumbing a shaft, if any calculation based on linear measurement is relied upon. It is very difficult to measure a base line with absolute accu-

taken. I find that it is the best policy to get out at each level and carry the elevations from the shaft to permanent stations on the cross-cuts immediately.

I know of no better method for measuring vertical shafts than with the 300-foot steel tape.

THE MINING AND OCCURRENCE OF GOLD IN THE DUTCH EAST INDIES.*

By S. J. TRUSCOTT.

(Concluded from Page 445.)

Celebes.—The northern arm of this irregularly-shaped island is a gold-bearing country, the other parts are not. In describing the occurrence in that part, the mine of Palehleh claims first attention. At this place the natives have worked for a long period of years, and it is not improbable that the credit of starting this gold industry belongs to adventurous Portuguese, for there are graves at the place, and words in the native language which strongly suggest this idea. The process used in winning the gold is as follows: The ore is broken down small by striking it with a crude pestle, and then it is ground fine with a little water by working a stone rubber on a stone plate. The resultant paste is washed in wooden dishes till the lighter portions are carried away, leaving only the sulphurets and the free gold. The gold is separated as cleanly as possible, and the sulphurets are ground and washed again for a further separation of gold, this being repeated until everything has passed over a slime, and there is nothing left to work upon. It is agreed that the maximum number of times that the sulphurets can be so ground and washed is seven times.

This mine of Palehleh was taken by Europeans in about the year 1892, and eventually it became the property of the Nederland Indische Gold Mining Company.

The reefs consists of veins and stringers of sulphurets with gold in a diorite rock. The sulphurets are iron pyrites, galena, zinc-blende and a little copper pyrites, and upon analysis a little antimony and still less arsenic are shown. The principal shoot of this mineral ore is along a very definite and strong fracture, which appears to be continuous through old workings for a total length of about 2 miles. The old workings are at specific points along this extent, and it is probable that they are upon the better developed shoots, the intervening spaces between them being comparatively barren. In the principal workings the ore lies almost entirely in the footwall of the fracture above mentioned, whereas in another place the reverse is the case, the ore being in the hanging-wall, the dip being about the same in each case, 85° E., the strike being north-northwest and south-southwest.

The veins and stringers, which make up the reef, become smaller as the lateral distance away from the fracture becomes greater. In any cross section the sulphurets, whether close to the fracture or away from it, have much the same value, though the reef is richer nearer the fracture, because in that vicinity the veins and stringers are thicker, and the amount of intervening rock is less. The occurrence is not a regular network of stringers, but there are 3 or 4 veins of sulphurets separated by widths of rock in which smaller stringers ramify, and in which also a small amount of sulphurets is disseminated, so that it is difficult to find pieces of it, within the limits of the reef, which assay less than 0.1 ounce per ton.

In the principal workings the whole size of the reef to include all the stringers which it is economically possible to take varies from one 1 foot up to 20 feet, the average width being about 6 feet. If the sulphurets could be mined separately, the ore so obtained would contain about 60 per cent. of concentrates, and it would carry 4½ ounces of gold and 12 ounces of silver, with 8.5 per cent lead, 1.5 copper and 3.5 zinc.

Immediately to the south of Palehleh, near the south coast of this northern arm of Celebes, the country rock on a concession named Pageat is generally

*Abstract of paper read before the Institution of Mining and Metallurgy, London.

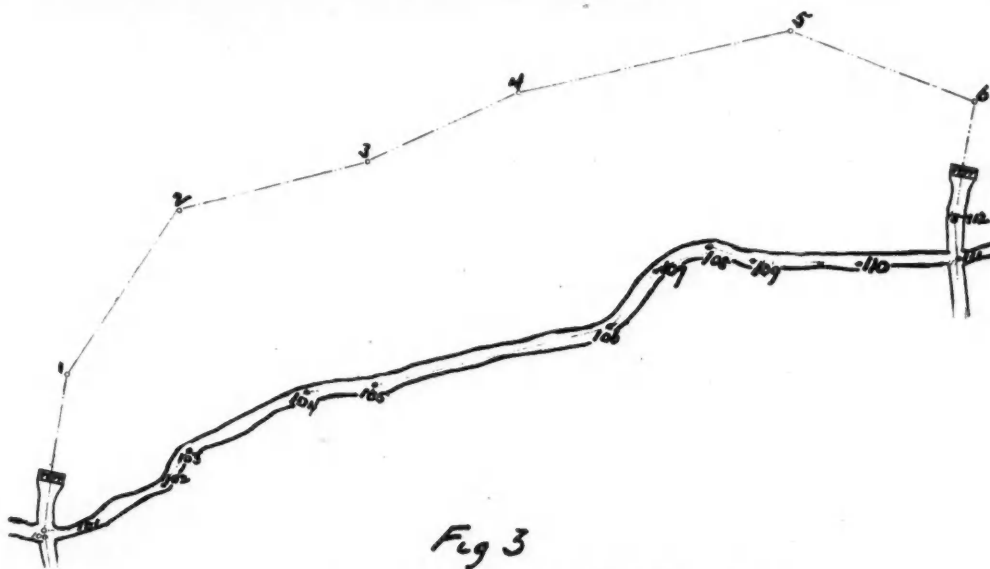


Fig 3
MINE SURVEYING ON THE WITWATERSRAND.

to 100 is due north, then the angle at the bob will be 135°. But we determined the bearing of this imaginary line on the surface. Now, since we know the angle that the first line from the bob to the first station in the tunnel makes with this imaginary line of known meridian, we easily find the meridian of the line from the bob to Station 100, for instance. Having the first line, we run the survey right through the mine from it.

You will notice that the underground survey on the assumed meridian is simply to determine the angle made at the bob by the imaginary line joining the bobs and the first line from the bob into the tunnel. In this method there is a good deal more office work but less shaft work than in the method of plumbing a shaft with two wires.

There is a little point I will add to the "one-wire-in-each-shaft" method, as it might not occur to one using this method for the first time. Let me illustrate from practice. In Fig. 1, A is the plumb bob in the shaft and Station 111 is the last station along the drift from the other shaft. Now, instead of sighting from 111 to A, a station 110, as far down the cross-cut as possible, is selected as the final station from which to sight to the plumb-bob, in order to have the last distance from the bob as great as possible, so that there would be the least effect from the swing of the bob in the shaft.

There are times when it is impossible to make use of the "one-wire" system, for instance when one of the upper levels runs into the adjoining property and there is no connection along the tunnels with any other workings.

Lately I had to carry the meridian from a lower to an old level that was surveyed years ago. The work

racy, and the slightest mistake in the length makes such a difference in working out the angles. For plumbing a single shaft the old method of getting the instrument in line with the two bobs in the shaft is the safer, I think.

The two principal ways of taking levels down the shaft is by measuring the length of the rope of the haulage engine and measuring all the way down with a 300-foot American steel tape.

In the first method two marks are made on the rope, one at the surface and one at the level in the mine. Then one man goes to the top of the head gear and the other stands on the ground. The engine drivers pulls in the rope in convenient lengths for measuring.

In the other method three men are required, one to hold the reel of the tape, one to manipulate the signal bell and the third to take down the readings. The man with the books stands inside the cage, while the other two stand on the skip over the cage.

The elevation of a bench mark near the shaft is determined some days before. In measuring the shaft the first thing is to drive a nail into one of the timbers, and its elevation is then determined from the bench mark.

The hook at the end of the tape is slipped over the nail and the signal given for lowering. About 300 feet of the rope is run out and another nail driven into the timbers. The distance between the two nails is carefully determined, a piece of white rag left hanging on the second nail so that it can be easily found, and then the signal to hoist to the top is given. A rapid descent is then made to the second nail, the hook slipped over it and 300 feet more of rope run out. In this way the total depths are

a porphyrite, which in places has small stringers of sulphurets running through it carrying gold, this being probably the source of that metal which has been found by the natives in the stream beds of this neighborhood. Close by there are also some slates which are sometimes so impregnated with sulphurets that the copper in them has been the object of a good deal of developing work.

About 40 miles to the west of Palehleh along the coast there is another mining camp, Soemalata. At this place the ore is almost entirely of heavy sulphurets, and the reef is a strong vein running vertically in a hard and compact porphyrite or andesite. It strikes about northwest and southeast, and on its northwestern extension it passes into a slate country similar to that noticed in Palehleh; at this passage the value of the reef deteriorates quickly, so that its extension in the slate is worthless.

The whole occurrence is very similar to that at Palehleh, except that both the reef and the country rock are more solid, hard and compact, which allows the ore to be mined with less admixture of waste. The coarse ore, which leaves the headgear after the lumps of waste have been picked out from it, assays about 1.5 ounces of gold per ton, and the fines about 0.75 ounce. From these latter about one-half is separated out as waste upon the dressing-floors, so that the value of the clean ore from them is brought up to about the same value as that of the coarse ore, the proportion of sulphurets rising at the same time to close upon 90 per cent. These sulphurets consist almost entirely of iron pyrites, with smaller percentages of zinc, lead and copper sulphides. In one portion of the reef there is some quantity of quartz in the gangue, but this is exceptional, the occurrence of a little colespar being more often noticeable.

Still further to the west, about 10 miles beyond Soemalata, there is another mining camp, at Denerki Bay, on the Monano Concession. At this place there is one principal reef which strikes north-northwest and south-southeast, and dips 80° W., in a porphyrite country. The reef matter, consists sometimes of brecciated rock in a silica cement, and sometimes of more solid quartz, binding the detritus of a disturbed fracture. Sulphurets form about 20 per cent of the ore, and they consist of zinc-blende, iron pyrites, galena and copper pyrites with low values in gold and silver.

The prospecting work which has so far been done still farther to the east, above this coast, has not resulted in the publication of anything of particular interest bearing upon the occurrence of gold. That done upon the Belang Concession shows that this property is within the auriferous region, but beyond this point upward not much is heard of gold.

On the southern coast of this peninsular, however, there are properties which are very interesting, and of these the most easterly is Totok, which is remarkable for the occurrence of a tremendous lot of quartz, as blocks, embedded in a tough clay, which is in a limestone rock lying upon porphyrite or altered andesite. The clay is accompanied by a large proportion of decomposed igneous rock, and there are evidences that the clay itself may likely be the final product of similar decomposition. On the borders of this occurrence the limestone on either side is traversed by stringers of quartz running in all directions and at all angles.

The opinion is that this is the case of an intrusion coming up into the limestone, though the exact nature of the occurrence is at present difficult to determine. There is one place in particular where it occurs on surface in the porphyrite without the conflicting presence of the overlying limestone, and there is no doubt that where it occurs on surface in the limestone it passes into the porphyrite, which is not far beneath.

Judging, then, of its occurrence in the porphyrite, which seems to be its parent rock, there is nothing to show that it is a volcanic intrusion of igneous rock into that porphyrite, but rather that it is an alteration of that rock, accompanied by a heavy deposition of silica, along a very strong fracture. In the limestone, also, the introduction of silica is by far the most

pronounced fact, far more pronounced than any evidence pointing to the introduction of such an igneous instrument as would be foreign to the porphyrite beneath. The clay and decomposed rock now found in the limestone can be accounted for as the resultants of the decomposition of porphyrite fragments broken off and intruded from along the fracture.

The gold in the Totok ore occurs as specks or leaves between the larger crystals, or like moss or wire upon the aggregates of minuter crystals. In the dense interiors it has not been seen. The stringers which ramify into the limestone are very small, though they carry high values in gold, in consequence of which they have especially been made the subject of pursuit by the natives, who, when they worked upon the larger and concomitantly poorer masses of quartz, examined the boulders for pieces showing visible gold, as the whole bulk would not be payable for them to break down and wash. There is a marked absence or scarcity of sulphurets in the ore, which distinguishes it from those which have previously been described.

About 6 miles in a southwest direction from Totok, there is another mining camp, at Kotaboenon, where the gold also occurs associated with stringers and impregnations of quartz, and of sulphurets in a decomposed andesite or porphyrite rock. These stringers and impregnations are arranged with reference to the fractures from which the solutions emanated. Two principal fractures have so far been discovered, one having a northeast and southwest direction, and the other running about at right angles to this direction, both being more or less vertical.

At other places on this south coast, as at Bonè, Pinago, Paguejaman, a good deal of prospecting work has been done. These places are centered around the town of Gorontalo, in a granite country, in which porphyry dikes and felsitic masses occur. With these dikes some veins of quartz occur which are more or less auriferous, and in connection with the occurrence elsewhere it is interesting to note, that small red colors, as of earthy cuprite, have been noticed with the gold in the pan when samples have been washed.

At the back of this extent of granite there is a high range of hills of porphyrite, or andesite, forming the watershed between the rivers running north and those running south. This range is capped by a recent limestone, as at Totok.

It may here be mentioned, that in the hinterland of Gorontalo, some deposits of copper-bearing pyrites have been found, which are now the subject of development.

Speaking generally, then, the whole known occurrence of gold in North Celebes is as secondary deposition or impregnation following fractures which occur chiefly in an altered andesite or porphyrite rock. This introduction of gold has sometimes been accompanied by that of complex sulphides, as at Palehleh and Soemalata, sometimes by that of quartz, as at Totok, and sometimes by both sulphides and quartz, as at Kotaboenon, though in no case is one or the other completely absent.

This occurrence is very similar to those which have been described in Sumatra and Borneo, so that it may be said of the whole of the Dutch East Indies that the gold occurs there in reefs, veins, and zones of impregnation, accompanied with sulphurets and quartz in a porphyrite rock or near the junction of such a rock with Devonian slates, in which slates there are sometimes similar though less extensive occurrences. It may also be said that it is likely that the zones of impregnation, whether they occurred around fractures in the solid mass or as dikes emanating from the mass, have provided the largest proportion of the alluvial and detrital gold, the reports of which first drew the attention to the possibilities of gold mining.

It is remarkable that the gold is always accompanied by a larger amount of silver, and that in almost every place where gold could be washed in the stream, some occasional colors of earthy cuprite, or native copper, would be seen.

The differences in the gangues, at the various mines,

determine the difference in treatment to which the ores are subjected upon reduction.

At Palehleh, at present, a richer and a poorer ore are mixed in the proportion of 1 of the richer to 10 of the poorer. The former contains about 60 per cent of the sulphurets, and it has the following value in base and precious metals: Gold, 4.5 ounces per ton; silver, 12 ounces per ton; lead, 8.5 per cent; copper, 1.5 per cent.

This ore is at present shipped to Europe for treatment, pending the erection of a smelting plant at the place, which course is rendered possible by the position of the mine on the coast.

The poorer ore contains about 8.5 per cent of sulphurets, and 0.75 ounce gold, and 4 ounces silver to the ton.

It is crushed in a 30-stamp battery, supplied by Fraser & Chalmers, and the pulp is passed over amalgamated copper plates 10 feet long, by which 58 per cent of the assay value of the ore is extracted; then it is led over blanket tables of about the same length, and by these about 15 per cent of the assay value is obtained, principally in coarse free gold. After this Frue vanners are used, and concentrates are obtained, in which about 11 per cent of the assay value is held. The tailings, which leave these vanners, assay about 0.125 ounce, and they contain about 16 per cent of the original assay value of the ore. The tailings are in a nice clean condition for cyanide treatment, but at present they are allowed to run to waste, as there are no cyanide works to treat them, and, owing to the steepness of the dumping ground and to the occurrence of heavy rains, it has been found impossible to stack them economically.

At Soemalata, where the ore to be treated consists almost entirely of sulphides, smelting for matte is undertaken. The coarse ore as it comes from the mine is picked over on the headgear, and the waste is there thrown out from it, after which, it passes to the smelter bins. The finer ore is passed through rotary sieves, to be sized into three products, of which the two finer ones are jigged, whilst the third is hand picked, the result of these dressing operations being a product having much the same composition as the clean coarse ore, which is about as under: Sulphur, 30 per cent; iron, 50; copper, 1; zinc, 3; lead, 2; arsenic and antimony, 4; lime and alumina, 5; silica, 5. This ore contains 1.5 ounces of gold and 4 ounces of silver per ton.

The charge for the smelter is generally as follows: Ore, 26 hundredweight; coral, 8; wood, 2; or coke, 70 pounds. Warm blast is used, and the smelting results in a concentration of 4 of ore into 1 of matte. The matte is essentially an iron matte with from 1 to 2 per cent of copper. At present it is shipped to Europe to be sold, but it is projected to obtain a better concentration on the spot by roasting and re-smelting, so that instead of containing 6 ounces of gold per ton it shall contain a much higher value. It is interesting to note that this is a case where an iron matte makes a very good extraction, with the help of only a very small amount of copper. The slag is fluid and clean.

Another interesting fact is that sometimes the smelting is entirely carried on with wood fuel. This wood is of the branches of trees, cut up into small blocks, and it is used while still green. In weight it is 5½ per cent of the charge, whereas the percentage of coke to take its place would be 1.7 per cent. Such wood appears better than coal, because it is harder, and resists pressure better. The coral is obtained from the seashore. The whole expenses of this matte smelting would be only about 75 cents, or \$1 per ton if the smelter were running continuously; the labor is cheap, because Chinese coolies have been taught to carry on the work with only one European overseer to look after the three shifts at the smelter.

Mining Law.—The sole right to explore open areas is granted to persons or companies domiciled in Holland or in the Netherlands Indies, upon their application to the Government.

This right is called the "vergunning" of the area, and it is granted for periods of 3 to 5 years, at the end of which it may be extended provided the Gov-

ernment is satisfied that the holders are carrying out the intention of exploring. The area must not exceed 30,000 bouws, or 52,500 acres in extent, and for each bouw 2½ cents must now be paid per annum, though before the new mining law come out there was no such charge. As these areas have generally been granted in unsurveyed regions, and the bound-

Singapore for one year's service upon the mines; it is agreed to pay their passage to the mine, and back again to Singapore upon the completion of the contract. It is rare, however, to see as many as one-half of the original number returning; the others were staying on as free men, or had run away or died. During their service they receive pay at the

YUBA RIVER PLACERS, CALIFORNIA.

The accompanying illustrations, from photographs sent us by the owners of the property, show some interesting placer mining work now in progress on the Yuba River, in California.

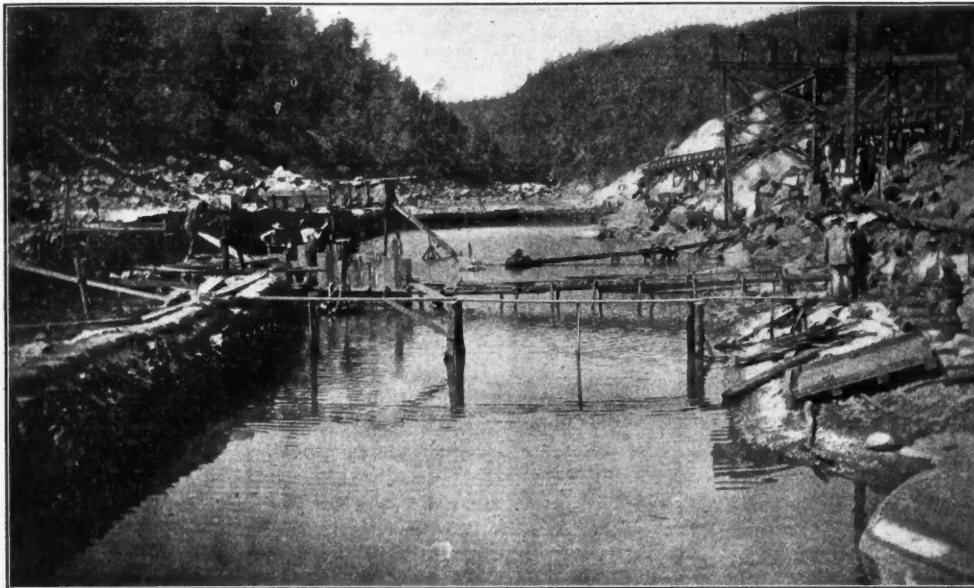
The property is situated in Placer County, about 7 or 8 miles from the town of Grass Valley, quite near a small settlement known as French Corral. The Yuba River has been extensively worked by placer miners ever since the discovery of gold in 1849, but this particular part of it they had never succeeded in working owing to the depth of the water and the swiftness of the current. The firm of Kaye, De Wolf & Co., of New York, in connection with Messrs. Geo. W. Root, clerk of the Supreme Court of California, and J. W. Heisner, of the firm of J. W. Heisner & Co., put in a 400-foot wing dam, which was completed early in September. The water has just been pumped out, and has uncovered a great deal of virgin gravel, some of it running as high as \$2.50 to the pan.

Considerable trouble was met with in making the dam water tight, on account of the nature of the river bottom, but the water was at last put under control, and the miners are now washing the gravel satisfactorily. Several attempts have been made to work this property before, but without success.

Up to the time that hydraulic mining was stopped in California, it was impossible to get at this gravel owing to its having been covered over to the depth of 20 or 30 feet with the washings from the hydraulic machinery further up the stream. Within the last few years, however, the rains and freshets have washed away a great deal of this top covering, till at the present time there is only about 5 feet of washings over the virgin gravel, which contains the gold.

THE METRIC SYSTEM IN GREAT BRITAIN.

United States Consul-General H. Clay Evans sends from London, August 30, 1902, a letter from the



YUBA PLACER, CALIFORNIA.

aries are stated very roughly, upon the application it is one of the duties of the holder to survey his ground.

This vergunning is no proprietary right, though it is valuable and can be sold or transferred; but should payable ore be discovered, the holder of the vergunning has the first right after the Government, to the concession for the exploitation of the ore. Application has then to be made for the concession, which may be made to cover the whole area or only the portion required, when, if all the stipulations of the mining law are complied with, it cannot be refused. The principal stipulations are that the person or company desirous of carrying on the exploitation must be domiciled in Holland or the Netherlands Indies, and that their *bona fides* must be evident from estimates of profit and loss which have to be submitted to the Government, that they may be satisfied that enough money will be forthcoming to properly carry out the intention of exploitation.

These concessions are granted for periods of 75 years, during which time payments have to be made to the Government of 2½ per cent of the yearly output of mineral or metal, and 25 cents per bouw of the concessions area.

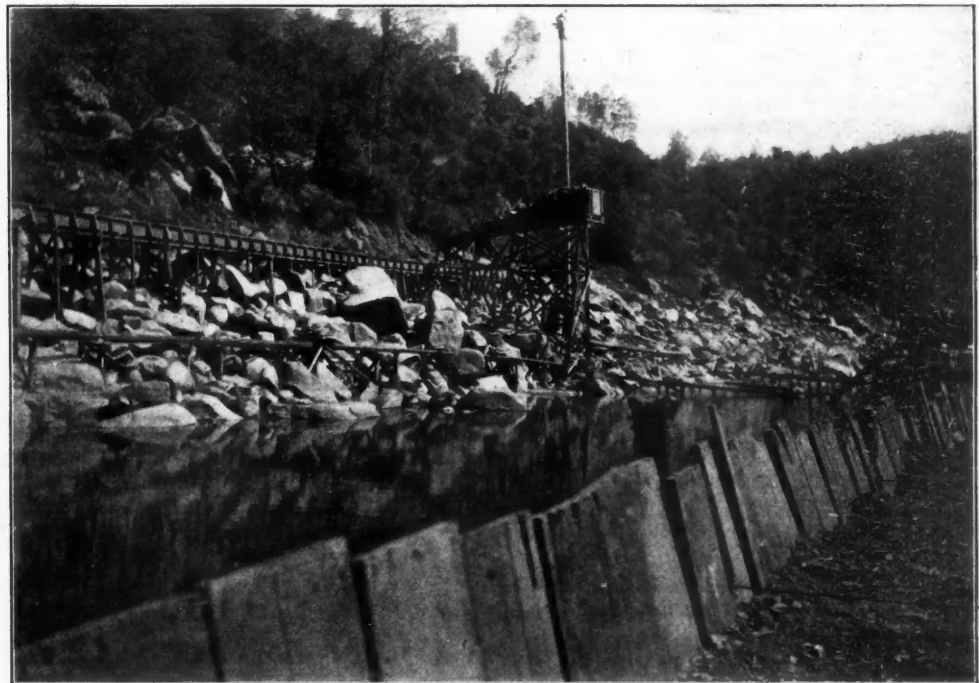
A few concessions were granted before the introduction of this present law, and these have their own particular payments to make. The Redjang Lejong Company has the first four years free of such payment on their output, but after that has to pay 10 per cent of the profits to the Government, though it has the option to alter this, and to accept the terms of the present law as given above. The Nederland Indies Mining Company has to pay 4 per cent of the profits in addition to a payment for the area held.

Labor.—The mining areas are situated in countries where the indigenous population is small, so that labor for the mines has always to be imported. The coolies which promise to supply the most successful labor are the Chinese. Javanese are also good, but it will become more and more difficult to procure them in the face of a protective Government, and in view of the labor necessities of Java itself. The Chinese are stronger and capable of showing a greater intelligence when trained. Until they are acclimatized they suffer a good deal in a new country, and a very large number of them die; but in spite of these facts it yet remains that they provide the best labor. They work under contract, being engaged in

rate of about 12 cents per day, in addition to free food and clothing.

The cost of the Javanese was perhaps a little more; they certainly received more in actual money but less in considerations, and they were of less trouble.

In engaging such coolies it must always be seen that they are Chinese who are newly arrived from



YUBA PLACER DAM, CALIFORNIA.

China, for those who have been a long time in the Straits or the East Indies are no good; they are rarely strong physically, and they are lazy, for those who were otherwise would not offer themselves as contract coolies.

Climate.—The climate is tropical, but as the mining districts are away from the coast, and are often situated high up in the hills, it is not at all bad. Malarial fever and dysentery are the things most to be guarded against; but of these the former is not virulent, and the latter can be kept away by care in meat and drink.

secretary of the Decimal Association, showing the progress of efforts to have the metric system of weights and measures adopted in England. The letter says:

"It has come to my knowledge that there is a considerable feeling in favor of the adoption of the metric weights and measures in the United States of America, and with this in mind, I am sure that you will be interested in information regarding the prospect of this country adopting metric weights and measures also.

"I therefore venture to lay before you the following

information: There are 290 members of the present House of Commons so thoroughly in accord with our aims that they have given me authority to publish their names as supporters. If we add to this the number of members of Parliament who would be influenced by a debate in the House of Commons to vote in our favor, we are convinced that we are now strong enough to carry a bill.

"During the last four or five weeks, no less than 60 city, town and county councils have passed resolutions to the effect that it is desirable that the reform should be made in the interest of commerce and education.

"One of the most definite results, in fact, I think I may say, the most definite result, of the conference of the colonial premiers was the passing of a resolution in favor of the adoption of the metric weights and measures throughout the British Empire. This will have a most important result, and will render certain the early passing of a bill to give effect to those views.

"All the chambers of commerce in this country, nearly all the school boards, the trades unions and a great number of societies of various kinds have for a long time been active supporters of my association.

"The attitude of our premier may be gathered from some remarks he made to the deputation which waited upon him in regard to this question in 1895. He said: 'If I may express my own opinion upon the merits of the case, there can be no doubt whatever that the judgment of the whole civilized world, not excluding the countries which still adhere to the antiquated systems under which we suffer, has long decided that the metric system is the only rational system.'"

CANADIAN MINING INSTITUTE.

The affairs of the new British Columbia Branch of the Institute, the organization of which was recently noted, will be in the hands of an executive committee composed of the following members: S. S. Fowler (chairman) and R. R. Hedley, Nelson; E. B. Kirby and Bernard MacDonald, Rossland; F. Keffer and S. F. Parrish, Boundary District; James Cronin and A. C. Garde, Slocum; J. H. Tonkin, Fernie; W. M. Brewer and W. F. Robertson, Victoria.

The meeting was a very successful one, both in point of attendance and in the character of the papers presented. The discussions on these papers were also of much interest.

It was decided to hold the next meeting of the Branch in Victoria, in March, 1903.

The following new members were elected: Norman Carmichael, Frank Fletcher, A. H. Gracey, Aaron H. Kelly, James W. Moffat, Nelson, B. C.; J. H. McKenzie, S. S. Sorensen, William Thompson, Rossland, B. C.; R. W. Coulthard, Thomas Stockett, Jr., J. H. Tonkin, A. R. Wilson, Fernie, B. C.; James Cronin, Moyie, B. C.; H. Mortimer Lamb, Victoria, B. C.; George L. Griffith, Winnipeg, Man.; H. C. Riehle, Black Lake, Que.; Frank H. Probert, Los Angeles, Cal.; Edward H. Sanborn, Philadelphia, Pa.; Dr. Bernard Mohr, London, England.

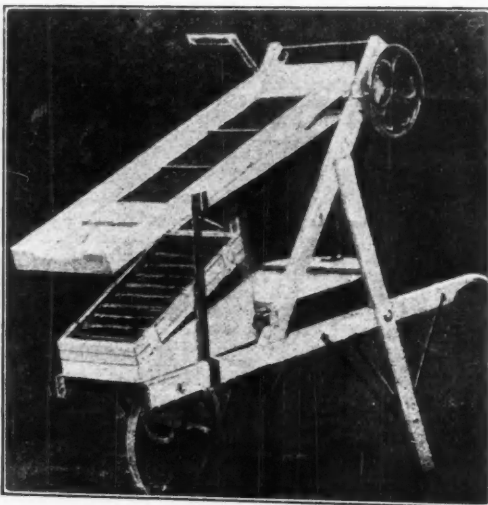
MINING EDICT IN CHINA.—Under date of August 13, 1902, United States Minister E. H. Conger sends from Peking translation of an imperial edict, as follows: "Mining is at the present time an important factor in our administration. Liu Kun-yi and Chang Chih-tung have recently memorialized the Throne by telegraph, pointing out that we ought to carefully adapt and harmonize our mining regulations with those of other nations. We consider this as eminently proper, and command those viceroys to note carefully how other countries manage such matters, and that they, in consultation with each other, discuss the rules in question, after which they may memorialize the Throne for our sanction by edict. Such rules should have no defects; they should be acceptable everywhere, yet protecting our rights and manifesting our circumspection."

DRY BLOWERS IN AUSTRALIAN GOLD PLACERS.

An interesting paper on the Clermont Gold-field by Mr. B. Dunstan, Assistant Government Geologist of Queensland, gives an account of the dry blowers in use in the placer workings of that State. As machines of this class have been extensively used in Australia, we give below a part of his paper.

It is proposed to describe only those machines and other accessories which have proved to be of special importance in alluvial gold-mining on the Clermont field. The ordinary processes of saving alluvial gold being so commonly known, a description of them will not be required.

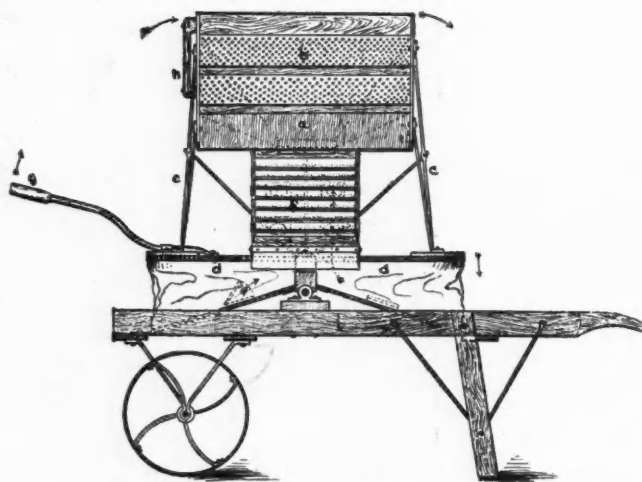
We have, first, the machines known as dry



KNOCKER DRY BLOWER.

blowers and dry jiggers, machines which have saved thousands of ounces of alluvial gold since they were introduced, and which in consequence have considerably extended the life of some of the surface leads.

At the time when a number of dry blowers were brought into use on the Western Australian fields for saving gold, one of these machines was



CARLSON'S DRY BLOWER.

brought over by a miner to Clermont. The machine was very cumbersome to move about, very laborious to work, and had several defects in its arrangements for saving the gold, and consequently did not find much favor amongst the Clermont miners. It was known as the knocker, because it had an eccentric movement, producing an upward blow to the hopper or screen on which the wash is thrown before coming in contact with a blast from a bellows.

From this machine there were many modifications, all more or less successful in helping to remove objectionable features or else introducing new ideas, until now machines are constructed

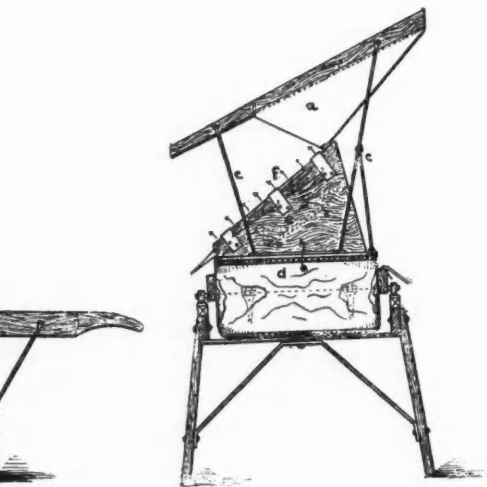
which are almost perfection. The principles underlying the machines are, first, the separation of the larger pebbles in the wash from the finer portion by a coarse perforated plate; second, the delivery of what passes through this coarse screen to one finely perforated; and, third, the forcing through the fine screen of a blast of air sufficiently strong to remove the earthy particles without also removing the gold.

In all of the machines the coarse perforated plate (or plates) is made of iron and the material passing through this is thrown off as hopperings. That which passes through the screen is fed on to a steeply-inclined finely-perforated zinc plate forming the top of the wind-chest of a bellows. By the blast of air the material is blown away from the zinc plates, and riffles are placed horizontally on the top of this to catch the gold. From the number of perforations in the zinc plate a casual observation might lead one to suppose that the gold, as well as the other material, would be blown away, but experience has shown that the gold is usually caught in the first couple of riffles in a box of half-a-dozen or more, and seldom, if ever, near the bottom. If the gold is lost it is due to the earth being damp or clayey, the gold clinging to the earthy particles being blown out.

The three machines to be described are types of Clermont dry blowers.

Carlson's Dry Blower.—This machine has been in use longer than any of the others, and all over the gold-field numbers of them are to be seen in operation. A drawing of the machine is given.

The hopper and hopper screen on top of the machine, and the wind-chest, zinc perforated screen, and riffle-box below are all fixed to the long board forming the top of the double bellows, and as the handle attached to the bellows is raised or lowered to make the blast, so the hopper, riffle-box and wind-chest is rocked from side to side with a see-saw motion, the fulcrum being the block of wood separating the two bellows. The hopper screen and its riffles are not removable, and only require to be looked at occasionally for coarse gold, but the riffle-box, to which is attached the zinc screen, has to be taken out frequently. The riffle-box has two sides tapering towards the front, so that it may be firmly wedged into a num-



ber of metal fastenings and set perfectly air-tight on the top of the wind-chest.

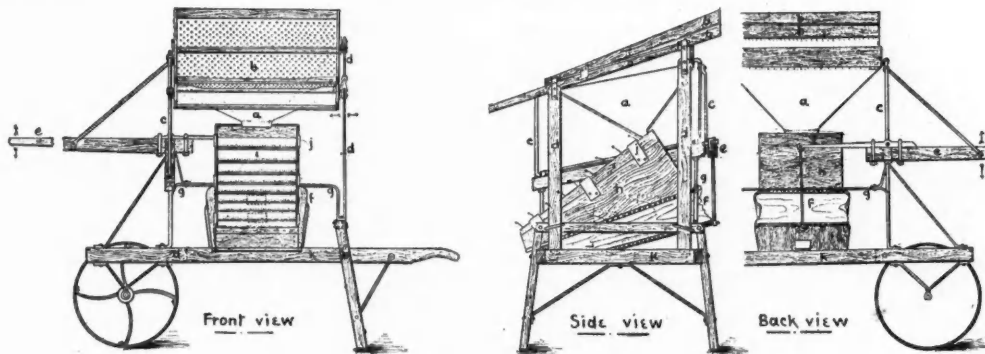
In operating the machine the coarse material comes over the front of the hopper, the finer portion being delivered on to the top of the riffle-box, where the see-saw motion and the pulsating blast together cause it either to be blown out or to descend over the riffles.

The residue in the riffle-box is thrown into a prospecting dish, then wind-blown by tossing or by pouring from one dish to another. The heavy particles, too heavy to be thus removed, are taken out by a quick motion of the hand after settling the gold at the bottom of the dish, and the gold is

finally cleaned by blowing with the mouth. The task of separating the gold by dry washing seems to require considerable skill, but the miners get accustomed to it, and to them it becomes a simple, rapid and mechanical operation. With fine gold there is not much loss through want of skill or from carelessness, but generally from the gold adhering to the particles of stone or clay. Further details are shown on the drawing.

In the illustration, a is the hopper; b, hopper screen and riffles; c, rigid supports for hopper; d, double bellows, bottom movable; e, wind-chest and valves; f, perforated zinc screen and riffles; g, handle for right hand; h, handle for left hand; i, barrow frame.

Rankine's Dry-Blower.—In this machine there are two screens to the top of the hopper, one



RANKINE'S DRY BLOWER.

coarser than the other, each provided with riffles. The motion of the hopper and the top screens is not the see-saw one of Carlson's blower, but is horizontally from side to side, which the inventor claims is a decided improvement. The zinc screen and box is placed above a single bellows, both of which remains stationary during the operation of blowing. From the drawing of the machine it will be seen that the handle is supported on a rigid iron frame, which acts as the fulcrum and has one connecting bar attached to the hopper, while another bar extending along the back of the machine connects with the bellows. The hopper is supported on the side next to the handle by a swinging iron frame resting on the fixed iron frame supporting the handle, and on the other side the hopper is kept into position by two flat wooden supports attached to the base. These wooden supports are made very slender, and act as springs to pull the hopper back to a central position when the handle, by being moved up or down, has forced it to either side. The machine is well constructed, and as only the hopper of the machine has to move, the life of the machine is considerably extended, besides reducing to a minimum its weight and the labor to operate it.

Buhre's Dry-Blower.—Buhre's machine combines the horizontal motion of the hopper and the stationary riffle-box of the Rankine blower with the double bellows of the Carlson blower. It has its advocates amongst the miners, some of whom prefer the double blast to the single one. Its construction is shown in the accompanying drawing. The bottom board of the double bellows is made the foundation of the machine, while the tops are hinged to the sides of the wind-chest. The handle moves the top of the bellows, which by a rod is connected to one side of the hopper. As the handle is moved, say upwards, the air is drawn into the bellows on that side, and at the same time the connecting-rod forces the hopper to the right (see arrow point in the illustration). Another connecting-rod from the side of the hopper is attached to the opposite bellows, and as this is depressed a blast is driven up through the zinc screen.

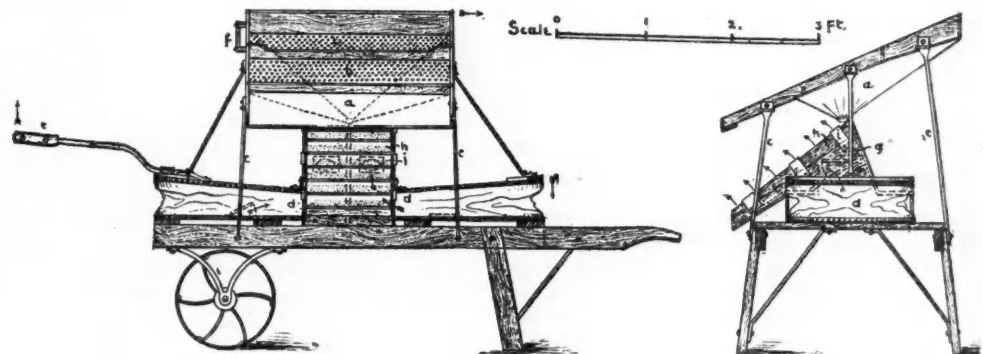
A commendable feature of the machine is that the hinges of the two bellows are placed on top instead of at the bottom. A difficulty is experienced in keeping the hinges free from an accumu-

lation of dust, when they are placed at the bottom as in Carlson and Rankine's blowers, and the constant motion has a tendency to squeeze the dust into the crevices between the hinges and their leather covering. If care is not exercised to have the inside of the bellows occasionally cleaned from dust, the woodwork and the leather will either burst or become strained. With Buhre's blower this objectionable feature is removed.

Notes on Dry-Blowers.—The perforations in the zinc screen are placed $\frac{1}{8}$ inch apart and there are about 5 parallel rows right across the screen just above each riffle. The number of riffles varies from 6 to 8. The perforations are made with a blunted No. 8 sewing needle, or a bundle of them set in a block. The riffle-box with the zinc screen on the bottom has to be well fitted, and should

not require any packing. Leather may be used to make this air-tight, but this soon wears away and requires frequent renewal. The angle of inclination of the riffle-box in all the machines now used is unalterable, as experience has shown that the working angle varies but slightly.

If it is found necessary to alter the angle, it may be done by slightly tilting the whole of the machine and fixing it in this position by a support under one leg. This is much preferred to the adjustable riffle-box on the top of the wind-chest made partly of leather, an arrangement not so substantial as when made entirely of wood. The less inclined riffle-box will save more gold than the steeply inclined box, but it will not allow so much earth to be put through in a given time. If



BUHRE'S DRY BLOWER.

the character of the gold in any deposit is known, the machine can be set accordingly, and without any experimental work.

The capacity of the machines described above is very much the same, being about four or five loads a day under nominal conditions. Should the earth be at all damp, this quantity will be diminished, but when dry on a hot day, the quantity will be increased. With the assistance of a second man about eight loads can be treated. If the earth is hard, it is beaten up with a piece of timber shaped for the purpose. Under favorable conditions—the wash perfectly dry and gravelly—many miners prefer the dry-blowing to wet methods.

The machines are not suitable when the earth is clayey, although this difficulty can sometimes be overcome by heating the earth and then powdering it

on a flat sheet. Losses of gold are generally due to the presence of this clay, and if a clayey wash once treated be allowed to remain exposed for some time to the weather and treated again, more gold will probably be obtained.

With reference to the blast, some have been of the opinion that a fan would answer the purpose of bellows. This has been tried repeatedly at Clermont, and has proved an utter failure. The blast evidently requires to be pulsating. The strength of the blast is supposed to have some effect in saving or losing the gold. In one of the Clermont blowers the writer has seen experiments tried in which it was found impossible to drive the gold off the fine screen even with the strongest blast the machine was capable of producing. What the result would be, however, if the gold was mixed up with earth cannot be stated.

The cost of the locally-made machines varies from \$32.50 to \$50, according to the material they are made of, but the great majority of machines cost about \$42.50.

Hopper screens are made of galvanized iron, the perforations being about $\frac{1}{2}$ inch in diameter, and the centers of the holes less than 2 inches apart. The holes are commonly made with a punching-tool, but it is said the screens last much longer if the holes are bored, as this operation leaves a clean level edge, and to a great extent preventing their becoming choked or burred.

The timber used in the machine should always be well seasoned, otherwise there will be leakages in the bellows and wind-chest in a very short time, and the machine will lose both its rigidity and efficiency.

Dry-Jiggers.—These machines were introduced as a modification of the dry-blower, the original one, it is said, being made from parts of an old discarded knocker. The machine as now used consists simply of a number of inclined screens, one above the other, with a varying mesh, and supported on four slender legs. Usually on the top of the screens a perforated hopper is placed to separate the coarse portions of the earth, but sometimes this is dispensed with.

The machine in general use is shown. A perforated hopper with holes of about $\frac{1}{2}$ inch in diameter is fixed in an inclined position, and all large stones are thrown out at one end. The finer portions travel down an apron d to the head of the coarse wire screen e, and what will not pass through this is thrown out at the other end. The fine particles passing through this screen fall on to the fine

screen g, on which the gold is caught. The fine screen delivers out at the same end as the screen above all the material that will not pass through it, while the very fine dust falls through the screen on to the ground.

The top screen is made with a mesh of about $\frac{1}{8}$ inch in diameter and the bottom one generally 1-16 inch, and any gold finer than this is allowed to pass away.

The jigger is supported on the legs, or springs, by the box carrying the coarse screen c, on the sides of which two handles are fixed, each having two receptacles on the lower side, in which the heads of the legs or springs are set in. The springs in the old machines were made of steel, but experience has shown that wooden ones are much to be preferred; they last longer, are cheaper, and are very easily

made. Spotted gum or brigalow are the timbers generally used for the purpose. The springs require to be set rigidly in the bed-frame, and should be fitted well and keyed in, otherwise the constant vibration will loosen them. The bed-frame is roughly made, and some heavy stones are placed on it to prevent movement.

The operation of jiggging is very simple, but the miners assert that with the same machine and under similar circumstances one man will save gold while another will lose it. One man to each machine is the usual practice, and he begins by throwing a few shovelfuls of earth on to the hopper, and then shaking until all has passed out at the ends or through the fine screen. After repeating this a great number of times the fine screen, with any gold it may have caught, is removed by drawing it out from the two narrow wooden supports going across the bottom of the top box. After shaking it over a dish or flat sheet it is replaced again, and the jiggging is continued. The riffles on the top screen are at intervals inspected for coarse gold.

In having a bottom screen with 1-16-inch mesh, no doubt a loss of gold must take place, but a few ex-

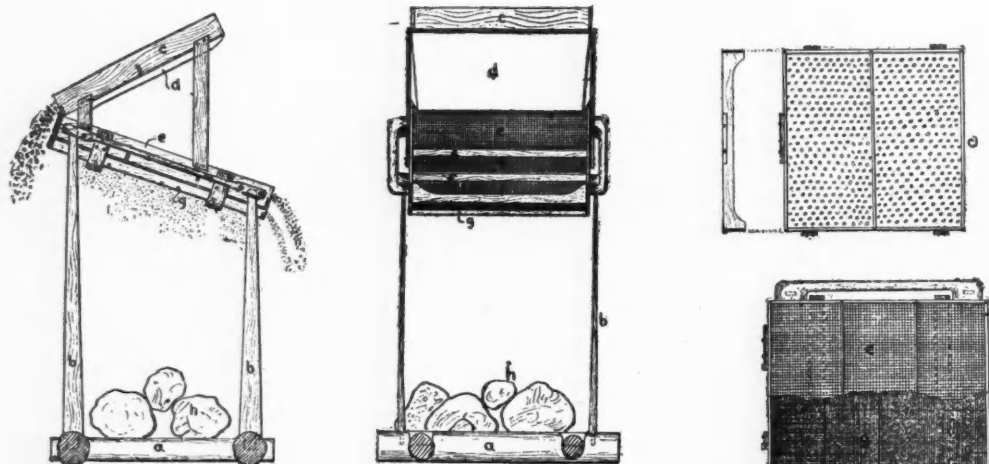
being contributed to by 266 German societies, by 25 English and 25 French societies; of individuals, there are 1,333 German, 229 English and 192 French contributors at work. The editorial staff is desirous of obtaining the active co-operation of all persons interested in any branch of engineering or technical science.

ROBERT HASENCLEVER.

Robert Hasenclever, one of the most eminent of German chemical engineers and captains of industry, died at Aachen, June 23, 1902. His death was briefly noted at the time. He was born aturtscheid, Germany, May 28, 1841. His father, who was a pharmaceutical chemist, established in 1852 the firm of Hasenclever & Co., for the manufacture of sulphuric acid and heavy chemicals at Stolberg, near Aachen. Stolberg had long been the center of important metallurgical industries and was the location of large zinc smelters. It was the scheme of the new firm to utilize in sulphuric acid manufacture the fumes from their blende roasting furnaces, which was a pioneer undertaking. It succeeded, however, and in 1856 the concern was incorporated as the Chemische Fabrik

ing districts of Germany. It has now been displaced by another furnace, of quite distinct construction, also designed by Hasenclever, which is known variously as the "New Hasenclever" and the "Rhenania." This has been devised both for hand raking and mechanical raking, but only the former type is in use. It is now employed extensively for blende roasting in all parts of Europe and is recognized as the highest development of the hand-raked muffle furnace.

For his improvements in blende roasting and in other branches of the chemical industry, Hasenclever was honored in many ways. He received the medals of several important technical societies and was made doctor of engineering, honoris causa, by the Technical High School of Karlsruhe. In recognition of his position as a captain of industry in Prussia the title of *commerzienrath* was bestowed on him. He was an extensive contributor to technical literature, freely communicating the results of his own work and progress, scarcely a year passing without some valuable paper from his pen on one of his specialties. His loss will be felt, therefore, not only by the chemical and metallurgical industry of his own country, but also by that of the rest of the world, which had learned to appreciate his high attainments and the merit of his opinions in technical matters.



DRY JIGGERS.

periments with the machine show that even with this mesh the gold does not easily pass through, unless it is fine and shotty. A finer mesh has been used, but it was found that with a reduction in the capacity of the machine there was not a compensating amount of gold saved. As the quantity which can be treated is about double that of a dry-blower, the fine paint gold is neglected if there be any coarse gold in the material. Without coarse gold the jiggers are not successful, and dry-blowers are used.

The material to operate upon by a dry-jigger as with the dry-blower should not be moist or clayey. Both of these objectionable features are remedied to some extent by breaking up the earth, as described previously, and spreading it out to dry in the sun. The best stuff to treat is a loose gravel free from clay and quite dry.

Sometimes the jigger is permanently mounted on a wheelbarrow roughly cut out of the forked branch of a tree, and then is very convenient for moving about.

THE GERMAN TECHNICAL LEXICON.—A report has been issued recently concerning the progress that has been made in preparing the great German technical lexicon. Dr. Hubert Jansen was commissioned to undertake the leadership in this great work on behalf of the Society of German Engineers. The report says that the getting together of the dictionary part of the work will be finished about the end of 1904. Then the arranging, looking over and touching up of several millions of words, among which there will be thousands of duplicates and triplicates, will take two years at least. Thus, the editors hope that the manuscript will be ready for the press toward the end of 1906. The work is

Rhenania, which subsequently became, and is now, one of the largest and most enterprising chemical manufacturing companies in Germany.

Robert Hasenclever, after receiving an education at the Technical High School at Karlsruhe and elsewhere, and gathering practical experience in various places, went to the Rhenania works as superintendent in 1864. The remainder of his life was devoted to their operation and the development of the gradually increasing business. In 1874, upon the death of his father, he succeeded him as managing director. During the 38 years of his connection with the business the number of men employed in it increased from 200 to nearly 1,200.

Robert Hasenclever made numerous important improvements in various branches of chemical manufacture, but his greatest technical work was in the utilization for sulphuric acid manufacture of the gases from blende roasting furnaces. This was the specialty of his company, and in it he was the highest authority. To no one more than he is due the credit for the recovery of these previously wasted resources of sulphur. At the present time almost all of the blende roasted in Rhenish Prussia and Westphalia is thus utilized for sulphur as well as for zinc, and largely through the instrumentality of Hasenclever. According to his own statistics, out of a total production of 845,582 metric tons of sulphuric acid, reduced to a basis of 60° B., in Germany in 1897, the quantity of 136,868 tons was derived from blende roasting. He contributed to this great development by the invention of efficient roasting furnaces for the purpose. The well-known Hasenclever & Helbig furnace was first introduced at Stolberg in 1869 and in a modified form soon came into use and remained in use for a long time in most of the zinc smelt-

COAL IN FORMOSA.—Consul Layard, in a report to the British Foreign Office on the trade of North Formosa, says that there were 73 coal mines in this district in 1901, of which 42 were in operation at the close of the year, with an area of a little over 3 square miles; 31 others, with an area of about 3 square miles, were not being worked. The total output in 1901 was 62,547 tons. The mines lie principally around Kelung, and are for the most part surface workings. Preparations on an increased scale are being made at Tamsui for the export of this mineral, which mostly goes to China, and operations in the mines are being extended around Kelung, where the coal veins are very numerous. Although the Formosa coal is very brittle, yet it appears to be coming into favor on account of its great heating power and the very small percentage of ash. This does not apply to all coal found in the island, as there are some veins of inferior quality which show too large an admixture of sulphur. The better coal, the Consul is informed, when used for bunker purposes shows better results than the average coal of Moji, in Japan. Last year from Tamsui and Kelung 25,130 tons of coal were exported, as against 22,996 tons in 1900.

FIRE-RESISTING WOODS.—Mr. Edward Atkinson and Prof. Charles L. Norton have been conducting experiments upon the combustibility of so-called fire-resisting and non-inflammable woods, which are ordinary woods treated by some chemical process. Prof. Norton reports that the only advantage of the wood thus prepared is a slight diminution in its combustibility. It is somewhat less liable to ignition by a brief and feeble exposure to heat and is not so likely to spread a fire, inasmuch as it burns with less flame. It can be ignited at about the same temperature as untreated wood, and in many cases will continue to burn. It is a good fuel, and makes a very hot fire. When heated it gives off a gas which makes it less likely to keep burning than untreated wood, and when afire gives out less flame. Under many conditions, however, it will support its own combustion. It is destroyed by external heat nearly as rapidly as untreated wood. It is not so easy to work. The mechanical strength of the wood is slightly impaired by the treatment, and it may cause rusting of the iron and steel with which it is in contact. "While it may be a safeguard," says Prof. Norton, "to use this treated wood in tall buildings, it is so slight a safeguard as to be, in my opinion, of questionable value." Prof. Norton also remarks that the samples tested by him were received directly from the manufacturers, and probably were of a standard of excellence which would hardly be reached in general save under a very rigid and expensive examination.

RECENT DECISIONS AFFECTING THE MINING INDUSTRY.

SPECIALLY REPORTED.

WHEN VENDOR'S LIEN WILL NOT BECOME SECONDARY.—Parties sued to recover mining property which they had conditionally sold to a company under a contract providing certain improvements should be made. A mortgagee intervened and alleged that his mortgage was for money loaned to the company to make the improvements in accordance with the conditions of the contract of sale. It was held that if it was loaned for such purpose the mortgagee must have known of the contract and its conditions, and must therefore have taken subject to the vendor's rights. The fact that the latter were stockholders in the corporation to which they had sold, in the absence of any showing that they were present at the stockholders' meeting when the mortgage was authorized, or actually consented to same, would not prevent them from asserting their rights under the contract.—*Martin v. Eagle Creek Development Company* (69 *Pacific Reporter*, 217); Supreme Court of Oregon.

BINDING AGREEMENTS BETWEEN OWNERS OF UNDIVIDED INTERESTS.—A trustee took a mining lease with option to purchase, and providing that certain work should be done monthly, failure to do which for 10 days should forfeit the lease. He formed a voluntary association, issuing to each member a certificate representing a 1-30 interest, and providing that the holder should pay \$10 on the 4th of each month, and on failure to pay such assessment the share might be sold, etc. Afterwards at a meeting of all the shareholders, they agreed that the monthly expenses should be divided into 30 parts, each part to constitute an assessment, and afterwards the assessments were doubled. A party had purchased a share from an original holder, and on default his share, with that of other delinquents was sold. The court held, that even if the arrangement was a partnership, and not a joint stock association, the sale of such delinquent shares was as valid as the purchase. Also, in view of the necessity of prompt payments to comply with the terms of the lease, and the manifest intent of the parties the provision in the certificates that the sale of delinquent shares should take place on the tenth day of the month following such failure, etc., should be construed to mean the 10th day of the same month after the default in the payment of the assessments.—*Joseph v. Davenport*, (89 *Northwestern Reporter*, 1081); Supreme Court of Iowa.

MATERIAL MAN'S LIEN ON MINING PROPERTY.—The law of Utah (Revised Statutes, 1898, section 2000) makes a trust deed notice to lien-holders from the time it is filed for record. Section 1372 provides for a material man's lien, which by section 1381 is made to apply to those furnishing materials for the working, etc., of a mine. Section 1384 provides that a material man's lien shall be prior to any mortgage of which the lien-holder had no notice, and which was unrecorded when he commenced furnishing the material; section 1385 provides that such lien shall relate back and take effect as of the time when the lien owner commenced to furnish materials, and shall have priority over any incumbrance subsequently intervening, except a certain lien of the same class, of which the material man had no actual notice at the time. The court held, that the lien for materials commenced to be furnished to a mine-owner prior to the execution and recording of a mortgage on the mine property and continuing to be furnished, under a contract creating a continuous running account, until some time after the recording of the mortgage, took effect from the date when the first was delivered and continued until the last materials were delivered, with priority over the intervening trust deed. When all the items of a running account for materials relate to one con-

tinuous transaction between the same parties, and their dealings indicate an expectation to continue such business relations, the account will be regarded as continuous and dates from the first item of the same, though the goods were furnished on separate orders and at different dates and there were intervening irregular payments on and monthly balances in the account. But where the materials are furnished for separate and distinct purposes, under separate contracts or orders requiring cash payment, under circumstances tending to rebut any presumption of a continuous dealing, the lien for material dates, in the absence of express contract to the contrary, from the date when the materials were commenced to be furnished on the respective contracts or orders.—*Fields v. Daisy Gold Mining Company* (69 *Pacific Reporter*, 528); Supreme Court of Utah.

FRENCH BRIDGES FOR CHILE.—The *Echo des Mines* of Paris announces that the Government of Chile is about to sign a contract with the Creusot Company for the reconstruction of the railway bridges throughout the country.

ABSTRACTS OF OFFICIAL REPORTS.

Consolidated Mercur Gold Mines Company, Utah.

This company's report covers the year ending June 30, 1902. The statement of earnings and expenses is as follows:

Gold produced:	
Golden Gate Mill.....	\$1,359,844
Manning Mill.....	97,220
Total gold receipts.....	\$1,457,064
Miscellaneous.....	1,713
Total receipts.....	\$1,458,777
Working expenses.....	\$1,111,514
Construction.....	1,859
Taxes, etc.....	3,319
Total.....	\$1,116,692
Net balance.....	342,085
Balance from previous year.....	273,310
Total surplus.....	\$615,395

From this dividends amounting to \$465,000 were paid, leaving \$150,395 surplus forward to current year.

The ore from the mine was treated in the Golden Gate Mill, the Manning Mill being run on old Mercur tailings. The extraction from these tailings showed an average of 93.5 cents per ton, the expenses being 59.4 cents per ton.

The directors' report says: "The average assay value of all the ore mined and milled during the year was \$5.72. The tailings averaged \$1.19. The mining costs were \$1.41, and the milling costs \$2.09 per ton, or a total of \$3.50 per ton. This includes all expenses of whatever nature. The expenses, however, have lately been considerably reduced. During the last three months of the year covered by the foregoing figures, the mining costs averaged \$1.32, and the milling costs \$1.70, or a total of \$3.02 per ton. This record should be maintained while the tonnage is kept up to the present mark.

"The dividends paid during the year were Nos. 3-8, inclusive, making a total of 46½ cents per share, or \$465,000. Prior to the period covered by this report, the company paid \$235,000 in dividends, hence the total dividend disbursements of the Consolidated Mercur Gold Mines Company to June 30, 1902, were \$700,000. During the year the old Mercur Gold Mining and Milling Company paid its final dividend, of \$9,500, bringing that company's total up to \$1,490,500. De La Mar's Mercur Mines Company paid \$689,813 up to the time of the consolidation. Accordingly, the grand total of dividends paid by the properties embraced in the Consolidated Mercur Gold Mines Company to June 30, 1902, is \$2,880,313."

The superintendent's report says: "The most important achievement of the year in the way of improvements was the extension of the electric tunnel to the Lulu workings. This work was begun January

10, 1902, and the connection was made June 9, 1902, up to which time the tunnel was extended 1,260 feet, making its total length 1,660 feet. This tunnel affords a convenient and economical outlet for all ores in the Lulu and adjacent workings, and by means of a system of raises the ores from all portions of the Mercur Mine can be cheaply handled through this avenue.

"The electric tunnel runs under the great reserves in the Lulu ore-bodies and is connected with the workings above by a series of chutes. As the ore is broken it is dumped into the chutes, whence it is loaded directly into cars and conveyed to the shaft by electric locomotives. It can readily be seen that a great saving should follow in the transportation of the ore, not alone in the haulage, but also in doing away with raising it up the Lulu, No. 27, Silver and No. 5 inclines, all of which required air hoists, men and power. Where the ore was formerly handled three times, it is now handled but once. In addition to its economical features, the tunnel is of great value in prospecting. It is now in ore, and it will be continued on its present course, to explore the very large tract of virgin territory in the Fremont claim, which has never yet been prospected. The tunnel is large and straight, with long side switches; in fact, almost a double track the entire distance; is lighted by electricity, and well ventilated by raises and other connections to the surface. The trains run directly to and under the chutes. The road is equipped with two 10 horse-power electric locomotives, capable of hauling 20 tons per train, at a speed of 6 miles per hour, and 87 cars of the capacity of 1¼ tons each. We have also driven a new tunnel, 335 feet long, to take the place of the old Saw Mill tunnel, which had been undermined, causing it to settle and close. This tunnel connects with the main shaft, and affords ingress to and egress from the Golden Gate Mine. We straightened and enlarged 70 feet of the main shaft in the Golden Gate Mine, below the Viking level, and constructed 2 large ore pockets adjoining the shaft, having a combined capacity of 100 tons. This has effected an appreciable saving in tramming and hoisting, for, with plenty of bin room, fewer changes are necessary by the skip loaders, and no time is lost by the car men."

Prospecting work has resulted in showing a large increase in the ore reserves.

The report says, in conclusion: "Of the entire tonnage going through the mill, two-thirds is coming from Mercur and one-third from the Golden Gate Mine. On account of the past year's developments, the Mercur Mine has a large excess over the Golden Gate in ore reserves. Furthermore, the Mercur reserves are largely oxidized, while those in the Golden Gate are mostly base, where they are available. And then, the base ore from the Mercur is more easily roasted than that from the Golden Gate, for, although they are mined from the same strata, there is a material difference in their general make-up and treatment. In the Golden Gate Mine the base ores carry more sulphide of iron and arsenic than in the Mercur, and when the proportion of ores treated is right, much better results are achieved. Accordingly, the Mercur Mine furnishes most of the oxidized ore and part of the base.

"The tonnage put through the mill has increased about 30 per cent during the past four months. It was absolutely necessary, however, to overhaul every piece of machinery in the mill, in order to maintain a steady and high tonnage. We put in a complete set of roll shells and shafts, and in many parts of the mill have put in new line and counter-shafts. Consequently, our repairs have been extraordinarily heavy. A simple mechanical change in the mill has proven very economical. Up to some time last March there had been 2 dryers used for calcining oxidized ore or roasting base. These were very expensive to operate, and the results were not satisfactory. Since that time they have been stopped, and by means of an expenditure of not to exceed \$50 the oxidized ore has been treated as well as when calcined with the dryers, and the tonnage not reduced."

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.

Les Gazogenes. By Jules Deschamps. Paris, France; Veuve Ch. Dunod. Pages, 432; illustrated. Price (in New York), \$5.25.

Bulletin of the United States Fish Commission. Volume XX. First Part. George M. Bowers, Commissioner. Washington; Government Printing Office. Pages, 524; illustrated.

Heating and Ventilating Buildings. Fourth Edition, Revised. By Prof. Rolla C. Carpenter. New York; John Wiley & Sons. London; Chapman & Hall, Limited. Pages, 578; illustrated. Price, \$4.

Twelfth Census of the United States. Bulletin No. 246. Manufactures: Iron and Steel. Prepared by William G. Gray, under direction of S. N. D. North, Chief Statistician for Manufactures. Washington; United States Census Office. Pages, 98.

United States Geological Survey. Mineral Resources Division. Production of Petroleum in 1901. By F. H. Oliphant. Pages, 324. *Occurrence of Glass-pot Clays in the United States.* By Heinrich Ries. Pages, 18. Washington; Government Printing Office.

Zur Verwertung Speziell der Wiedergewinnung des Zinns von Weissblechabfällen. By Dr. Hans Menicke. Stuttgart, Germany; Ferdinand Enke. Pages, 68.

The Analysis of Steel Works Materials. By Harry Brearley and Fred Ibbotson. London and New York; Longmans, Green & Company. Pages, 502; illustrated. Price, \$4.25.

L'Electricité a l'Exposition de 1900. Fascicule 8. Traction Electrique. By E. Hospitalier and J. A. Montpellier. Paris, France; Veuve Ch. Dunod. Pages, 36; illustrated.

Reference Library of Modern Engineering Practice. Editor-in-chief, Frank W. Gunsaulus; assisted by twenty-five associates. *Volume I, Mathematics. Volume II, Mathematics, Mechanics, Heat. Volume III, Foundry, Forge, Machine Shop. Volume IV., Machine Design, Boilers. Volume V, Chemistry, Metallurgy, Engines. Volume VI, Marine and Locomotive Work. Volumes VII and VIII, Electricity. Volume IX, Heating, Ventilating and Plumbing. Volume X, Mechanical Drawing.* Published by the American School of Correspondence.

BOOKS REVIEWED.

The Manual of Business. By Sidney P. Johnston. Chicago; Daniel Stern. Pages, 264. Price, \$1.50. This is a useful manual containing a large number of forms for executing commercial instruments and many hints as to business usage and correspondence. It will be of service, not only to business men, but also to engineers and others.

Electricity. By George L. Fowler. Philadelphia; the Penn Publishing Company. Pages, 206; illustrated. Price, 50 cents.

This is a convenient and well written treatise, giving an elementary idea of electrical work and the methods of construction of electrical apparatus. A general introduction summarizes rather briefly the general subject and is followed by chapters on different apparatus, including the telegraph, telephone, dynamos and motors, electric lighting, etc. There are also chapters on electro-plating and similar work. Its different rules, etc., seem to be generally sound and it contains a good deal of information in a little space. It does not take the place of more elaborate works, but is very convenient to those who wish an elementary knowledge of the subject.

Materials of Machines. By Prof. Albert W. Smith. New York; John Wiley & Sons. London; Chapman & Hall, Limited. Pages, 148; illustrated. Price, \$1.

This book, as the author says in his brief introduction, is the result of an effort to bring together in a concise form the information needed by the designer or constructor who has to select material for machinery parts. It includes an outline of iron and steel metallurgy, which is necessarily brief and is given chiefly in order to explain in a general way the methods employed in the manufacture of iron and steel from the raw material, with the reasons for the different character products. This is followed by chapters on the testing of material and by others on cast-iron, wrought-iron and steel, and on bronze and other metallic alloys which are used in construction. The book has evidently been prepared with care and gives many notes which will be of use to the mechanical engineer and the designer and builder of machines.

Ontario: Report of the Bureau of Mines. 1902. Thomas W. Gibson, Director of Bureau. Toronto, Ont.; Public Printer. Pages, 310; with maps and illustrations.

This excellent report covers chiefly the year 1901, though some of its data extend into the current year. The period to which it refers was one of substantial progress in the mineral industries of the Province. In iron, nickel and copper there were very considerable gains in production, while the non-metallic output also showed an increase, especially in the cement and clay industries. Aside from the collection of statistics, the report shows a great deal of work accomplished by the Bureau in studying and reporting on metallic deposits, building stones and other minerals of economic importance. The Bureau also conducts an assay office in which a large number of determinations are made yearly for miners and prospectors, while summer schools for mines are also carried on under its auspices.

In addition to the statistics and the general report of operations, this volume contains special reports or papers on Ontario at the Pan-American Exposition, the Mineral Industries at Sault Ste. Marie, Arsenic in Ontario; Iron Ranges in Northwestern Ontario; the Corniferous Exposure in Anderdon; the Michipicoton Iron Region; the Eastern Ontario Gold Belt; Syenites near Port Coldwell; Explorations from Temiscaming to the Height of Land. The concluding paper is a summarized description of the Mines of Ontario, by W. E. H. Carter.

The report is fully up to the standard of the Bureau's previous issues, and contains a variety of information which will be useful to miners, prospectors, investors, and all who are interested in the mineral industries of the Province.

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.

Mine Litigation.

Sir: In your issue of September 13 appeared the abstract of a paper read before the International Mining Congress by G. W. Tower, Jr., entitled "What Constitutes a Mine?" in which the author describes a mine in its broadest sense. In his summary of the charges to be borne by a property before it can be considered a mine he cites among others "cost of possible litigation." Is not this an entirely unnecessary expenditure? What business man would think for an instant of buying a stock of goods or a farmer a farm, to which he could not obtain an absolute, clear title? Then, why, should a mining engineer consider the purchase of a mine against which he had to set aside a proportion of said mine's output for a

possible litigation that usually proves nothing and is one of the greatest drawbacks to legitimate investments in mines? W. H. D.

San Francisco, Cal., Sept. 26, 1902.

(The item of expense for litigation is unfortunately made necessary by the present condition of our mining laws, and the opening which they give to litigation by the allowance of extra-lateral rights and other complications. It is a drawback upon mining, as you say, but it exists and must be reckoned with.—EDITOR E. & M. J.)

Another Side of the Anthracite Strike.

Sir: I have been reading with considerable interest Dr. Raymond's editorials on the anthracite strike, but must take exception to some of his statements. What particularly brings out my remonstrance in his attack on the character of Mr. Mitchell, in which he states "that Mr. Mitchell has forfeited the right to be believed, and I would not condemn a dog, not to say a Governor upon his unsupported evidence." I do not think that Dr. Raymond can have met Mr. Mitchell, or at all events, have conversed with him very long or he would not have made this statement. I do not take issue with Dr. Raymond upon the dignity due the office of governor, but I think that Mr. Mitchell is a sincere man and is acting up to his lights. My interests are with the employer rather than the employed, so I think I can say this without being misunderstood, particularly as I have had occasion to meet Mr. Mitchell in a number of conventions, in which I was concerned as a representative of the operators. Those operators have universally found that Mr. Mitchell is the most conservative of the Union officials, and but for his strong personality in more than one case, there would have been State strikes. I think that the soft coal operators generally feel that had it not been for Mitchell, the soft coal miners would have gone on a strike, which would have meant real disaster to the country's business interests. I do not think that our opinions are biased by the belief that soft coal interests are aided by the anthracite strike. Practically they are not in the West, at least directly. So far the trade in Iowa and Illinois this fall is more backward than usual. Later on, in winter, I am inclined to think the scarcity of hard coal will have some effect, but it will be rather in the nature of higher retail prices, which we, as miners, will not especially benefit from, on account of our yearly contracts.

I notice that Dr. Raymond thinks that it is especially bad that the soft coal leader should have anything to do with hard coal matters. From the standpoint of the miner, the combination is certainly the wisest one, as they are enabled to support one division from the other. Whether this leverage is always wisely used, I am not prepared to say, but you cannot blame the miner, if you allow the right to maintain unions at all, from strengthening himself all he can. Dr. Raymond says the physical conditions of hard coal mining and soft coal mining are not comparable. In my limited experience with hard coal in Colorado, this would not be the case. The anthracite mines there were worked almost identically with the soft coal mines of the same thickness of seam and pitch of strata. In fact, there were wider variations presented by the soft coal mines themselves. The handling of the coal after leaving the mine is of course very different.

In an earlier editorial Dr. Raymond made the statement that the anthracite mines were not in a "trust." I do not suppose that he means to quibble about the popular application of the name, but I should think that if there was a trust in this country, this was peculiarly one, for is this not demonstrated in the maintenance, without remonstrance, of the freight rates, which are absurdly high on hard coal as compared with soft coal? I understand that the Lackawanna rates on hard coal, for instance, are nearly 1 cent per ton-mile, while, as you are doubtless aware, that on soft coal it is considered very high when it is one half of this, and many of the

rates are one-quarter of this. The hard coal rates would seem to be a difficult thing to defend.

I heartily agree with Dr. Raymond that violence should be prevented by the use of a strong hand, but I feel sure that the head men among the miners realize that violence is most fatal to their success, and that they try to prevent it as far as their personal influence goes. Most of this violence appears to come from the so-called foreign population, for whose presence, I am under the impression, the anthracite operators, of the past, were largely responsible since they introduced this element into the country 20 or 30 years ago. That is, I have heard it said that they were instrumental by contracting for large bodies of men from the Slavic countries.

It hardly seems to me to be just to discredit the only man whom the miners recognize, and with whom it is certainly easier to deal than it is with the majority of his radical followers.

COAL OPERATOR.

Chicago, Sept. 23, 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.)

Graphite.—I know of a 60-foot vein of plumbago (graphite). Can you tell me its value per ton?—G. L. S.

Answer.—Graphite is worth from \$8 to \$20 per ton in New York, according to its quality. This varies very widely, which accounts for the wide range of prices. The best imported Ceylon graphite brings as much as \$30 per ton.

Cobalt.—What is the value of cobalt?—G. L. S.

Answer.—Cobalt has little value as a metal. It is sold in its salts—oxide, carbonate and nitrate. Quotations for these are given in our columns each week.

Carmichael Lead Smelting Process.—Can you inform me who represents or owns this process in the United States?—M. B. F.

Answer.—The inventor of the Carmichael process of lead smelting is A. D. Carmichael, Broken Hill, New South Wales. It has been patented in the United States, but we believe the inventor has no representative in this country at present.

Elmore Oil Concentration Process.—Is the Elmore oil concentration process patented in this country? What is the name and address of the company owning the patent?—C. H. W.

Answer.—The Elmore oil concentration process is covered by several United States patents, issued during the past two years. The more recent of these patents, issued in 1902, are Nos. 689,070 and 692,643. The patents are owned by the Ore Concentration Syndicate, Limited, 4 Bishopsgate Street, Within, London, England. We are not aware that the company has at present any representative in this country.

Hydraulic Elevators.—Is there on record a hydraulic elevator which is worked on any placer mine direct from a pump, and with success?—S. A. T.

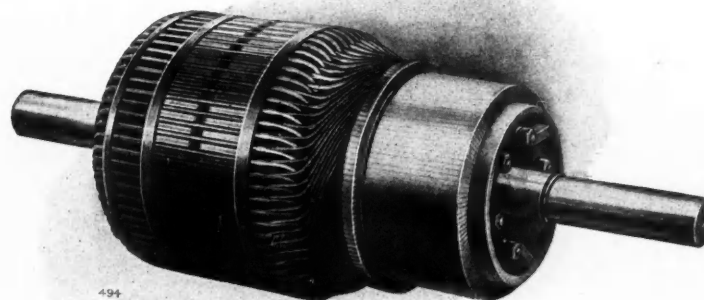
Answer.—We do not know any case in which a hydraulic elevator is worked direct from a pump. The hydraulic elevator finds its special field where there is a large supply of water, under a good head. Pumping water for its use would be a process of doubtful economy.

If any of our readers know a case in which a pump has been used for this purpose, we should be pleased to have them inform us.

Infusorial Earth.—What would be the value per ton of infusorial earth in New York, having an

analysis as follows: Silica, 86.50; alumina, 1.50; iron oxide, trace calcium carbonate, 0.70; water, 11.20; total, 99.90. This is in crude state; if washed and dried, what would it probably be worth? I looked up the subject in *The Mineral Industry*, and think something is wrong there, as it says about 1,100 tons were consumed in 1900, and the cost was about \$8 per ton. Now, the German earth is quoted in New York at about \$30 per ton and American at about \$20. The latter is inferior in silica to the German article. Is not my analysis equal to or better than the German article? Does *The Mineral Industry* take into account the amount imported from Germany? If not, can this amount be ascertained? If crude earth up to my analysis could be washed and dried, would it not be likely to supplant the imported article? Is there a duty against the importation of the earth? I cannot believe from what I know to be the many uses to which this earth is put in the arts and industries of the United States that only 1,000 or so tons are consumed in the year.—N

Answer.—Your material seems to be equal to the German, and should bring a corresponding price, if washed and dried. The production of infusorial or diatomaceous earth in the United States last year is



ARMATURE OF "CECO" MOTORS.

reported at somewhat over 4,000 tons. There may be some production which escapes record, as a considerable quantity used in polishing materials is mined directly by the manufacturing companies, and does not come on the market at all. The imports are not large and are not reported separately. There is no duty upon the earth.

We may add that the line separating infusorial earth from tripoli and some other similar forms of silica is not well defined, and there is liable to be some confusion in the returns.

"CECO" ELECTRICAL MACHINERY.

The Christensen Engineering Company, Milwaukee, has just placed upon the market complete new lines of "Ceco" electrical machinery, including direct current motors and generators, alternators and transformers. For several years this company has been manufacturing electric motors for driving air compressors used in connection with the well-known Christensen air brake equipments on electric cars. More than 6,500 of these motors are in highly satisfactory service throughout the world. The company has also built a large number of motors of various capacities for driving air compressors used in general commercial service, and all the motors for driving machine tools and shafting in their own works.

In order to manufacture these motors the company has maintained an extensive equipment, particularly suited to the purpose. Some time ago it was decided to greatly increase the company's manufacturing facilities and to develop a complete line of electrical machinery of the highest grade. The company is now prepared to build machines up to 1,500 kilowatts in capacity, suitable for general power, railway or lighting service.

The line of "Ceco" motors, known as Type C. E., ranging in capacity from 2 to 50 horse-power, is illustrated herewith. These motors are made in three styles, open, semi-enclosed and enclosed. The standard styles are belted, but any motor can be geared or direct connected to the driven machine or shaft. The C. E. motors are for general service in industrial establishments of every kind where a high-grade, durable and reliable machine is required.

The frame or magnet yoke to which the poles are secured is cylindrical in shape. It is composed of a single steel casting. The bearing brackets are secured to the frame by bolts. The terminals are mounted on top of the frame where they are not liable to be accidentally touched, but where they are readily accessible in case it is desired to change the connections in order to reverse the direction of the motor. The two bearings are supported by two end brackets, which are identical and interchangeable, so that the motor is symmetrical and pleasing in appearance. The semi-enclosed style is the same as the open, but with the addition of 4 perforated malleable iron cover plates. The plates fit into the 4 open spaces between the arms of the end brackets, and can be quickly and easily removed or replaced.

The enclosed style is the same as the semi-enclosed, except that the cover plates are solid instead of perforated. Either style of cover plates will fit into the open style motor, consequently the same motor may be used as open, semi-enclosed or enclosed.

The field poles are built of laminated sheet steel, thereby avoiding eddy current losses. The larger machines have 4 poles, and the smaller sizes are built with 2 only, thus permitting the use of a commutator that can be insulated far more satisfactorily than is possible in small machines of the usual 4-pole construction. The poles are bolted to the yoke so that a rigid construction is obtained, and the pole is easily removable without disturbing the armature.

The field winding is composed of machine formed coils accurately wound by automatic machinery. Any field coil can be readily and quickly removed without disturbing the armature by simply withdrawing the pole, as explained above. The armature core is built up of punched discs of soft sheet steel slotted around the periphery to receive the armature winding. These discs are re-annealed and insulated after being punched, before assembling. The shape of the punching is such that when assembled on the steel shaft openings are provided for ventilation parallel to the shaft. Additional ventilation is secured by the use of radial air ducts.

The armature coils are all machine wound. Those for the smaller motors are of wire, while those for the larger sizes are composed of copper bars. The coils are carefully insulated, then dipped into a bath of special insulating compound, and finally placed in a drying oven until they are thoroughly baked. Surface bands are used to retain the coils in the slots on the smaller sizes, while the same result is secured in larger sizes by the use of retaining wedges placed in specially provided notches near the top of each slot.

As the core and poles are constructed of soft laminated steel, it is evident that the magnetic circuit, which consists of these 3 elements, is of the highest permeability, and the efficiency of the motor is therefore correspondingly increased.

The commutator is built up of copper segments insulated from each other by sheets of the highest grade of mica, of hardness corresponding to that of the copper, so that a smooth and even wearing surface is presented to the brushes. Pure hard-drawn lake copper is used. The segments are of generous length and depth, insuring cool running and allowing ample margin for wear. The commutator is easily removable from the armature shaft, tapped holes being provided in the face of the commutator sleeve for that purpose. As the commutator is usually the cause of more trouble than all other parts of a motor combined, unusual care has been given to

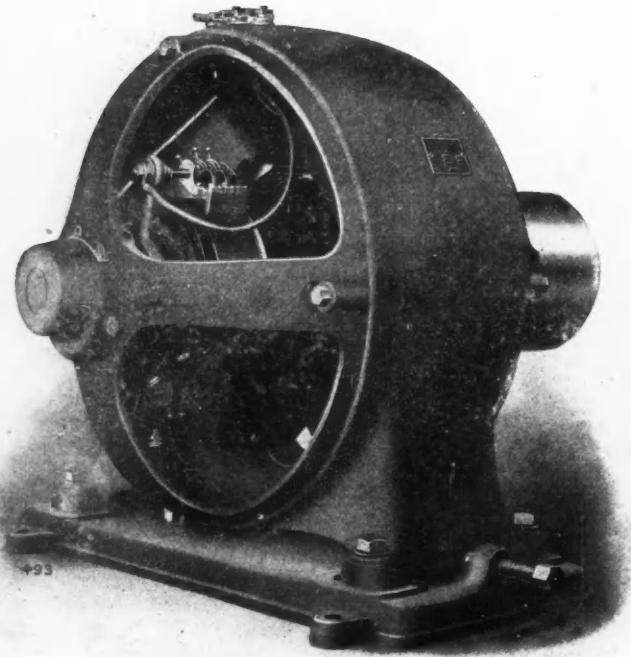
position without sparking. They will also operate for 2 hours with 25 per cent overload and for 2 to 3 minutes with 50 per cent overload without injurious heating or sparking.

These motors will operate in any position in which the shaft is horizontal. This is accomplished by shifting the bearing brackets on the frame so that the oil chambers remain in the proper position, whether the motor is secured to the floor, the ceiling or the side wall.

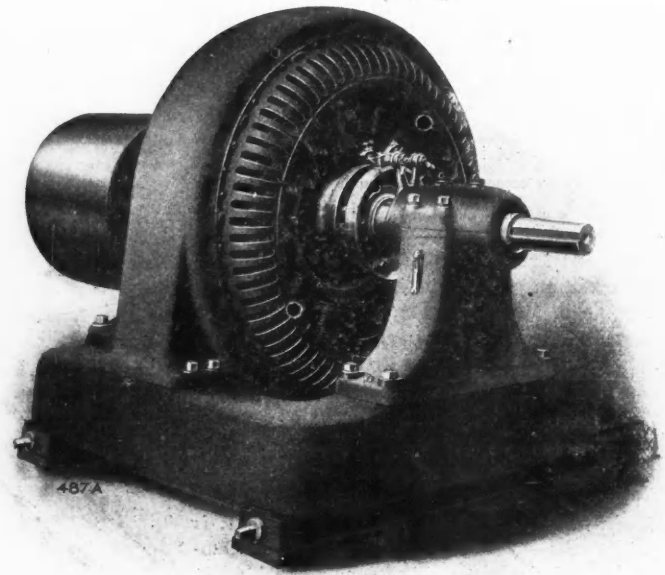
A rigid system has been established for the inspection of the parts of each machine while under construction, and there is no poor material or workmanship to hide under canvas, rope or other "protecting" material. When completed each machine is given a severe running and high insulation test. Then the frame is rubbed with a good filler and painted. All bright parts are polished, so that in

cast iron, and carbon brushes are used, thus reducing to a minimum the tension required as well as the wear of the parts. Standard frequencies are 60 and 25 cycles per second. With the exception of the smaller sizes, "Ceco" alternators can be wound for any voltage up to 15,000. The temperature rise, when running continuously with full load at any power factor, will not exceed 35° C. in the armature or 40° C. in the fields. At 25 per cent current overload the corresponding temperatures will not exceed 40° C. and 50° C. The machines are all designed so that they will carry satisfactorily a 50 per cent current overload for 2 hours at any power factor without injurious heating.

The Christensen Engineering Company is entering the electrical manufacturing business with exceptional advantages. Its present works were completed but 2 years ago, and no expense was spared in



TYPE C. E. "CECO" MOTOR.



250 K-W., 3 PHASE "CECO" ALTERNATOR.

the design and construction of this important element of "Ceco" motors.

Carbon brushes are used, and the brush holders are of the Christensen Company's coil spring reaction type. They are very simple in design and absolutely reliable in operation. The brush holder studs, to which the holders are secured, are mounted upon a yoke, which is fastened to the inner side of the bearing-bracket. Each brush can be readily adjusted, and any brush can be quickly and easily removed while the motor is running. The brush contact area is in all cases ample for the current to be commutated, the current density being very low and at the same time consistent with economical design. Wear of the commutator is provided for by radial adjustment of the brush-holder studs. After the brushes are properly set no shifting is required, and the motor operates without noise and without sparking.

The bearing surfaces are generous in area. Self-aligning babbitted bearings, with the well-known self-oiling ring arrangements, are provided. The motors are mounted on a cast-iron sub-base, which is composed of a single casting, thus insuring perfect alignment. Belt tension is accomplished by moving the motor upon the sub-base in the usual manner.

The ventilation of the armature and commutator is remarkably good, thus insuring a low temperature while running continuously. The "Ceco" motors will operate at their rated loads without the temperature of the armatures rising more than 30° C. The rise in temperature of the field coils under these conditions will not exceed 40° C., and of the commutator 45° C. These machines will operate from no load to full load with the brushes in a fixed

addition to being compact in design, substantial in construction and superior in performance, each machine presents a graceful and pleasing appearance.

All the "Ceco" alternators, whether belted, engine type or direct couple, are of the revolving field type, thus leaving the armature stationary and easily accessible. By this form of construction the difficulties of properly insulating the armature coils which have caused much trouble in rotating armatures are eliminated.

The frame consists of cast-iron housings, into which rings of laminated steel with inwardly projecting teeth are assembled, thereby forming slots for receiving the armature windings. The armature is designed with 6 slots per pole, so that it may be wound or rewound for single, 2 or 3 phase, as required. The armature frames for the belt-driven alternators are cast in one piece, while the frames for the direct driven machines are divided horizontally. Instead of the usual practice of having several coils for the same machine, all the armature coils for each "Ceco" alternator are of the same size and shape, so that they are interchangeable. The coils are specially insulated, so that they will stand without injury the highest temperature that will ever be reached in service.

The poles are built up of laminated steel upon a cast-iron spider, which is mounted upon a forged steel shaft. In the large sizes the laminated poles are assembled upon a steel ring, which is carried on the shaft by means of the cast-iron spider. The individual poles are in all cases easily removable with their coils without dismantling the machine. The field coils are composed of rectangular copper strap bent on edge. The collector rings are made of

providing every facility for the rapid, accurate and economical manufacture of its product. The equipments of machine tools, cranes, special machines, etc., is unusually extensive, modern and complete. The foundation for a 250-foot extension to the main machine shop, which is 186 feet in width, has just been completed. There are 3 stories, and this extension will provide 88,000 additional square feet of floor space.

A NEW INDUSTRIAL CENTER.

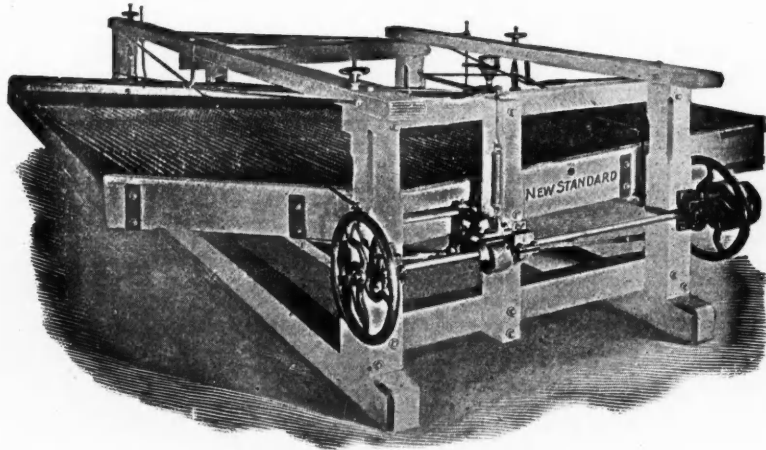
The great growth of the affiliated Westinghouse industries was recently signalized by the creation of a new city and the building of another Westinghouse manufacturing plant. The new industrial center is located about 17 miles east of Pittsburg, on the Pennsylvania Railroad, and is to be known as Trafford City. Extensive factory sites have been laid out here to provide for the overflow of the several Westinghouse industries, a number of which have already used up all the available building room at their present locations and are still pressed for space. The first of the Westinghouse companies to erect buildings in the new city is the Westinghouse Foundry Company, which is at present putting up an extensive and model foundry plant and pattern shop. This addition is necessitated by the rapidly increasing business of the Westinghouse Machine Company, especially in connection with very large steam and gas engines and steam turbines.

The new town is connected with Pittsburg by the Pennsylvania Railroad. In addition a trolley line has been built, connecting with the Pittsburg Railway Company's line at Wilmerding, 2½ miles distant. This street railway passes over a steel viaduct into

Trafford City and forms a loop through the principal streets.

The new foundry and pattern shop of the Westinghouse Foundry Company are located at the extreme southern portion of the factory site, and near the steel viaduct mentioned above. The pattern shop and storage building, which has already progressed well towards completion, is a steel and brick structure, 605 feet long and 80 feet wide, with a height to the eaves of the roof of 47 feet. The pattern shop occupies 160 feet at one end of this building. It is divided into two floors, the second floor being suspended from the roof trusses in order that the first story may be entirely free from columns, thus providing ample space for handling the largest patterns. The remaining 447 feet of the building is to be used for the storage of patterns and has three floors, umns, and the entire space being divided by in the two upper floors being supported on steel colterior fire walls into three separate compartments.

The foundry building is 611 feet 8 inches long and 184 feet 3 inches wide outside of the brick walls, which are 36 feet high at the eaves and 80 feet at the peak. As in the case of the pattern shop, the foundations are built of concrete, and the superstructure of steel and brick. The foundry is di-



NEW STANDARD ORE CONCENTRATOR.

vided transversely into three bays, the center bay being 80 feet 3 inches wide between centers of columns, runways being provided for traveling cranes of 80-foot span and 150-tons lifting capacity. The cranes will be electrically driven. The two side bays are each 50 feet 6 inches wide from center to center of columns and are provided with runways for traveling cranes of 47 feet 2½ inches span and 50-tons lifting capacity. At one side of the foundry building runways are provided for yard traveling cranes of 100-foot span, and a lifting capacity of 75 tons.

The plans for the buildings were prepared under the supervision of the Westinghouse Machine Company. The Security Investment Company, of Pittsburg, is the financial agent and general contractor for the entire works, and Messrs. James Stewart & Co., of St. Louis and Pittsburg, are the managers of construction.

THE "NEW STANDARD" CONCENTRATOR.

The accompanying illustration shows an ore concentrator, the design of which has been based on numerous practical tests. It is made and is being introduced by P. B. McCabe & Company, of Los Angeles, California, who have given the machine the name of the "New Standard" concentrator.

This machine is of the bump type, and is so arranged that the bump can be carried as required, from the lightest to the heaviest percussion. The bump, with the swing of the table, causes the ore to travel towards the percussion side; the table being inclined at an angle which allows the wash-water to carry the lighter particles from the top of the ore backward at an angle to the line of bump of the table. This acts so as to carry the heavy particles

of the ore to the furthest limit, where they are met and acted upon by the current of the wash-water, which is at a right angle to the travel of the light gangue.

An important matter in the concentration of ores is to first accomplish a thorough settling; to precipitate the heavy particles to the bottom, thus leaving the lighter particles on the top. Another important feature is to protect the heavier particles which have settled to the bottom, and allow their uninterrupted travel to the final cleaning space. These objects are attained by the New Standard concentrator by providing riffles on the table surface, which permits the settling of the heavier particles, and also protects them from the sluicing action of the water, while the motion imparted to the table, combined with the bump, moves the mineral across the table to the final cleaning space. The riffles are arranged at a line tangent to the line of the bump of the table, which causes the water to wash squarely over them. The travel of the mineral or heavier particles being in the line of the bump and the riffles being tangent to this line, cause the mineral to travel along the riffles on their under-sides. To prevent the concentrates from having to travel the entire distance of the riffled surface of the table at a line

tangent to the bump, the riffles of the New Standard concentrator are made of a length not to exceed 18 inches, are pointed or beveled at their ends, and are set with openings between their ends approximately on the line of the bump; this causes the mineral to pass upward and through the riffle lines, and strike the riffle next above. While the mineral is passing between the ends of the riffles, it is protected from any sluicing action of the water by the riffle next above it.

The table is suspended from the superstructure of the machine by means of hooks, and is counterbalanced between a pull-string and a cushion spring. Motion is imparted to the table by means of a pull-rod attached to the bottom of the table through the means of a bell-crank, which is actuated by an irregular, heart-shaped cam. The lines of the cam are so drawn that the motion of the table is accelerated and arrested by it, giving to the table the proper travel and speed required at its different positions. This arrangement of the mechanism allows the table to be swung free from all operating means, and when the cam is at rest the table can be freely swung by the hand; the cam, with its different lines, simply times and gives the proper speed to the table.

The table, being hung from the superstructure, can be raised or lowered to give it any inclination desired, as there are three points of support. The narrow portion, or upper end of the table, is carried by a yoke, which has a central support passing up through the superstructure, and a hand-wheel to raise and lower the same. The lower corners of the table are supported in like manner. The pull-rod is attached to the bottom of the table by means of a hinge joint and passes through a roller-joint in the bell-crank and has a block and cushion-washer to ease the motion of the bell-crank.

This concentrator, being narrower at the head than at the foot, brings the ore under the action of the wash-water as soon as it commences to travel down the table, and keeps the heavy particles up to the line of action of the wash-water until the ore is thoroughly cleaned from the gangue. It may be said that the ore is washed and cleaned for a distance of 14 feet. This guarantees thorough and clean work. The arrangement of the riffles allows of the ready discharge of the ore to the wash-water side, and at the same time protects the fine mineral from being again mixed with the gangue and washed away.

This concentrator was invented by Mr. Luther Look, of Los Angeles; and, as stated above, the design is the result of long experience and much practical work. It is claimed that it has a very wide range of adjustment, and can therefore be adapted for use with many different kinds of ore.

PATENTS RELATING TO MINING AND METALLURGY

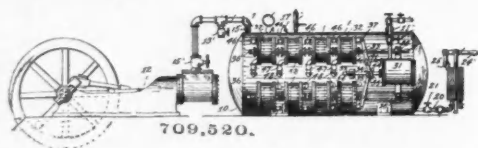
UNITED STATES.

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 September 23, 1902.

- 709,482. PROCESS OF ELIMINATING THE SULPHUR FROM SULPHIDE ORES.—Adolph Gutensohn, London, England, assignor to Sulphur Elimination Syndicate, Limited, London, England. A process for the elimination of sulphur from sulphide ores, consisting in crushing the ore, mixing it with carbon and a sodium salt which will yield sulphide of sodium when the mixture is heated, the amount of carbon added being largely in excess of the amount required to form the sulphide of sodium heating the mixture to a temperature approaching incipient redness, and then exposing it freely to air to effect its oxidation and burn off all sulphur that is set free.
- 709,489. MANUFACTURE OF ALLOYS OF THE ALKALI METALS.—George F. Jaubert, Paris, France. A method of manufacturing alloys of the alkali metals, such as potassium and sodium, which consists in mixing one of the metals with a caustic oxide of the other metal, then heating the mixture *in vacuo* at a temperature of from 200° to 300° C., and in then allowing the residue to cool, substantially as and for the purposes described.
- 709,490. PROCESS OF COMPRESSING PEROXIDE OF SODIUM.—George F. Jaubert, Paris, France. A method of compressing sodium peroxide, which consists in first pulverizing the sodium peroxide, then melting and pulverizing another salt, then mixing the pulverized sodium peroxide and the pulverized salt and finally compressing the mixture into pastils or tablets.
- 709,495. MOLDING-BOX FOR THE MANUFACTURE OF BUILDING-STONES.—Edward Levi, Zurich, Switzerland. A molding-box consisting of a bottom and front and back walls attached thereto by joints, of removable side walls and intermediate partition-walls parallel to the same, running from the front to the back wall, dividing the space formed by the four walls into regular rectangular chambers, and of means to press the front and back walls against the side walls and partitions.
- 709,580. SUCKER-ROD GRAB FOR OIL-WELLS, ETC.—Warren La Barte, Cairo, W. Va. A sucker-rod clamp comprising two blocks having mating semi-cylindrical grooves forming a cylindrical bore interiorly screw-threaded to be attached to the screw-threaded end of a well-tube, a wedge-shaped opening in each block above said semi-cylindrical groove having a groove in the vertical walls thereof at each side of the oblique surface, wedge clamps slidably mounted in said wedge-shaped opening and having flanges to fit into said grooves, a bolt secured in the oblique face of each clamp and extending through a vertical slot in the block, eyebolts secured in said blocks, a lever pivoted in said eyebolts formed to surround said blocks, slotted surfaces on each side of said lever to receive said bolts, and a plate secured to the tops of said blocks.
- 709,520. AIR-COMPRESSING APPARATUS.—Edward J. St. Croix, Madrone, Wash. In an apparatus for compressing and storing air; a reservoir, a main conduit adapted to convey air under pressure to said reservoir, a gate-valve to control said conduit and a second gate-valve in the conduit closely adjacent said reservoir, an auxiliary conduit adapted to convey steam to the main conduit and a gate-valve to control same, a driving-cylinder, a branch conduit leading from the main conduit to said cylinder and having a gate-valve therein, a double series of air-compressing cylinders each of less length of bore than said driving-cylinder, said series arranged within the cylinders in tandem and disposed at opposite sides of the center line of

the driving-cylinder, a conduit leading from one head of each compression-cylinder to the reservoir and a port of



ingress in said end, a check-valve in the last conduit, and a check-valve arranged to control said port, a piston-rod for each series of cylinders and a like rod for the driving-cylinder, oppositely-disposed levers operably connected to the rod of the driving-cylinder and arranged to drive the piston-rods of the compression-cylinders, valve-operating mechanism for the valve of the driving-cylinder operably connected to one of said levers, and a manually-operative air-pump connected to said reservoir.

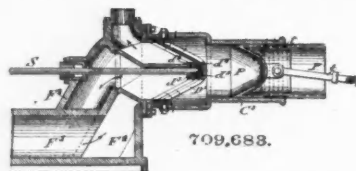
709,570. PROCESS OF PRODUCING CYANATE OF POTASSIUM.—Sylvester Zuckschwerdt, Leopoldshall, Germany. A process for the separation of cyanate of potassium from cyanide and carbonate, thereby producing pure cyanate of potassium, which consists in first treating the salt mixture obtained from the synthetic cyanogen processes, with sufficient water to dissolve the carbonate and at a temperature not over 66° C. whereby the cyanide and cyanate remain undissolved, and then treating the said remaining undissolved salt mixture with sufficient water to dissolve the cyanide and at a temperature not exceeding 5° C. whereby the cyanate remains undissolved.

709,593. APPARATUS FOR TREATING PULVERIZED ORES OF GOLD OR SILVER.—Daniel C. Boley, Chicago, Ill., assignor to Henry Block, Pekin, Ill. In an apparatus for treating finely-divided ores by filtration, the combination with a moving filter-surface, of means for creating a vacuum beneath the filter as it passes a portion of its course, and means for producing at a different time an air-pressure backward through the filter, at the same portion of its course.

709,642. GRINDING OR CRUSHING HEAD OR ROLL.—Volney W. Mason, Jr., New York, N. Y. A grinding or crushing head or roll composed of a core, and a number of hard, tough yet ductile unmachinable external segments, capable of distortion, secured thereto and disposed relatively to each other to provide very narrow spaces between them.

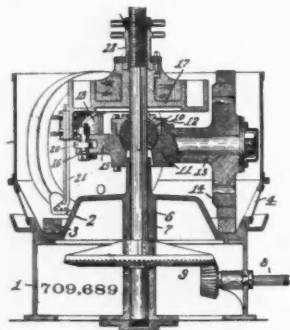
709,682. ROTARY SLIDE-VALVE FOR PUMPS, COMPRESSORS, OR MOTORS.—Louis Roedel, Passaic, N. J. The combination, with a stationary cylinder having interior inlet and outlet channels and inlet and outlet ports, and a supporting-frame having supply and discharge channels communicating with one end of said channels, of a rotary slide-valve having ports registering successively with the inlet and outlet ports, a plunger on the cylinder, and means for imparting reciprocating motion to said plunger.

709,683. ROTARY SLIDE-VALVE FOR PUMPS, COMPRESSORS, OR MOTORS.—Louis Roedel, Passaic, N. J. The combination, with two stationary cylinders arranged axially in line with each other and provided with interior



inlet and outlet channels, of conical slide-valves at the ends of said cylinders, means for imparting rotary motion to the slide-valves, plungers guided in said cylinders, and means for imparting reciprocating motion to said plungers.

709,689. CHILEAN MILL.—George F. Waddell and William J. Evans, Anaconda, Mont.—The combination, of a main shaft, a sphere mounted thereon, a spider-hub loosely mounted on the sphere, journal-arms projecting rigidly from the hub, rolls mounted on the journal-arms, a die co-operating with the rolls, drag-arms projecting from the hub, journal-pins carried by the drag-arms, a rotary annular pan discharging



on the die and rolls, secured to the shaft above the hub, journal-pins projecting from the bottom of the rotary pan, and links connecting the journal-pins of the water-pan with those of the drag-arms.

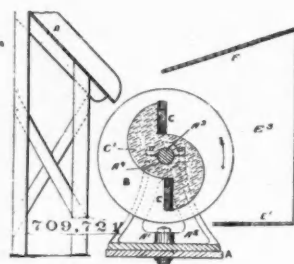
709,664. PROCESS OF PREPARING BOG-PEAT FOR FUEL PURPOSES.—Antoine Charon, Montreal, Canada, assignor to Alexandre Duclos, Montreal, Canada. A process for the manufacture of fuel from peat consisting in passing the same between disintegrators and causing a current of electricity to pass through the peat between said disintegrators thereby simultaneously pulverizing and carbonizing the same.

709,672. MOLD-COATING FOR APPARATUS FOR CASTING PIG METAL.—John M. Hartman, Philadelphia, Pa. In a pig-metal-casting apparatus, the combination of a series of metal-molds; means for wetting the said molds; and a coating formed of powdered bituminous coal applied to the interior of the molds.

709,691. CAR-HAUL.—Alfred M. Acklin, Pittsburg, Pa. A device for moving or controlling the movement of cars, comprising an endless chain, so arranged that a portion of said chain will move the cars in one direction, while another portion is moving or controlling the movement of cars in the opposite direction, so that the cars traveling in one direction will move alongside of the cars traveling in the opposite direction; hinged or pivoted joints within the links to said chain to enable the same to conform to the different curves or courses in the movements, hooks on one side of said hinged or pivoted joints for engaging the cars moving in both directions, and wheels or rollers mounted on the opposite side of said hinged or pivoted joints and adapted to travel on tracks to support the chain in its movements.

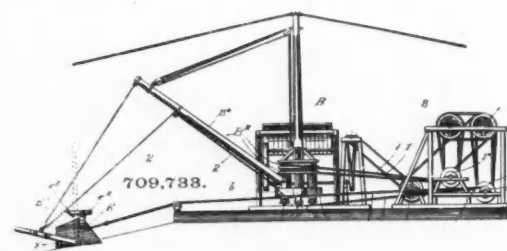
709,692. OVERHEAD TRAMWAY.—Alfred M. Acklin, Pittsburg, Pa. An overhead tramway comprising a single or main rail or track, two trolley-frames carrying buckets adapted to be moved in both directions on said rail or track, and an auxiliary rail vertically above said main rail or track adapted to engage with one of said trolley-frames to enable it to pass the other trolley-frame at a given point, one of said trolley-frames being adapted to travel on both the main and auxiliary rails, and both ends of said auxiliary rail being adapted to lift one of the trolley-frames from the main rail.

709,721. CENTRIFUGAL TAILINGS ELEVATOR.—Walter Peck, Dunedin, New Zealand. A wheel provided with



beaters, said wheel being mounted for rotation, and being free of an inclosing casing, whereby, on the rapid rotation of said wheel, material supplied thereto will be centrifugally scattered, and the standard of the wheel being swivelly mounted.

709,733. MINING-DREDGE.—Henry J. Barton and August C. La Bud, Oak Bar, Cal. In a mining dredge or excavator, a scoop of shovel form, a draft-loop connected to the lateral walls of said scoop just above the center of the



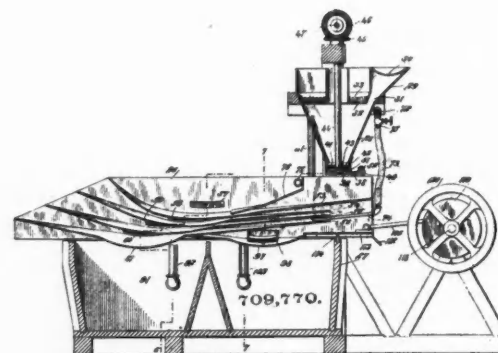
height thereof, a rear handle lever pivoted to said scoop, a catch carried by the scoop for holding said lever upright, a loading-drum located near the surface of the ground, the draft or loading cable carried by said drum, and connected to said draft-loop, and the hoisting-cable connected to said handle-lever.

709,745. PROCESS OF TREATING ORES AND BY-PRODUCTS CONTAINING SULPHUR AND IRON.—Arthur W. Chase, Avoca, Iowa. A process of treating materials of the character described, which consists in subjecting said ores or ash to the action of heat and a suitable reducing agent, whereby the iron is completely changed to an insoluble form, and the sulphur is either volatilized or reduced to a soluble form, and leaching out the residual soluble sulphur salts, substantially as described.

709,763. APPARATUS FOR COOLING AND FILTERING COMPRESSED AIR.—Friedrich Grumbacher, Charlottenburg, near Berlin, Germany. An apparatus for cooling and filtering air comprising a filtering-chamber the filtering layer of which is penetrated by a central pipe, the upper end of the

latter fitting tightly into the cover of the filtering-chamber and connected to a supply-pipe, and the lower end of the said central pipe being open, in combination with a system of cooling-pipes arranged within the central pipe and provided at one end with a closed common chamber and connected at the other end respectively with a collecting-chamber and supply-pipe.

709,770. CONCENTRATOR.—John A. Holmes, Salt Lake City, Utah, and John F. Wood, Denver, Colo. A concentrator, comprising a sluice-box, a series of pans arranged one above another in the sluice-box, said pans being longitudinally curved and laterally inclined, said sluice-box hav-



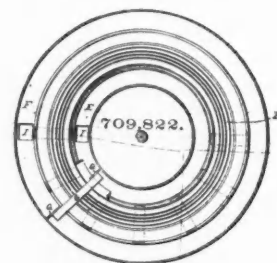
ing openings for discharge of gangue at the higher sides of the pans, and openings at the lower sides of the pans for discharge of values, launders arranged one within another and receiving material from the first-named openings and means for imparting a reciprocating motion both laterally and longitudinally to the sluice-box carrying the pans.

709,772. APPARATUS FOR PURIFYING GAS.—Herbert A. Humphrey, Westminster, London, England. The combination of a series of centrifugal apparatus each delivering into the next succeeding it, pipes connecting the delivery and suction sides of the said centrifugal apparatus and valves in the said pipes.

709,808. CARBORUNDUM ARTICLES AND PROCESS OF MAKING SAME.—Frank J. Tone, Niagara Falls, N. Y., assignor to the Carborundum Company, Niagara Falls, N. Y. A method herein described which consists in compressing into coherent form a mass containing non-crystalline material adapted under heat to form crystalline carbide, and then crystallizing it by subjecting it to intense heat.

709,817. ELECTROLYTICALLY TREATING ORES.—Clinton E. Dolbear, Boston, Mass., assignor to American Mining and Metal Extraction Company, Boston, Mass. A method of reducing metals from their ores, which consists in dissolving the crushed ores in a nitrate of the suitable metal, adding to the mixture thus formed sulphuric acid, and subjecting the solution to the action of an electric current, whereby the metal is plated out of the solution.

709,822. ORE-CRUSHING MACHINE.—Charles C. Lane, Los Angeles, Cal. An ore-crusher comprising a revolving frame; revolving crushing-rolls mounted in said frame; a



tread for said rolls composed of a plurality of concentric rings, having spaces therebetween; supports for said rings; screens below the tread, adapted to deflect the crushed ore into the troughs at the side of and below the tread; arms affixed to the revolving frame, having scrapers on the bottom thereof adapted to work in said troughs.

709,830. GAS-BLOWPIPE.—George B. Snow, Buffalo, N. Y., assignor to the Snow Dental Company, Buffalo, N. Y. A gas-blowpipe having a valve-casing, a gas-valve and an air-valve located therein and adapted to be opened by pressure of the finger, a spring for closing said valves, and a screw-cap, threaded upon one end of the casing, whereby said valves are confined therein and suitably adjusted.

709,846. AMMONIA-GENERATOR.—James A. Young, Nyack, N. Y., assignor, by direct and mesne assignments, to Conrad Doersch, trustee, Nyack, N. Y. An ammonia-generator comprising an inclosing soluble member, and an inner soluble member or core, the inclosing member having orifices which receive liquid and conduct it to the inner member.

709,851. ARTIFICIAL FUEL.—Charles B. Harris, New York, N. Y., assignor to S. I. Atwater, trustee, New York, N. Y. An artificial fuel, consisting of petroleum-coke, Texas asphalt, rosin, glutinous matter, water and coal-dust.

PERSONAL.

Mr. Robert Bell, of Blackfoot, Idaho, has been visiting Salt Lake, Utah.

Mr. A. Houle is now superintendent of the smelter at Encampment, Wyo.

Mr. George H. Robinson has been in Salt Lake, Utah, from Butte, Mont.

Mr. Geo. Kislingbury, mining engineer, has returned to Los Angeles, Cal., from Alaska.

Mr. J. N. Mosely, of Wardner, Idaho, has gone to Lima, Peru, on a prospecting expedition.

Mr. S. V. Sherrod has taken charge of the Bonitos group of mines in Guanajuato, Mex.

Mr. Alfred Beit, of the house of Wernher, Beit & Co., London, Eng., has gone to South Africa.

Mr. E. J. Adams, of Apex, Colo., having large interests in Gilpin County, is in Washington, D. C.

Mr. J. S. Findley has returned to Goldfield, Colo., from a visit to a group of mines in British Columbia.

Mr. Geo. E. Sanders, of the Oro Grande Mine, recently returned from New York City to Wickenburg, Ariz.

Mr. John J. Cooper, the mining expert of London, England, has been in Montana on professional business.

Mr. Arthur Buckbee, general manager of the Virtue Consolidated Mine, is in Salt Lake, Utah, from Oregon.

Mr. E. G. Brown, supply clerk of the Calumet & Hecla Mine at Calumet, Mich., is in the East on a vacation.

Mr. Frederick S. Harris, manager of La Dorada Mine, Sonora, Mexico, is visiting his home in Kansas City, Mo.

Mr. A. L. Collins, of Telluride, has been visiting Gilpin County, Colo., looking after mining and milling interests.

Mr. J. R. Gifford, mining engineer, formerly of Victoria, B. C., has opened an office in San Francisco, Cal.

Mr. J. M. Callow is in Park City, Utah, installing one of his submerged shaking screens at the Daly-Judge Mill.

Mr. H. F. Fay, of Boston, Mass., recently visited the mines under his management in the Michigan copper country.

Mr. Charles Lerchen succeeds Mr. F. L. Branham as manager of the Georgetown Gold Mining Company, Georgetown, Colo.

Mr. George A. Flagg, auditor of the Calumet & Hecla Mining Company, recently inspected the mine at Calumet, Mich.

Mr. F. McM. Stanton, agent of the Atlantic and Phoenix mines in the Lake Superior copper district, was recently in Chicago.

Mr. A. A. Brown, manager of the Mammoth Tunnel and Mining Company, has returned to Silverton, Colo., from an eastern trip.

Mr. William Stanley, Jr., of the Stanley Electric Manufacturing Company, of Pittsfield, Mass., has returned from his trip to Europe.

Mr. Duncan McVichie, general manager of the Bingham Consolidated, is with Mr. Victor M. Clement on a hunting trip in Idaho.

Mr. Otis R. Allen, mining engineer of Seattle, Wash., has taken charge of the Macomber Mining Syndicate's Mines in California.

Messrs. E. C. Voorhees and J. A. McIntyre, of the Lincoln mine and chlorination works, Sutter Creek, Cal., have been in San Francisco.

Prof. Regis Chauvenet, of Denver, Colo., has been examining the Argentine Mining Company's properties in Clear Creek County, Colo.

Mr. John Hays Hammond is looking over the Stratton's Independence property at Cripple Creek, and the Camp Bird at Ouray, Colo.

Mr. George A. Sonneman, of Spokane, Wash., has been looking over the mining properties in which he is interested near Silver City, Idaho.

Mr. S. A. Knowles is now foreman of the Sun & Moon Mine, Idaho Springs, Colo., succeeding Mr. A. Clute, who goes to southern California.

Mr. George E. West, of New York City, president of the Gold Pan Mining Company at Breckenridge, Colo., recently inspected the company's property.

Dr. George A. Koenig, professor of chemistry and metallurgy at the Michigan College of Mines, Houghton, Mich., has returned from a trip to Europe.

Mr. Will A. Childs, third assistant superintendent of the Calumet & Hecla Mine at Calumet, Mich., recently returned from a business trip to Milwaukee.

Mr. P. T. Berg, for many years chief chemist of the Carnegie Steel Company, at Pittsburg, Pa., has resigned, and will hereafter live at Stockholm, Sweden.

Mr. Martin J. Heller has returned to San Francisco, Cal., from Copper River, Alaska, where he has been examining copper deposits for Capt. J. R. De La Mar.

Mr. Don H. Bacon, president of the Tennessee Coal, Iron and Railroad Company, has returned to New York City, after being in the Birmingham District for a few weeks.

Mr. Clarence K. McCornick has returned to Salt Lake, Utah, from a trip to Paris, where, with Col. O. P. Posey, he was instrumental in launching the Gold Road Mining Company.

Mr. W. F. Fuerst, a member of the chemical importing firm of Fuerst Brothers & Co., of New York, leaves for Europe to-day, October 11. He will be absent about 4 weeks on business.

Mr. William Magenau, superintendent of the Catherine Lead Company, of Fredericktown, Mo., has returned to that place after a month's visit to Boston, New York and other eastern points.

Messrs. George A. Chalfant and C. C. Chalfant, of Pittsburg, Pa., have been at Silverton, Colo., looking over the mining properties of the Mammoth Mining Company, in which they are interested.

Mr. George S. Blackwell, of George G. Blackwell Sons & Co., Limited, Liverpool, Eng., sailed for Canada and the United States on October 2. He will go to Quebec, thence to Montreal and New York City.

Mr. M. A. Gilman, of Westfield, with several business men from Westfield, Holyoke and Northampton, Mass., has gone to Sherbrooke, N. S., where he will inspect the property of the Royal Oak Mining Company.

Mr. Robert Pringle, of Chicago, Ill., president of the Old Channel Company, has been in Josephine County, Ore., looking over the interests of the company, in company with Messrs. J. R. Harvey and F. H. Minard.

Mr. Louis E. Otte, for several years master mechanic for the firm of Torbert & Peckham, of Chicago, Ill., has been appointed manager of the eastern business of this firm with offices in the St. Paul Building, New York City.

Mr. E. McGinnis, who has been superintending the development work of the Druid Gold Mining Company in Russell District, Gilpin County, Colo., for Scotch owners, has gone to Shasta County, Cal., to examine properties for the same men.

Mr. J. W. McQueen, secretary-treasurer of the Sloss-Sheffield Steel and Iron Company, will leave Birmingham, Ala., shortly for New York City on a combined business and pleasure trip. Mr. McQueen will stop at the Waldorf-Astoria.

Mr. George W. Taylor, for many years master mechanic and foreman of shops at different points on the Chicago & Alton Railroad, has been appointed master mechanic of Torbert & Peckham's shops, with headquarters in the Monadnock Block, Chicago, Ill.

Prof. B. A. Langridge, of Boulder, Colo., has been appointed consulting engineer of the Baca Land Grant Mining Company, in New Mexico. Professor Langridge recently visited Boston, Mass., where he met Lord Thurlow and other stockholders of the company.

Mr. C. T. Mixer, mining engineer of Salt Lake, has taken charge of the Creole Mining Company's property, at Park City, Utah, for President Dern, of the Consolidated Mercur. Mr. Mixer will still be able to fill engagements in the examination of mining properties.

Mr. F. S. Oakes, of Buffalo, N. Y., president of the Buffalo & Cripple Creek Gold Mining Company, and Mr. Brewer D. Phillips, of Jamestown, N. Y., trustee of the bondholders of that company, recently visited the works of the corporation on Grouse Mountain, Cripple Creek, Colo.

Toronto and Montreal, Can., men who recently purchased considerable stock in the Sloss-Sheffield Steel and Iron Company will be in the Birmingham, Ala., District about the middle of October to inspect the company's properties. They will be shown around by President J. C. Maben, and will spend about two weeks in the Birmingham District.

Mr. P. T. Berg, chief engineer of the Homestead Steel Works of the Carnegie Steel Company, Pittsburg, who recently resigned, is succeeded by Mr. R. H. Stevens. Mr. Berg has been suffering from bronchial troubles, and will return to Sweden. He is a graduate of the Imperial University at Stockholm, and came to this country 20 years ago, entering the Edgar Thomson Steel Works.

Mr. John T. Morrow has been named as superintendent of the Boston & Montana smelters of Great Falls, Mont., the position left vacant by the removal of Mr. C. W. Goodale to Butte. Mr. Morrow was formerly assistant superintendent, and Mr. A. E. Wheeler has been named to succeed Mr. Morrow. Mr. Morrow is a graduate of Lehigh University, class of 1889, and for a number of years was with the Edison Electric Company, at Boston. In 1893 he

went to Great Falls to take charge of the electrolytic plant of the Boston & Montana Smelter, and last year was appointed assistant superintendent. Mr. A. E. Wheeler is a graduate of the Massachusetts Institute of Technology.

OBITUARY.

Eugene L. Kenyon, known to the anthracite coal trade through his connection with Coxe Brothers & Company, died recently at Chicago, Ill. He was for many years interested in the coal trade at Hartford, Conn., and was a contributor to the *ENGINEERING AND MINING JOURNAL*.

SOCIETIES AND TECHNICAL SCHOOLS.

ENGINEERS' CLUB OF ST. LOUIS.—At the meeting on October 1 29 members and 14 visitors were present. Messrs. A. H. S. Cantlin, F. T. Adler and D. E. MacCarthy were elected to membership. Mr. Roper, the committee appointed to revise the rules concerning the award of an annual prize, made a report, which was accepted.

The chairman then introduced Mr. R. H. Phillips, who addressed the club on the subject, "Some Engineering Features of the Exposition Grounds." Mr. Phillips exhibited maps and drawings showing the progress of work to date. The disposal of the River Des Peres and the means for the prevention of floods by the removal of obstructions below the exposition grounds were described. The layout of the system of sewers and water for domestic and fire purposes, roads, lagoons, cascades, conduits for electric wires and railroad tracks were shown by means of the maps, and the engineering features were considered. In the discussion which followed a large number of the members participated.

INDUSTRIAL NOTES.

The Stillwell-Bierce & Smith-Vaile Company, of Dayton, O., is about to ship some pumps, etc., to F. Well, Victoria street, London.

The Ingersoll-Sergeant Drill Company, of New York City, is reported to have taken some heavy orders for air drills for South Africa.

The pumping stations of the petroleum pipe lines at Baku-Batum, Russia, are to be equipped with 50 Diesel engines of 100-h.p. capacity each.

The American Pulley Company, of Philadelphia, Pa., is reported to have secured large orders from Australia, New Zealand and England.

The Wheeler Condenser and Engineering Company, of New York City, has recently taken a heavy contract for machinery for shipment to Cuba.

The Allis-Chalmers Company is reported to have good contracts on hand for mining machinery, to be shipped to Mexico, South Africa and Australia.

The Joshua Hendy Machine Works, of San Francisco, Cal., is to erect a 20-stamp mill for the Red Cross Mine, at Washington, Nevada County, Cal.

The George V. Cresson Company, of Philadelphia, Pa., manufacturer of power transmitting machinery, has made some good shipments recently to Mexico and New England.

The Quincy Engine Works, at Quincy, Ill., has been running its plant overtime some months. It has important orders for Williams engines for electric work to be completed within the next 6 months.

The Western Electric Drill Company, Butte, Mont., has sold 2 Durkee electric drills, including boiler, engine, generator, etc., complete to W. E. Sanders, of the Bonanza group of mines, at Wisdom, Mont.

The Ruggles-Coles Engineering Company, of Cleveland, O., has recently received large orders for dryers from the Lehigh Portland Cement Company, at Mitchell, Ind., and the International Cement Company, at Pittsburg.

The steamers *Modock* and *Apache* have lately been fitted with the Little Giant oil burners, made by G. E. Witt, of San Francisco, Cal. Similar burners have been installed on the largest clam-shell dredger on the Pacific coast.

The B. F. Sturtevant Company, of Boston, Mass., manufacturer of blowers and heating and ventilating appliances of all kinds, states that its new plant at Readville, Mass., is fast approaching completion. It will provide employment for about 5,000 men.

Fairbanks, Morse & Co., through their Salt Lake branch, have filled an order for the Sevier Consolidated Mining Company, of Ogden, for a hoist with a capacity of 600 ft. and has an order for a large gasoline hoist from the American Mines Company, of Idaho.

The Eickmeyer Pump Company has been incorporated under the laws of New Jersey by Carl Eickmeyer, of Yonkers, N. Y., and J. W. Avery and S. R. Bullock, of New York City, for the purpose of manu-

facturing electric pumps under the patents of Mr. Eickmeyer.

The Nordberg Manufacturing Company, of Milwaukee, Wis., is considering the immediate enlargement of its machine shop to nearly double the present capacity. The firm is unwilling to accept new orders, except from old customers, on anything less than 10 to 12 months' delivery.

The coke oven plant of the Lehigh Coal and Coke Company at West Superior, Wis., is to be doubled in capacity this winter. Materials for the new ovens are being placed on the ground and a larger engine is being put in. The trestle over which the coal is hauled is to be lengthened about 800 ft., making it 1,626 ft. long.

The Weber Gas and Gasoline Engine Company, of Kansas City, states that the September sales were never better. The increase of business has compelled the company to enlarge facilities by putting up four new buildings and adding new tools. It is now equipping its plant with crude oil fuel for forging, heating and other purposes.

Messrs. M. Warren, Robt. B. Kux and Sewall Richardson, of San Luis Potosi, Mex., have formed the Mexican Land, Mine and Industrial Company, with a capital of \$50,000, for promoting Mexican industries and purchasing and selling all classes of real estate, mines and industrial enterprises. The firm will also act as consular agents in classes of mercantile business.

The Sharon, Pa., Steel Company is to build another blast furnace, with a daily capacity of 400 tons. It will be a duplicate of the 400-ton furnace now under erection. The Brown Hoisting Machinery Company, of Cleveland, O., has the contract for erecting the ore handling machinery. The company recently purchased the right to use the Monell process in its open-hearth department.

The mining machinery department of the Salt Lake Hardware Company reports these recent orders among others: Sinking pump and accessories for the Climax Mining Company, of Deep Creek, Utah.; J. P. Gardner, manager; air compressor for George Adams, of Silver City, Utah.; a car of 10-in. pipe and a 1,500-gal. pump for the Bingham Consolidated Mining and Smelting Company; gasoline hoist for W. H. King, of DuBois, Idaho.

At the annual meeting of the Hocking Valley Railway Company at Columbus, O., on October 7, the old board of directors was re-elected as follows: Charles B. Alexander, Robert Bacon, R. M. Galloway, Ralph W. Hickey, Charles Steele and Thomas F. Ryan, of New York City; James H. Hoyt, Myron T. Herrick, Charles G. Hickox, of Cleveland, O.; N. Nonsarrat, P. W. Huntington, W. F. Goodspeed, R. S. Warner, of Columbus, O. The election showed that the road had not changed hands.

The Pelton Water Wheel Company reports having just closed a contract with the Vancouver Power Company, of Vancouver, B. C., covering 3 Pelton wheel units, with a combined capacity of 10,000 h. p. The wheels are for direct connection to electric generators; the power to be used for electric railway and manufacturing purposes near Vancouver. The Pelton Company now has under construction Pelton water wheels aggregating 30,000 h. p.—all of which are to be used in connection with the electric transmission of power.

The United Gold Fields Company recently placed an order with the J. H. Montgomery Machinery Company, of Denver, Colo., for a tramway and complete mine equipment, including 50 cars, necessary screens, and a large amount of track, etc., sufficient to handle the output of its coal mines in British Columbia. The proposed tramway will be 3,600 ft. long, with a guaranteed capacity of 100 tons per hour. The J. H. Montgomery Machinery Company will build this tramway, superintend its erection and install all the machinery at the mine.

The Ottumwa Box Car Loader Company reports having sold 17 loaders recently, and is working 2 shifts in its factory at Ottumwa, Ia. The Monongahela River Consolidated Coal and Coke Company has placed an order for an Ottumwa box car loader to be installed at the mines at Boston, Pa. The Central Coal and Coke Company, with headquarters at Kansas City, Mo., is installing an Ottumwa loader at its Huntington, Ark., mines, making 8 loaders for this company. The Northern Coal and Coke Company, of Denver, Colo., has ordered another Ottumwa loader for its mines at Lafayette, Colo.

The Illinois Car and Equipment Company, of Hegewisch, Ill., near Chicago, has recently purchased a large amount of electrical apparatus. An order on the Westinghouse Electric and Manufacturing Company includes two 250-k.w. and one 200-k.w. 2-phase alternators, together with a 4-panel switchboard, and the following induction motors: 2 100-h. p., 5 75-h. p. and 1 50-h. p. The Brown Engineering Company, of Cleveland, O., has recently purchased from the Westinghouse Electric and Manufacturing

Company, a large number of railway-type crane motors, ranging in capacity from 25 to 50 h. p.

The firm of Straley, Hasbrouck & Schloeder, counselors at law, 257 Broadway, New York City, established some years ago as an experiment a department devoted to the soliciting of patents for inventions, the registration of trade marks, etc., and litigation affecting the same. The result has been so satisfactory that Messrs. Straley, Hasbrouck & Schloeder recently placed this branch of their business in the charge of C. Augustus Dieterich, counselor at law and solicitor of patents, formerly of 229 Broadway, New York City. With their improved facilities Messrs. Straley, Hasbrouck & Schloeder are now in position to take complete charge of the legal business in all phases, of large corporations, manufacturing concerns and individuals.

An arrangement between the American School of Correspondence, of Boston, Mass., and the Armour Institute of Technology, of Chicago, Ill., has been completed by which the correspondence school has removed to Chicago, where all correspondence work is carried on under members of the Faculty of Armour Institute, and given full credit toward the degree of Bachelor of Science. The American School of Correspondence states that no one need longer hesitate to study by correspondence because he has no guarantee of the ability of his teachers or of the standing of his school. Those who can continue by resident study after completing a correspondence course are admitted to the classes of the Armour Institute without an examination in the subjects which they have passed in the American School. For students who are anxious to have shop and laboratory practice, night classes have been established at the Armour Institute, and arrangements made to help students obtain positions in Chicago while attending classes.

TRADE CATALOGUES.

Catalogue No. 37 on hoists and mine equipment, published by the J. H. Montgomery Machine Company, of Denver, Colo., is a pamphlet of 24 pages, describing particularly the firm's widely known common sense steel whims for prospector's use and small mines. The company also supplies ore buckets, wire hoisting-rope, ore cars, mine cages, boilers and steam hoists.

The Western Electric Company, of Chicago, Ill., has published a cloth bound book of 1,074 pages, with an excellent index. This is a combination of its 3 catalogues, covering electric light supplies, street railway supplies and general house goods. The catalogue contains brief descriptions and prices of the articles mentioned, and will be found of value to every concern dealing in electrical supplies.

Advance sheet No. 15, issued by the Jeanesville Iron Works, of Jeanesville, Pa., describes a variety of models of the firm's well known pumping engines. These have the outside packing and other features that have gained such wide commendation from mine owners. Advance sheet No. 16, issued by the same company, describes U-tube surface condensers and duplex and single jet condensers.

The American Engineering Works of Chicago, Ill., is sending out pamphlets and circulars, calling attention to various matters of interest. The company for several years has been repairing air drills or furnishing for concerns doing their own repairing, forgings, castings, special nuts, steel, etc. The company also says it has on hand a lot of new machinery supplied to a Mexican mine, but returned to be sold on account of the mine shutting down.

Direct-acting hoisting engines are described in Circular No. 1, series H-O, a 40-page pamphlet, published by Webster, Camp & Lane, of Akron, O. The company builds improved balanced cage hoists with Corliss valve-gear, 2-cylinder Corliss engines, with one or two drums and reel hoists. The company also makes hoists having straight or conical drums and compound engines, the engines being fitted with the Pitkin patent intercepting valve, by which the piston pressure in the high and low cylinders at the moment of starting is equalized.

Over 300 Knight water wheels are in operation in California. Their distinguishing feature is the shape of the nozzle used, the manufacturer believing that a rectangular slit utilizes the full power of the water better than a round opening. The small wheels from 9 to 24 in. diameter have cast iron casings, and the larger wheels up to 6 ft. diameter or over have steel plate casings. For driving generators, these water wheels are equipped with an electrical governor, stated to act promptly under all variations of load. The wheels are described in a 48-page pamphlet published by Knight & Co., of Oakland, Cal.

A heavily bound and well-illustrated book of 892 pages that will interest all dealers in and users of mining machinery, is issued by the Mine and Smelter Supply Company, of Denver, Colo., as its general catalogue No. 15. This catalogue is divided into 10 sections, covering engines, boilers and feed-water

heaters, hoists, pumps and hydraulic machinery, mining, milling and smelting machinery, assayers' supplies, electrical machinery, mining tools and supplies, and iron and steel woodworking machinery. The volume also contains a large number of useful tables, arranged for ready reference, and has a most excellent index. The company claims that the catalogue gives a more complete treatment of mining machinery and supplies than any general catalogue of like subject yet issued.

An interesting and useful work published by the John Roebling & Sons Company, of Trenton, N. J., is a 74-page pamphlet on "The Transmission of Power by Wire Rope." This pamphlet presents a brief description of the usual methods of power transmission by wire rope with practical rules for general work, omitting more or less cumbersome mathematical formulae. It covers the proper design of sheaves, the character of rope, tension devices, etc., and gives a series of tables showing the horse-power developed at various speeds with different distances from center to center of sheaves; these tables being for distances of from 100 to 350 ft. Some excellent half-tone cuts with accompanying brief descriptions, give a good idea of modern practice in this line. The pamphlet contains also specifications of the various makes of Roebling wire rope.

GENERAL MINING NEWS.

Petroleum Developments.—A decrease in wells completed in the Pennsylvania and Trenton rock oil-fields was recorded in September, says the Oil City *Derrick*, but the new production and new operations were the heaviest of the current year. September's record was 1,380 wells completed, 19,042 bbls. production and 262 dry holes. Compared with August, this represents an increase of 17 completed wells, 789 bbls. production and 58 dry holes. The new work under way in the Pennsylvania and Trenton rock oil-fields at the close of September included 615 rigs and 1,217 wells drilling, a gain of 15 rigs and 5 wells drilling over the figures for August 31.

ALASKA.

CAPE NOME.

Nome Gold Output.—The season's output of gold of the country tributary to Nome is estimated at approximately \$4,500,000 by W. J. Erskine, cashier of the Northern Commercial Company, who is in close touch with all of the large mining companies. Mr. Erskine estimates that the total shipments of bullion and dust from Nome up to September 1 amounted to \$2,532,690. Shipments made during September bring this up to more than \$3,000,000, as compared with \$3,140,666, the total shipments up to October 1, last year.

ARIZONA.

MOHAVE COUNTY.

(From Our Special Correspondent.)

Alta.—This mine, near Chloride, is running a drift on the 75-ft. level in rich gold and silver ore. A shipment of 10 tons has been made.

Cyclopic.—This mine, in Gold Basin, has added to its cyaniding department 2 rolls from the Elkhart Mine at Chloride.

Maguire.—Preparations for work on this mine, near Kingman, are being made by its California owners.

Mocking Bird.—Oscar Ellis, using his newly patented electric process, is working the old dumps of this mine, near White Hills, the yield being given as \$10 gold per ton.

Rough Rider.—This mine, at Layne Springs, belonging to R. F. Harris, of Chloride, is shipping to the smelter at Chloride 12 tons of rich ore.

Searchlight.—Preparations are being made for working this property on the Colorado River this winter.

Val Verde Company.—This company, of Jerome, has taken options on a number of claims at Mineral Park.

Vulcan Smelter.—Additional machinery for treating silver-lead ores has been installed at Chloride.

PINAL COUNTY.

(From Our Special Correspondent.)

Lake Superior & Arizona Mining Company.—This company has been organized by Calumet, Mich., men with a capital of \$200,000, divided into \$1 shares. No promotion stock has been issued, and the company has \$100,000 and 125,000 shares in the treasury. A group of 6 claims has been purchased, on which development is said to show a large deposit of ore running high in copper and gold. Over 3,000 ft. of development work is reported done on the claims. The following are officers: President, F. S. Carlton, Calumet, Mich.; vice-president, Dr. W. A. Holt, Phoenix; secretary, A. W. Kerr, Calumet, Mich.; treasurer, W. R. Anderson, Calumet, Mich.; directors, Capt. Thomas Maslin, Calumet, Mich.; Johnson Vivian, Laurium, Mich.; John D. Cuddihy, Calumet, Mich.; Henry

Baer, Hancock, Mich.; W. A. Thielman, Calumet, Mich., and Dr. W. A. Holt, Phoenix.

CALIFORNIA.

AMADOR COUNTY.

(From Our Special Correspondent.)

Kennedy Mining and Milling Company.—In this property, at Jackson, J. F. Parks, superintendent, a heavy cave has occurred on the 2,300-ft. level. Ore is milled from the 2,400 and 2,500-ft. levels. The grading for the new mill and hoist is nearly done.

Defender.—This company, at Defender, has bought the machinery from the Gowanus Mine at Plymouth.

BUTTE COUNTY.

(From Our Special Correspondent.)

River-Bed Mining.—The company, which has taken up so much mining ground along the Feather River, may expend as much as \$2,000,000 on ground and plant, according to report, before any returns are expected. It now has about 100,000 acres of mining ground, and the annual assessment work for the coming year will cost about \$60,000. H. H. Yard is still securing more ground for the company.

CALAVERAS COUNTY.

(From Our Special Correspondent.)

Crystal.—At this mine, at Angels, the shaft is being timbered, and the hoisting machinery prepared for sinking. The shaft is down 100 feet.

Fannie Marie Mining Company.—F. O. Courtmarsh, manager at Glencoe, is buying more machinery for the company.

Mahala.—Good results are shown by development in this claim near Rich Gulch, owned by Redmond & Casey, of San Andreas. Some of the rock taken out is very rich.

McKisson.—At this mine, Rich Gulch, George McKisson, superintendent, a steam hoist has been erected.

Ranch.—The Sherman tract, on which this mine is situated, near Milton, has been bought by Mr. Rathbun, who has purchased machinery from the Diamond Jack Mine.

Siberia.—At this mine, also known as the Big Six, near Milton, the hoist has been burnt by a bush fire.

EL DORADO COUNTY.

(From Our Special Correspondent.)

California Bangor Company.—Pennsylvania slate men are negotiating for 40 acres of the land of this company at Kelsey. Some of the men make school slates. The property is to be leased.

INYO COUNTY.

(From Our Special Correspondent.)

Death Valley Borax Beds.—F. M. Smith, of San Francisco, is sending several expeditions into Death Valley to explore for borax and niter. Altogether 70 men will be kept prospecting for about 8 months. Other private expeditions have also started.

Inyo Gold Company of Los Angeles.—This company, owning mines at Tuba Canyon, near Panamint, is shipping in a cyanide plant, to work tailings. J. P. Flint, of Los Angeles, is president.

Mineral Hill.—This mine, near Ballarat, D. H. Chaplin, superintendent, has started work again.

KERN COUNTY.

(From Our Special Correspondent.)

Big Four.—This company, at Havilah, has increased the force on the tunnel. W. Wood is superintendent.

Bucna Piedra.—This mine, at Granite Station, 25 miles from Elmer, has developed a fine gold ore shoot at the 200-ft. level. A. W. McCrae is superintendent.

Friday Gulch Mining Company.—In this mine, at Havilah, the hoist is ready and the pump soon will be. The mine will be unwatered.

King Solomon Mining Company.—This company, at Havilah, John Hayes, superintendent, has let a contract to continue the shaft and drive the 600-ft. tunnel and another 100-ft.

LOS ANGELES COUNTY.

(From Our Special Correspondent.)

Pico Canyon.—The bed of the creek in this canyon, near Newhall, is to be worked on a better scale than formerly. A Los Angeles company is to bond the Newhall ranch. Much dry washing has been done in that locality in past years.

MARIPOSA COUNTY.

(From Our Special Correspondent.)

Buckeye.—This mine, near Mariposa, D. F. McRea, superintendent, has 14 men busy.

McAlpine.—This mine, at Coulterville, is to put in 3 shifts of men shortly.

MONO COUNTY.

(From Our Special Correspondent.)

Sweetwater.—This mine, near Bodie, J. A. Brown, general manager, and A. P. Sayre, superintendent, has

closed down for the season on account of lack of water. The cyanide test of the first run of ore has not been completed.

NEVADA COUNTY.

(From Our Special Correspondent.)

Badger.—At the annual meeting at Grass Valley the following were elected directors: Peter Johnson, president; John Glasson, vice-president; T. J. Miceli, secretary; Harry Nathan and W. H. Bryan.

North Star Mining Company.—This company owns 10 mines at Grass Valley. James D. Hague is president and A. D. Foote manager. A double set of concentrators is being installed at the 40-stamp mill. A new hoist is being placed at the 1,600-ft. Central shaft and a triple expansion duplex Worthington pump is to be installed.

Pennsylvania Mining Company.—This company, at Grass Valley, has begun suit against the Grass Valley Exploration Company for \$525,000 for ore taken from Pennsylvania grounds. The suit is to determine a point which Judge Morrow did not decide in his recent decision in favor of the Pennsylvania, that is, the amount of damages. The company claims that the W. Y. O. D. (or Grass Valley Exploration Company) took out 35,000 tons of ore of the valued sued for.

Seven-Thirty.—A new ledge has been cut in this mine, near Grass Valley, bonded by John Reilly, George Bennetts, John Bone, John Hill, William James and William Stevens. The shaft is down 200 ft., and is equipped with a good hoist and pump.

Union Hill.—E. C. Crellar, superintendent, has purchased for this mine, at Grass Valley, the 10-stamp mill formerly at the English Mountain Mine, at Graniteville. The mine has been unwatered to the 2d level.

Yuba Placer Company.—A very rich strike has been made on this property, near French Corral, on the Yuba River.

SAN BERNARDINO COUNTY.

(From Our Special Correspondent.)

Bagdad.—A railway is to be constructed to these mines, at Ludlow, from the main line of the Santa Fe. About 30 tons of ore daily are shipped to the mill at Barstow, the remainder being stacked.

Iron Chief.—This property is reported sold to J. F. Collins, of Pittsburg, Pa., for \$20,000. The new owner proposes to develop the property on a good scale.

SAN DIEGO COUNTY.

(From Our Special Correspondent.)

D. N. Stradley, of Denver, and J. P. Moulton, of Los Angeles, are investigating the mineral resources of Julian and Banner districts with a view to erecting reduction works at Banner.

Noble.—The mill at these mines, at Pine Valley, is to be started on ore from the mines of the district. J. A. Waupce is manager.

Oro Blanco.—L. N. Bailey, of Banner, expects to resume work on the tunnel shortly.

SAN LUIS OBISPO COUNTY.

(From Our Special Correspondent.)

Josephine.—This quicksilver mine is now owned by the California Consolidated Mines Company, of Kittery, Me. Albert Johnson is manager. A retort of 24 pipes is in use.

Liberdad Quicksilver Company.—This company has been incorporated to buy and work the Little Josephine Mine at Adelaide, sometimes known as the Traf-ton. The property is under bond to the company, of which Geo. A. Trafton is manager.

Pine Mountain.—W. H. Wright is manager of the company opening this mine and the Oceanic, both quicksilver properties. The tunnel on the Pine Mountain is 1,400 ft., but has not reached the main deposit. A large furnace will be put up in the spring.

SIERRA COUNTY.

(From Our Special Correspondent.)

Rattlesnake.—At this old gravel mine, near Downieville, J. H. Stewart has miners at work for Nevada men. The mine is to be reopened.

SISKIYOU COUNTY.

(From Our Special Correspondent.)

Elliott District.—This district is near the Oregon line, on Siskiyou Mountain. A great many copper and gold locations have been made recently.

Evening Star and Central.—A San Francisco company, with Ben. F. Daggett as superintendent, is opening these mines near Rollin.

Gold Ball.—This mine, near Rollin, has yielded 700 tons of \$10 rock this season.

Wabana.—The new mill for this mine, near Hornbrook, is running under direction of H. Mattern.

SOLANO COUNTY.

(From Our Special Correspondent.)

St. John Quicksilver Mines.—These mines, 5 miles from Vallejo, are under management of Alf. Tregidgo.

formerly of Grass Valley. There are 2 furnaces and 3 flat retorts. The condensers are of brick and 24 ft. high. The ore yields about 2 7/8 per cent mercury.

TRINITY COUNTY.

(From Our Special Correspondent.)

Enterprise Group.—These mines, near Coleridge, have been bonded by Spokane, Wash., men. The mines are owned by U. G. Day, Chas. Lobdell and Mrs. R. Balch.

Union Consolidated Mining Company.—A 5-stamp mill has been shipped to the mines of this company at Abrams.

TUOLUMNE COUNTY.

(From Our Special Correspondent.)

Bell.—A good body of ore has been found in this mine, at Tuttle town.

Lost Fox.—This mine will have a new ditch from Bear Creek.

Tolco.—The shaft of this mine, at Tuttle town, having been unwatered, 3 shifts are at work.

YUBA COUNTY.

(From Our Special Correspondent.)

Burgess.—A 3-stamp mill has been shipped to this mine, near Brownsville.

Miller.—This mine, near Brownsville, has temporarily stopped work.

COLORADO.

FREMONT COUNTY.

United States Reduction and Refining Company.—The American Zinc-Lead Works at Canon City, owned by this company, are being improved and enlarged. New buildings are being erected and modern machinery installed. A new crushing plant and sampling mill will be built, while the laboratory has been entirely remodeled. Another bag house will be constructed, making the total capacity 6,000 bags. The principal product of the plant is zinc-lead pigment, made by the Bartlett process.

GILPIN COUNTY.

(From Our Special Correspondent.)

Gilpin Ore Shipments for September.—The shipments of smelting and crude ores, mill tailings and concentrates from the Black Hawk depot to the smelters and outside points were 361 cars, or 7,220 tons. In comparison with September, 1901, shipments show a gain of 61 cars, or 1,503 tons, an increase of fully 25 per cent.

Consolidated Investment Company.—This company has been organized, with a capital stock of \$1,000,000, to operate a group of claims in Vermilion District, also claims to be interested in lead mines in Kansas and oil fields in Texas. The newly elected officers are: President, Judge W. W. Graves, of Kansas City; vice-president, Clarence S. Palmer, of Kansas City; secretary, B. F. Coughenour, of Kansas City; treasurer, Dr. Temple, of Kansas City; directors, C. B. Rhodes and H. I. Reed, of Kansas City, and W. M. Phillips, of Denver.

Fairfield Mining Company.—Baltimore men are interested in the Fairfield Mine, in Russell District. During the past week some free gold ore was found in the south 420-ft. drift. The company has sunk the main shaft a lift of about 150 ft., and over half that distance being on a 3-ft. body of milling and smelting ore, the former running 4 oz. gold per cord, while the smelting ore netted over \$123 per ton. A shipment of over 100 tons has gone to the Hidden Treasure Mill at Black Hawk. Dr. Nickerson, of Denver, is manager.

Lyons-Kyle Mining Company.—A contract has been given to McFarlane & Co., of Black Hawk, for the erection of a 50-ton lead plant in Quartz Valley District, the contract price being \$15,000, and the plant to be in operation by January 1. The main building will be 40 by 130 ft., and the equipment will be a 45 h.p. engine and 80 h.p. boiler, crushers, rolls, trammers, jigs and 20 rapid-drop stamps for recrushing. The plant is to be automatic throughout. Chicago and Boston men are interested. William Woods, Central City, is superintendent.

Ohio.—J. Waldhart, of Black Hawk, is interested in this property in Vermilion District. The owners have received net returns of \$119 for second class and \$245 per ton for first class ore from the Chamberlain sampling works.

Russell.—Ohio parties are preparing to start work on the Russell and West Pewabic claims, in Russell District, and a new shaft building and machinery are being put up. The main developments will be on the Russell claim this winter. If the prospects warrant a larger plant will be put up next spring. J. C. Noble, Russell Gulch, is manager.

LAKE COUNTY—LEADVILLE.

(From Our Special Correspondent.)

Leadville Ore Output.—October opens with a slight increase, the daily output being about 2,350 tons, of which 2,000 tons are handled by the American Smelt-

ing and Refining Company. The zinc output continues to improve, the A. M. W. and A. Y. & Minnie producing about 100 tons of concentrates daily, while the Moyer is shipping 200 tons of zinciferous stuff from the old dump. In addition zinc is coming from the Yak, the Louisville and a number of leasing propositions.

A. M. W. Combination.—The company produced over 9,000 tons last month, 3,000 tons concentrating ore and 3,000 tons crude material coming from the A. M. W., and 3,000 tons from the A. Y. & Minnie.

Banker Mining Company.—Machinery is being put in to lower the water. A large body of low-grade material at 800 ft. will be handled later by a concentrating mill that Manager Guth says will be built. Operations will be pushed at the 1,100-ft. level for richer ore.

Bartlett.—The lessees are running their 1,200-ft. tunnel, and will open several rich veins that have been cut in Bartlett territory.

Catalpa-Crescent.—Lessee P. McGreevey is handling 25 tons daily of good oxidized iron, and doing dead work to reach a large body of good iron in virgin ground. He has opened several large bodies of fine manganese ore.

Chippewa Leasing Company.—A rich streak of ore is being followed that assays from 1 to 5 ozs. gold. No trouble from water is experienced.

Homer Placer.—H. I. Higgins hopes to resume work on this new shaft in virgin territory during October. If he fails he will arrange for work during 1903.

Keystone Mining Company.—Heavy machinery is being put in and other surface improvements made prior to taking out the water from the Rex shaft. Pittsburg, Pa., men are back of the enterprise.

Midas.—Shaft repairs are completed and the company has resumed shipments from its iron shoot, making a tonnage of 250 tons daily.

Mike & Starr.—This mine is worked by John McAlister through the Yak tunnel. He is developing bodies of copper sulphides. The production is to be increased to 50 tons daily to the Buena Vista Smelter.

Morocco Mining Company.—Work is through the A. V. shaft under T. S. Schlössinger. At the 414 ft. level miners are following a streak of iron that is widening and assays 20 to 30 ozs. silver. The water flow is 200 gal. per minute, and is handled all right.

New Monarch Combination.—Manager Goodwin is shipping 250 tons daily, mostly oxidized material, from the Little Winnie shaft to the new smelter at Salida, and when the roasting plant is completed shipments from the sulphide bodies at the Monarch will start. Mr. Goodwin says that the Ohio and Colorado Smelting and Refining Company will start its plant at Salida about October 20, and that reports that the company could not get coke or cars on account of the trouble with the smelter trust are untrue.

Penn Mining Company.—Shipments are 50 tons a day of low-grade siliceous ores. Some new work in virgin ground is underway.

Resurrection Gold Mining Company.—Work on the new concentrating mill is going ahead rapidly, while development proceeds in both shafts, and great deposits of clean zinc-lead sulphide material have been opened, besides richer ore in other parts of the company's workings. The mill will be completed within six weeks. Three distinct products will be made.

Valentine Mining Company.—Larger pumps are going in, while the water is being lowered. Extensive prospecting will start as soon as the water is under control.

Toledo Avenue Mining Company.—This Carbonate Hill company has reorganized and raised funds to sink to contact. A. Dyatt is in charge.

LAS ANIMAS COUNTY.

Cedar Hill Coal Mining Company.—This company has resumed work at its mine near Trinidad. It recently purchased 30 additional coal cars and a large amount of track and other equipment from the J. H. Montgomery Machinery Company, of Denver, thus enabling it to double the former output.

OURAY COUNTY.

Blue Bell Mining Company.—This company owns the Hudson Mine, on Red Mountain, near Ouray, where prospecting is going on in the lower levels, the ores being a copper-iron sulphate, with values in silver and gold.

Camp Bird Revenue.—This company has a group of claims on Potosi Mountain, near the Camp Bird Mill, at Ouray. The stockholders are Ouray, Denver, St. Louis and Chicago men. Two tunnels are being driven, the upper being in about 400 ft. The ore is a gold quartz, showing some telluride. W. M. Burns is superintendent.

Revenue.—This company, at Ouray, is working both the Virginus and Montana veins. As the Montana

ore values can be largely saved by amalgamation, half of the Revenue Mill is being fitted for this ore. The mill contains 6 Huntington mills, and 6 more may be put in. The crushed ore is run over plates. The tailings from the plates are to be dried and concentrated, and the mill when completed will handle 350 tons of ore daily. E. A. Krisher is superintendent.

SAN JUAN COUNTY.

(From Our Special Correspondent.)

Big Colorado.—The Gardner Electric Drill Company, of Denver, Colo., is installing an electric plant, and will put in several electric drills.

Burrows Park District.—The Tobasco Tunnel has struck daylight on the opposite side of the mountain, 1,265 ft. from its adit. The vein averages 20 ft. wide of \$11 mill dirt. A new tramway is being erected to connect with the 109-ton mill. The Welch pneumatic cyanide process is used with success. A 200-h. p. electric plant, installed at the Sherman, will soon be working. The Isolde, owned and operated by the Dupre Company, is shipping a car-load every other day from a 5-ft. vein. Sixteen men are employed, 8 of whom are ore sorters.

Freeport & Cripple Creek Gold Mining Company.—Eight men are driving a cross-cut of 400 ft. to cut the Ransome vein, and are now in 150 ft. On the Acme, a 240-ft. tunnel is being driven on the vein. A concentrating plant may be erected in the spring.

Gladstone.—Negotiations are pending for the sale of this property on Sultan Mountain, near Silverton, by M. and W. Moyle to the Silverton Mining Company for \$25,000.

Gold King Consolidated Mining Company.—This company is building 8 new 3-room cottages for its mill employes, and also a 3-story boarding and bunk house. The town of Gladstone has been platted, and a school house is being erected. The Gladstone & Northern Railroad, owned by this company, has added to its rolling stock and runs several trains daily between Gladstone and Silverton. A spur is being laid to the mill.

Good Hope.—This property, operated by the International Reduction Company, of Bear Creek, reports a strike of gold ore.

International Reduction Company.—Manager Chas. H. Gage has gone East to purchase machinery for a Gage process mill at Bear Creek. Several large buildings will also be erected for the accommodation of employes.

Notaway Gold and Copper Mining Company.—A 50-h. p. boiler has been installed and a compressor ordered.

Picket.—An Eastern company has purchased this property in Poughkeepsie Gulch for \$40,000 from Ben Duval, of Del Norte. George Bradley, of Ouray, the manager, is getting things in shape for the winter's work. About 20 men are employed.

Titusville Group.—Negotiations have been closed and final payment made on this group on Kendall Mountain, near Silverton, by the Guggenheim Exploration Company, the consideration being given as \$500,000. This group embraces 21,000 ft. of the Letter G vein.

TELLER COUNTY—CRIPPLE CREEK.

(From Our Special Correspondent.)

Golden Cycle Mining Company.—The output for September is given as about 2,300 tons. The usual monthly output is between \$35,000 and \$40,000 gross. The Harrison vein has been cut on the 9th level, and opened for some distance, but so far has proved barren. The ore averages about \$18 per ton gross. The mine is working about 110 men. The receipts for September were: Ore sales and royalties, \$39,111; other sources, \$130; total receipts, \$39,241. Disbursements, expenses, \$23,101; dividends, \$11,250; total, \$34,351. Passed to surplus, \$4,891. Cash in bank September 1, \$94,963. The property is near the town of Goldfield, and was formerly owned by the Smith-Moffat syndicate of Denver. F. J. Campbell is general manager and A. T. Holman superintendent.

Laura Lee.—Work is about to start on this property, on Mineral Hill. Some Boston men have got hold of the property, and, it is understood, will try to make a mine of it. In the property is a junction of 2 veins, which bid fair to produce some very good ore. The opening up of a mine in this section will undoubtedly be a great thing for the district, and much interest is being taken in developments. Mr. Knox is general manager.

Pharmacist Consolidated Mining Company.—The new shaft sunk on the north end of this property by lessees McFarland & Ownbey, is down 400 ft., and no more sinking will be done at present. Quite a little ore is at present being taken out by lessees in the old workings.

Stratton's Independence, Limited.—It is reported on good authority that the Venture Corporation of London, England, is to bring suit against the estate of the late W. S. Stratton for \$5,000,000, alleging misrepresentations made to them at the time the Indepen-

dence Mine was sold. It appears to be the opinion of most mining men that the suit will not amount to anything. The property is at present reported producing about 8,000 tons of ore per month. Thomas Cornish has charge.

Stratton Properties.—Work is progressing as usual. The legal complications with regard to the will and the disposition of the property of the late W. S. Stratton are still on, and it is impossible to tell what the outcome will be. The Stratton estate comprises a large amount of valuable mining property, and its disposition is watched with interest.

Vindicator Consolidated Gold Mining Company.—The output for September amounted to about 2,000 tons of ore, most of which was taken out by the company, and some by lessees. The property, on Bull Hill, is one of the stable mines of the camp.

War Eagle.—The surface strike made some time ago continues to hold out well, and considerable ore is shipped. Quite a large amount has been taken out with a windless. The property belongs to the Stratton estate, and is worked under lease. It is situated on Bull Hill, near the John A. Logan, also owned by the Stratton estate.

Water Situation.—This is still being discussed. Several tunnel propositions that will drain the district at different depths are being investigated. Whether anything will come of these discussions is not known.

SAN MIGUEL COUNTY.

Four Metals Mining Company.—At the recent annual meeting in Pueblo these directors were elected: R. M. Scruggs, St. Louis, Mo.; W. F. Carter, St. Louis, Mo.; Charles H. McKee, St. Louis, Mo.; Patrick Short, St. Louis, Mo.; J. M. Galvin, Boston, Mass.; Edward J. Ryan and John Morton. The capital stock was increased from \$1,500,000 to \$2,000,000 in 2,000,000 shares, par value \$1 per share. The following named officers have been elected: President, W. F. Carter; vice-president, Charles H. McKee; secretary and treasurer, R. M. Scruggs. The new management intends to push development, and a mill will be erected at the Palmyra Mine. An air compressor will be installed at the Andrus Mine in Ingraham Basin, near Telluride. The offices have been removed from Pueblo to St. Louis.

GEORGIA.

CHEROKEE COUNTY.

Creighton Gold Mining and Milling Company.—This company, with a paid up capital of \$500,000, has been placed temporarily in the hands of a receiver on petition of John M. Patterson, of Pittsburg, Pa., who holds stock to the amount of \$175,000 and claims that his action is to protect his interests. The company has been operating the Creighton gold mine for several years, and is considered to be one of the most successful gold mines in the State.

IDAHO.

IDAHO COUNTY.

Aldrich.—This dredge on the Doumeq bar, above White Bird, is in operation. The gravel is dumped into moveable sluice boxes, where it is washed by water pumped from the river by a centrifugal pump. The sluice boxes are adjustable. The machinery is working well. The company is also putting in a plant on the Soldier bar, at Lucile, and will handle gravel by a derrick hoist.

LEMHI COUNTY.

Gold Dust Mining Company.—This company, at Leesburg, is preparing to put up a new 25-ton concentrating and cyaniding mill, constructed that its capacity can be doubled with little extra cost. R. A. Hasbrouck is manager.

OWYHEE COUNTY.

Addie Consolidated Mining Company.—This company is working an old producer, the Eureka, near Silver City. Since January 1 the company has erected a stamp mill with electrical power. It is now installing transformers and the stamps will soon be dropping.

SHOSHONE COUNTY.

Aper.—Frank Reitzel is reported to have struck a good body of galena ore on this property, one mile north of Wallace. Mr. Reitzel's group comprises 8 claims.

Consolidated Mining Company.—This company owns the Mascot Mine at Orofino. It has a 10-stamp mill and engines, and boilers large enough for 20 stamps and has 15 more stamps ordered. A 100-h. p. boiler has been hauled in, also a compressor and hoist. Nearly 6,000 ft. of tunnel work has been done. E. E. Rodgers is manager.

INDIANA.

CLAY COUNTY.

(From Our Special Correspondent.)

J. W. Lovett, of Anderson, Ind., is president of a recently organized company to develop coal lands in

this county. Mr. Lovett and his associates have secured options upon 2,000 acres of land, and will build a spur to the Big Four Railroad from the mines. A number of leading manufacturers in the gas belt are stockholders.

HOWARD COUNTY.

(From Our Special Correspondent.)

Coal Shortage.—A bituminous coal shortage is closing down the factories in Kokomo and other cities, including the steel works, which requires 30 cars a day; the American Strawboard Works Company and three paper mills.

MICHIGAN.

Copper Production Estimates.—The following table, while the estimate of a Boston paper, is of interest. It shows 13 mines now producing copper in the Lake Superior District.

	Tons rock stamped daily.	Per cent. cop. in rock.	Lbs. cop. in ton rock.
Calumet & Hecla.....	6,000	150	2.5
Champion.....	670	11	1.6
Trimountain.....	600	8	1.4
Tamarack.....	2,100	29	1.4
Wolverine.....	970	14	1.35
Baltic.....	1,300	16	1.25
Quincy.....	3,300	39	1.2
Isle Royale.....	500	6	1.2
Mass.....	500	6	1.2
Osceola.....	1,600	18	1.1
Adventure.....	480	5	1.1
Franklin.....	1,000	10	1
Atlantic.....	1,370	8	.55

Soon after January 1 next, Trimountain, Champion and Baltic, it is said, are expected to be stamping between 4,000 and 5,000 tons of rock daily, as against a total to-day of 2,600 tons. This increase will bring the daily rock tonnage of all the mines up to 22,000, and indicate an output of refined copper equal to 215,000,000 lbs. per annum. The output for the current calendar year is estimated at 190,000,000 lbs., against 167,856,659 lbs. in 1901, and 141,717,893 lbs. in 1900.

Six months ago Calumet was stamping 4,800 tons of rock daily, Wolverine 670, Baltic 750, Osceola 3,600 and Isle Royale 1,400.

COPPER—HOUGHTON COUNTY.

(From Our Special Correspondent.)

Atlantic.—The production for September was 270½ tons of mineral.

Baltic.—This mine produced 500 tons of mineral in September, with 3 heads at the mill in commission. Rock shipments averaged close to 1,350 tons per day.

Centennial.—The main shaft on the Kearsarge amygdaloid lode is down to the 23d level and sinking rapidly. During September the shaft was sunk 105 ft.

Elm River.—Work is confined to the cross-cut from the bottom of the exploratory shaft. It will tap the Winona lode shortly.

Franklin.—The September output was 353½ tons of mineral. At the Junior branch rock is hoisted from the 15th level of the shaft on the Allouez conglomerate.

Isle Royale.—Diamond drilling for the Baltic lode continues. The present hole is down 500 ft.

Osceola.—This company is sinking No. 6 shaft on the Osceola amygdaloid to the 40th level. The drift south from the shaft at the 36th level is in 1,400 ft. and opening good ground. At the Kearsarge branch timbering No. 3 shaft is well advanced.

Quincy.—This company produced 1,206 4-5 tons of mineral in September. Rock shipments aggregate 3,300 tons per day. Sinking is confined to No. 8 shaft on the Mesnard property. At Mason, the stamp-mill location, the supply of coal is arriving rapidly. Fifty thousand tons have been stored at the new dock and shed, and before the close of navigation 30,000 tons more will be received.

Tamarack.—This company now has 40 air drill-busy in No. 5 shaft. Rock shipments from this opening are increasing gradually.

Trimountain.—The low-pressure section of the 20,000,000-gal. pump at the stamp mill has been delivered by the Nordberg Manufacturing Company, of Milwaukee, Wis., and will be put in at once.

Wolverine.—The mine produced 455½ tons of mineral in September, the largest output of any month in its history. Two heads in the new mill at Traverse Bay are in commission, treating nearly 1,000 tons of rock per day.

Wyandot.—This company is sinking a perpendicular shaft on section 28. It is down 25 ft., and will go about 175 ft., where a cross-cut will be run in hopes of finding the Baltic lode. Diamond drilling is under way on sections 21 and 28, but nothing of value has been found.

COPPER—ONTONAGON COUNTY.

(From Our Special Correspondent.)

Michigan.—A new dry house has been erected capable of accommodating 100 men. Preliminary work on the foundation for the new hoisting plant for A and B shafts has begun, and will be finished before their

hoist is delivered on December 1 by Webster, Camp & Lane, of Akron, O.

Victoria.—Rails for a spur track to connect the mine and mill site are arriving. The railroad will be narrow gauge and 6,000 ft. long.

IRON—MENOMINEE RANGE.

Mesabi Mining Company.—This company, composed of Duluth, Minn., men, will begin pumping the water out of the Nanaimo Mine at Iron River before long. The company is developing mines on the Mesabi and wanted a mine with ore higher in silica.

Peveabic.—This mine, at Iron Mountain, is expected to ship this year about 550,000 tons, or more than its best preceding record, which was 530,000 tons in 1899. Most of the ore is of a leaner grade than in the earlier years of the mine, when the product was exceptionally high. The company's Walpole Mine is down 600 ft., and has some 60 per cent bessemer ore.

MINNESOTA.

(From Our Special Correspondent.)

Shipments of ore for September were as follows: Duluth & Iron Range road, 731,469 gross tons; Duluth, Messabe & Northern road, 689,582 tons; Great Northern road, 605,643 tons. For the year to October 1 these 3 roads have shipped 11,874,380 tons, an increase of 3,484,065 tons over 1901 figures, and 1,015,000 more than in the whole of 1901. It is probable that not less than 2,250,000 tons more will be shipped during October and the early part of November.

The Duluth, Messabe & Northern road has ordered 400 50-ton steel cars from the Pressed Steel Car Company and the Peninsula Car and Foundry Company, to be delivered early next year. Additional orders for such cars will probably be placed by some of the ore roads shortly.

IRON—MESABI RANGE.

(From Our Special Correspondent.)

A little ore is being found a couple of miles west of Biwabik, in a new exploration.

Centipede.—A 3-16 interest in this new mine, situated in section 4, T. 58, R. 15, has been sold for \$6,500. This mine carries a 25c. royalty and is a small deposit of fairly good ore.

Cypress Mining Company.—This new company is taking over a tract of land near Hibbing, belonging to Burrows, Rust & Goff, which has been recently explored and found to contain about 2,000,000 tons of ore. It will be a stripping proposition, and contracts for both stripping and mining will soon be let. The surface is light, and the ore is about half bessemer. The royalty is 35c., but the total cost of royalty and mining will be light. The product will be handled by the Great Northern road, which has an interest in the property.

Donora Mining Company.—This company, the mining end of the Union Steel Company, of Pittsburgh, Pa., has abandoned its option on the Holman land in section 21, T. 56, R. 24, it has been exploring some months. This land has received a more thorough exploration than any other property on the western end of the range. The result is an indication of importance. The Donora Mining Company sank a shaft nearly 200 ft. and put down a number of drill holes, which did not confirm the records of previous holes reported by the owners. It seems to be shown, however, that there is a very great discrepancy between samples taken direct from a shaft and from the washings of a drill to the disadvantage of the former, especially where there is as much free sand in the ore as on the western Mesabi. This has been especially noticeable in the work on this Holman 40. The Union Steel Company originally had an option on this tract at \$300,000. Holman, the original owner, sold to range parties for \$30,000, and they sold to Duluthians for \$180,000, who optioned to the Union Steel Company.

Elizabeth Iron Company.—Five drills are working, proving the ore body shown by the former explorers. Pickands, Mather & Co. are doing the work.

Letonia.—This property is shipping and will get out as much ore as possible for the remainder of the season. It is a stripping proposition, and is being stripped and mined by Butler Bros. The mine is a few miles west of Hibbing, on the Great Northern road, over which it ships to market. It is expected to produce about 200,000 tons a year after this season.

Roberts Mining Company.—It is not probable that any ore will be mined in the present mine next year.

IRON—VERMILION RANGE.

(From Our Special Correspondent.)

Explorations that have been under way at the McComber location in sections 13 and 14, T. 62, R. 14, first by D. E. Woodbridge, and for some months by M. L. Fay and associates, have been discontinued.

The Oliver Iron Mining Company has started 2 drills on lands adjoining and west of the McComber, section 14.

MISSOURI.

JASPER COUNTY.

(From Our Special Correspondent.)

Joplin Ore Market.—Every grade of zinc ore has materially advanced. Early in the week \$39 was paid for the output of the Doogin diggings. This was a fancy lot of ore, and no other bins were sold higher than \$38 on a straight bid, \$39 being the best price paid in many weeks. The assay basis is from \$34 to \$36, an advance of at least \$1 over the previous week. In some cases on a straight bid \$37 was paid for 60 per cent zinc, the highest price offered in the last 10 weeks. The King Jack sold a part of the 600-ton bin of ore that has been kept out of the market for over a month to the Edgar Zinc Company on a basis of \$36.50 for 60 per cent zinc.

There was an advance of 50c. per ton in lead ore, which was quoted at \$49.50. During the corresponding week of last year the zinc shipment was larger by 580,770 lbs., the lead sales larger by 156,890 lbs., and the value less by \$30,970. For the corresponding 40 weeks of last year the zinc shipment was less by 12,841,140 lbs. and lead sales larger by 3,601,770 lbs., and the value less by \$1,277,454.

Following are the sales from the various camps of the Joplin District for the week ending October 4:

	Zinc, lbs.	Lead, lbs.	Value.
Joplin.....	2,789,830	358,320	\$56,295
Galena-Empire.....	1,147,650	207,320	23,989
Webb City-Carterville.....	1,142,640	399,730	28,175
Prosperity.....	479,840	42,740	9,465
Cave Springs.....	200,110	2,120	3,306
Duenweg.....	274,240	31,990	5,591
Central City.....	124,010	6,880	1,840
Aurora.....	469,040	15,650	8,816
Spurgeon.....	156,030	41,880	3,378
Oronogo.....	130,530	12,280	1,920
Zincite.....	342,550	.....	6,333
Carthage.....	257,290	.....	4,631
Neck and Alba.....	55,780	.....	1,094
Reeds.....	242,090	.....	4,369
Granby.....	285,000	25,000	3,615
Sarcoie.....	55,340	.....	895
Stotts City.....	229,960	.....	4,133
Carl Junction.....	101,500	.....	1,878
Springfield.....	66,000	.....	1,229
Fortuna.....	61,000	.....	1,130
Total.....	8,618,300	1,143,760	\$171,202

Zinc value for week, \$141,310; lead, \$29,892; zinc value, 4 weeks, \$6,181,954; lead, \$1,119,072.

MONTANA.

FERGUS COUNTY.

Alameda.—A cyanide plant may be erected on this group of claims near Gilt Edge. The property is owned by Miss Davis, N. L. Poland, Orlando Sawyer and H. C. McEvony, and was bonded by them to R. E. Moulton a short time ago.

Barnes-King.—The addition to the plant is completed and milling is to start. The addition comprises 3 leaching tanks, with a capacity of 110 tons each, increasing the capacity of the plant to 240 tons daily, or more than doubling the output.

GRANITE COUNTY.

Denver & Montana Reduction Company.—This company's mill at Garnet, it is said, may soon start up again.

SILVER BOW COUNTY.

Amalgamated Copper Company.—The United States Court of Appeals at San Francisco has handed down a decision declaring that Judge Knowles, the United States District Judge of Montana, had no jurisdiction in the matter of the payments of Boston & Montana dividends to this company, and has restored jurisdiction of Judge Clancy who had already enjoined the payment of all such dividends.

Snohomish and Tramway.—The United States Court of Appeals at San Francisco, Cal., has ousted Receiver Harris and rebuked Judge Knowles, District Judge of Montana, who removed F. A. Heinze from the management of the Snohomish and Tramway mines and put in Harris. Heinze was the owner of one-half of those mines. The other half was in dispute.

NEVADA.

CHURCHILL COUNTY.

Bell Marc Mining and Smelting Company.—This company and the Nevada Copper Company, two of the copper mining companies of Table Mountain District, recently consolidated under the name of the Nevada Bell Mining and Reduction Company. The principal stockholders are Philadelphia and New York City men. The company is to start work under the new management and do extensive development. It has a 50-ton smelter.

HUMBOLDT COUNTY.

California & Nevada Mining Company.—This company, with J. Keeder, of Los Angeles, Cal., as general manager, has taken a bond and lease on the Victor group of mines in Arabia District, 14 miles from Lovelocks, and is working a number of miners, who are taking out ore showing horn silver, with some free gold. The Victor is an old producer.

Donnelly Mountain District.—There is considerable excitement in this district on the line between Hum-

boldt and Washoe counties. Some very rich finds of free gold in a hard white quartz are reported, and the country has been staked for a mile about the first location, made by Roger Brothers. The nearest railroad station is Lovelocks, on the Southern Pacific.

NEW JERSEY.

SUSSEX COUNTY.

Cramer.—R. Penhale and William Ackley have leased this mine, near Hackettstown.

Weldon Iron Ore Company.—This company has secured working leases on the Ford and Dodge mines, and made offers for the Beattystown mines in Warren County.

NORTH DAKOTA.

WAID COUNTY.

Mouse River Lignite Coal Company.—This company has a lignite mine at Davis, about 6 miles west of Minot, on the Soo line. The vein is said to be 10 ft. thick, and the demand for fuel all over the Northwest has grown until the mines are worked to full capacity. The company mines about 7 ft. from the bottom and leaves the balance up for the roof, using 6-in. props and caps. Wages are for hand-pick work, 70c. per ton in rooms and 90c. per ton in entries. The rooms are 18 ft. wide, and the entries 7 ft. at the bottom and 6 ft. at the top. Compressed air is also used for machine work, and good machine men are paid 14c. per ton for room work and 32c. for entry work. Miners who follow the machines are paid 40c. per ton for room work and 48½c. for entry work. L. M. Davis is superintendent.

PENNSYLVANIA.

ANTHRACITE COAL.

Anthracite Miners' Strike.—There have been important developments during the week, but nothing to indicate an immediate ending of the strike, which began May 12. President Roosevelt, moved by reports of the suffering that a continuation of the strike would cause, and possibly influenced by politicians, who fear the effect of the strike on the November elections, held a conference in Washington on October 3, at which George Baer, president of the Philadelphia & Reading Railroad; W. B. Truesdale, president of the Delaware, Lackawanna & Western; David Wilcox, general counsel of the Delaware & Hudson; Thomas Fowler, president of the Ontario & Western; John Markle, of G. B. Markle & Co., and John Mitchell, president of the United Mine Workers, were present. With Mr. Mitchell were John Fahy, Thomas Duffy and T. D. Nichols, district presidents of the union.

President Roosevelt, in opening the conference, said: "I wish to call your attention to the fact that there are three parties affected by the situation in the anthracite trade—the operators, the miners and the general public. I speak for neither the operators nor the miners, but for the general public. The questions at issue which led to the situation affect immediately the parties concerned—the operators and the miners; but the situation itself vitally affects the public.

"As long as there seemed to be a reasonable hope that these matters could be adjusted between the parties it did not seem proper for me to intervene in any way. I disclaim any right or duty to intervene in this way upon legal grounds, or upon any official relation that I bear to the situation; but the urgency and the terrible nature of the catastrophe impending over a large portion of our people in the shape of a winter fuel famine impel me, after much anxious thought, to believe that my duty requires me to use whatever influence I personally can bring to end a situation which has become literally intolerable.

"I wish to emphasize the character of the situation and to say that its gravity is such that I am constrained urgently to insist that each one of you realize the heavy burden of responsibility upon him. We are upon the threshold of winter with an already existing coal famine, the future terrors of which we can hardly yet appreciate. The evil possibilities are so far-reaching, so appalling, that it seems to me that you are not only justified in sinking, but required to sink, for the time being, any tenacity as to your respective claims in the matter at issue between you. In my judgment the situation imperatively requires that you meet upon the common plane of the necessities of the public.

"With all the earnestness there is in me I ask that there be an immediate resumption of operations in the coal mines in some such way as will, without a day's unnecessary delay, meet the crying needs of the people. I do not invite a discussion of your respective claims and positions. I appeal to your patriotism, to the spirit that sinks personal considerations and makes individual sacrifices for the general good."

To this appeal the railroad presidents, Mr. Markle and the representatives of the Mine Workers replied. Mr. Mitchell submitted the following proposition to the President on behalf of his organization:

"Confident of our ability to demonstrate to any impartial tribunal, the equity of our demands for higher wages and improved environment, we propose that the issues culminating in this strike shall be re-

ferred to you and a tribunal of your own selection, and agree to accept your award upon all or any of the questions involved. If you will accept this responsibility, and the representatives of the coal operators will signify their willingness to have your decision incorporated in an agreement for not less than 1 year or more than 5 years, as may be mutually determined between themselves and the anthracite coal mine workers, and will pay the scale of wages which you and the tribunal appointed by you shall award, we will immediately call a convention and recommend a resumption of work, upon the understanding that the wages which shall be paid are to go in effect from the day upon which work is resumed."

This proposition was rejected by the representatives of the operators for reasons set forth in their statements.

President Baer, of the Reading, said in part: "There are from 15,000 to 20,000 men at work mining and preparing coal. They are abused, assaulted, injured and maltreated by the United Mine Workers. They can only work under the protection of armed guards. Thousands of other workmen are deterred from working by the intimidation, violence and crimes inaugurated by the United Mine Workers, over whom John Mitchell, whom you invited to meet us, is chief.

"I need not picture the daily outrages committed by the members of this organization. The 'domestic tranquility' which the Constitution declares is the chief object of government does not exist in the coal regions. There is a terrible reign of lawlessness and crime there. Only the lives and property of the members of the secret, oath-bound order, which declared that the locals should 'have full power to suspend operations at collieries' until the non-union men joined their order, are safe. Every effort is made to prevent the mining of coal, and, when mined, Mitchell's men dynamite bridges and tracks, mob non-union men, and by all manner of violence try to prevent its shipment to relieve the public.

"The Constitution of Pennsylvania guarantees protection to life and property. In express term it declares the right of possessing and defending property 'to be inalienable.' When riot and anarchy too great to be appeased by the civil power occur, the Governor of Pennsylvania is bound to call out the State troops to suppress it. He must fearlessly use the whole power of the State to protect life and property and to establish peace—not an armed truce, but the peace of the law, which protects every man at work and going to and from work. He has sent troops to the coal regions. Gradually the power of the law is asserting itself. Unless encouraged by false hopes, order will soon be restored and then we can mine coal to meet the public wants. If the power of Pennsylvania is insufficient to re-establish the reign of law, the Constitution of the United States requires the President, when requested by the Legislature and the Governor, 'to suppress domestic violence.'

"Under these conditions we decline to accept Mr. Mitchell's considerate offer to let us work on terms he names. He has no right to come from Illinois to dictate terms on the acceptance of which anarchy and crime shall cease in Pennsylvania. He must stop his people from killing, maiming and abusing Pennsylvania citizens and from destroying property. He must stop it because it is unlawful and not because of any bargain with us. We will add to our offer 'to continue the wages existing at the time of strike and to take up at each colliery and adjust any grievance' this further condition: If the employers and employees at any particular colliery cannot arrange a satisfactory adjustment of any alleged grievances, it shall be referred to the Judges of the Court of Common Pleas of the district in which the colliery is situated for final determination."

Mr. Wilcox in his statement said of the United Mine Workers: "The United Mine Workers of America is an association composed of a large number of miners and laborers engaged throughout the country in mining anthracite and bituminous coal, and employed by the owners of the mines. It has divided the whole country into various districts, each of which is represented by a so-called president, and embraces local unions, and it seeks to compel every one engaged in the industry to join the organization. The affairs of the association are managed by an Executive Committee having its headquarters at Indianapolis, and by conventions called from time to time representing the entire organization. The object and practice of the association are, so far as possible, to regulate the supply of labor engaged in the occupation of coal mining throughout the country, and the terms of employment thereof. It thus consists of one central organization, which restrains and controls the production of fuel everywhere throughout the country and monopolizes the labor engaged therein. These are its purposes and results. Its ultimate object is to control the entire fuel supply of the country.

"At this hearing it is represented by one person, while six persons represent the part of the production of anthracite coal. It is therefore the most extensive combination and monopoly which the country has ever known. It habitually enforces its orders and directions by whatever means may be most effectual, in-

cluding strikes, boycotts, picketing, besetting and the like, not confined to its own members alone, but in which are compelled to join, as far as possible, all other persons similarly employed.

"In accordance with these objects last May the United Mine Workers ordered a strike in the anthracite coal region, which extended to all the workings therein. Since that time it has, so far as possible, forced all persons who are willing to work to cease doing so. Within a few days one or more miners who had returned to work, having been formerly connected with the Mine Workers' Association, have been murdered by those acting in sympathy with the strike.

"These facts show that the Mine Workers' Association is not within the rules regarding ordinary local labor organizations. On the contrary, the association and all of its members constitute a combination or conspiracy not only at common law, but also in restraint of trade and commerce among the several States, and also an attempt to monopolize the labor necessary in supplying coal found in one State to the markets of other States, and thus to monopolize this part of the commerce among the several States.

"The operators have been actively seeking to increase production, and are now producing about 15 per cent of the normal output.

"Grave as are the matters mentioned in the President's memorandum, the questions fundamentally involved are even more serious. They are whether freedom of life and property is to continue in this country or is to exist merely in accordance with the will of combinations and conspiracies which are prohibited by the Constitution and the statutes and the common law, and whether this company's faithful employees are to be delivered to the destruction which surely awaits them in case of the triumph of the Mine Workers' Association. The condition of returning to work which Mr. Mitchell makes is that a commission be appointed by the President to investigate existing conditions, and that the mine workers and the operators agree to abide by its recommendations. The personnel of such a commission is uncertain; its action would be without authority of law or precedent, and it would be without knowledge of the varying conditions in the different collieries and regions. This company has no power to commit the welfare and existence of the property to such uncertainties. Moreover, after the settlement of 1900 local strikes were more numerous than ever. Mr. Mitchell is now constantly counselling against violence, while, nevertheless, outrages and murders are of constant occurrence. He must, therefore, be powerless or insincere, and any assurances as to the future would be without value."

President Roosevelt, disappointed at the result of the conference, appealed directly to the representatives of the Mine Workers' on October 6, sending this message to Mr. Mitchell through Carroll D. Wright, Commissioner of Labor:

"If Mr. Mitchell will secure the immediate return to work of the miners in the anthracite regions the President will at once appoint a commission to investigate thoroughly into all the matters at issue between the operators and miners, and will do all within his power to obtain a settlement of those questions in accordance with the report of the commission."

This proposition having been rejected by the striking miners it is not likely that the President will take further action.

Governor Stone, at last, apparently moved by the statements of the operators, has called out the entire Pennsylvania militia for duty in the anthracite regions. It remains to be seen, however, whether the troops will repress disorder and intimidation or simply act after rioting has occurred, making a show of power after some house has been blown up by dynamite, or some non-union worker clubbed to death. Thus far the troops have hardly been handled so as to convince miners who want to work that their lives and property will be protected.

Lehigh Valley Coal Company.—This company's August statement shows the effects of the miners' strike. The figures for August and the two months of the fiscal year from July 1 to August 31 are as follows:

	August.	Two months.
Earnings	\$128,593	\$246,891
Expenses	275,192	563,951
Deficit	\$146,599	\$316,160

For the two months there was a decrease of \$2,710,551 in earnings, and a decrease of \$2,285,354 in expenses; this year's deficit comparing with net earnings of \$109,037 last year.

Philadelphia & Reading Coal and Iron Company.—This company's statement for August and for the two months of its fiscal year from July 1 to August 31, is as follows:

	August.	Two months.
Earnings	\$242,313	\$498,510
Expenses	524,457	1,039,421
Deficit	\$282,144	\$540,911

For the two months there was a decrease of \$3,818,978 in earnings, and a decrease of \$3,064,565 in expenses; the falling off being due to the strike of the miners.

BITUMINOUS COAL.

Keystone Coal and Coke Company.—This company has purchased the Lomison or Keaggy farm of 312 acres, immediately west of Greensburg, for \$90,000. The Seaboard Coal Company had sunk a shaft on this tract, but failed to secure satisfactory railroad facilities, and litigation ensued.

SOUTH DAKOTA.

CUSTER COUNTY.

(From Our Special Correspondent.)

Central Black Hills Copper Company.—E. M. Barnes, member of Drake, Barnes & Co., Cleveland, O., is preparing to erect a 200-ton leaching plant on the property recently purchased of Richard Palmer on Spring Creek. The company was organized by Drake, Barnes & Co., and the stock is held largely by Cleveland and Minneapolis men. A 40-ft. ledge is reported opened by a cross-cut 200 ft. above water level.

Grantz Mining Company.—A new boarding house, blacksmith shop, assay office and several dwellings have been erected. An average of 70 assays of ore from the bottom of the 80-ft. shaft on the Roosevelt group is said to have been \$65 in gold per ton. The company also owns the St. Elmo property, in Custer County, and has a shaft down over 100 ft. The Glover group of claims, 3 miles from the Roosevelt group, has been purchased.

LAWRENCE COUNTY.

(From Our Special Correspondent.)

Arcade Mining Company.—A shaft is started on the property on Miller Gulch, 6 miles northwest of Deadwood. The officers of the company are: John D. Mesereau, Pasadena, Cal., president; H. G. Hopkins, Denver, Colo., vice-president, and Patrick O'Dwyer, Deadwood, secretary and manager.

Gladiator Consolidated Mining and Milling Company.—Frank Murphy has sold to the company the Tip Top group of 40 acres, adjoining the Gladiator property. James Blaine has been awarded a contract to deliver 200,000 ft. of lumber and timbers for the mine and buildings. The ore is being tested, and a plant will be built in the spring.

Gold Hill Mining Company.—Water has driven the miners out of the shaft at a depth of 280 ft. A new boiler and pump are being shipped in, and work will start as soon as they are ready.

Imperial Mining Company.—The company is said to have cleaned up \$12,000 in September at the cyanide plant in Deadwood, running about half capacity. This with values tied up in solution and ore in bins brings the business of the month up to about \$16,000.

Ontario-Wanda.—Two car-loads of silver-lead ore, taken out by R. A. Murray, lessee, will be shipped to the National Smelter at Rapid City.

Oro Hondo Mining Company.—The new hoist, air compressor and drills have been installed and are in use. The company owns 1,000 acres adjoining the Homestake on the south, of which 51 claims are patented and 22 in process of patent. Gov. James B. Ouman, of Colorado, is president; George M. Nix, Lead, vice-president and manager; R. H. Driscoll, Lead, treasurer; George D. Begole, Denver, Colo., secretary.

Ruby Mining Company.—An ore house and other buildings are being erected on the Portland claim, near Galena, and preparations are being made to ship ore to various smelters. The property is developed by tunnels, shafts and open cuts. The main siliceous ore body is vertical. James Conzett, of Deadwood, is in charge. The main stockholders live at Newcastle, Pa., Charles Greer being heavily interested.

Spearfish Mining and Reduction Company.—The last clean-up for 15 days run gave \$18,000 in bullion. The cyanide plant is handling 300 tons a day. Clean-ups are larger than they have been, running about \$35,000 a month.

Titanic Mining Company.—Work is to be resumed and the shaft started 2 years ago sunk to quartzite. It is now 250 ft. deep. New machinery was recently installed.

PENNINGTON COUNTY.

(From Our Special Correspondent.)

Black Hills Copper Company.—The west drift from the bottom of the 800-ft. incline has cut the main ledge at a distance of 200 ft. from the shaft. The ore is said to assay from 3 to 7 per cent copper, with some gold and silver. At the 400-ft. level the vein is reported 60 ft. wide.

Copper Mountain Mining Company.—Grading has begun for a small copper smelter at Sheridan, a few miles from Hill City. S. A. Baxter and others, of Lima, O., are the principal stockholders.

TEXAS.

HARDIN COUNTY.

(From Our Special Correspondent.)

Sour Lake Oil-Fields.—The Guffy Petroleum Com-

pany has started drilling its No. 5 well, and is down 400 ft. The Jackson Oil Company has started its first well. It is stated on good authority that both the Southern Pacific Railway and the Guffy Petroleum Company are negotiating for the purchase of the Sour Lake Springs Company wells and holdings, and that the consideration named is in the vicinity of \$1,000,000.

JEFFERSON COUNTY.

(From Our Special Correspondent.)

The large pipe lines of the Burt Refining Company, from its plant to Spindletop, have been completed, and work has been started on the 8 and 6-in. lines to Sabine.

Beaumont Oil-Field.—Salt water is greatly agitating well owners, and opinions are divided as to the source of the trouble. Many of them assert that it is not increasing and that the plugging of 5 wells in block 39 which never produced any oil, which is to be done at once with the money being raised by subscription, will banish the evil. They also find consolation in an analysis made by Robert Steiner, which, he claims, explodes the theory that the water comes from the Gulf of Mexico. Theories aside, the facts are that the water appeared in the deepest wells in block 38 some months ago, and has gradually risen until some 60 wells in blocks 36, 37, 38 and 39 are now pumping from 10 per cent to 100 per cent water. There may have been 410 wells drilled on Spindletop, as claimed by some persons, but there are not more than 300 that can be classed as producers, and of these not more than 100 are being pumped. Crude oil at the well brings 18c. to 20c. per bbl., and f. o. b. cars, 30c. to 45c.

PRESIDIO COUNTY.

Chinatti.—This mine, about 4 miles from Shafter, has been opened 2 years. The ore carries lead, with some silver and gold, and is hauled to the Shafter Smelter. The smelter, under the management of J. C. Schneider, has been temporarily shut down.

Presidio.—This mine is in the Chinatti Mountains, about 1 mile from Shafter. It has 2 double-compartment shafts 6 by 11 ft. These are $\frac{1}{4}$ mile apart. One is down 500 ft., and has been worked extensively. The other, opened only 2 years, has levels at 500, 600 and 700 ft. Much good ore is found at the 500-ft. level, but none below. The drifts and cross-cuts are said to amount to over 20 miles. The two shafts are connected by drifts. Sixty tons of ore per day are hauled to the Cibolo Mill and Mining Company, on Cibolo Creek, under the same management as the Presidio Mining Company. The yearly output has been regular and is reported to be more than \$300,000. The ore, which contains a good per cent of lead, is shipped to the El Paso Smelter. Oil fuel is used, 6 large tanks having been put in at Marfa, and the same number will be at Shafter. Fifteen or more wagons will do the hauling. There are now 165 men on the pay-roll of the mine and mill. James Mann is manager of the mine.

UTAH.

(From Our Special Correspondent.)

Ore and Bullion Settlements.—For the week ending October 4 the Salt Lake banks report: Bullion, \$183,500; gold, silver, lead and copper ores, \$177,400; gold bars and bullion, \$27,100; auro-cyanides, \$2,400; total, \$390,400.

BEAVER COUNTY.

(From Our Special Correspondent.)

Majestic.—A large party of shareholders escorted by President A. B. Lewis and Col. Wm. A. Farish, have been inspecting the property and improvements.

BOX ELDER COUNTY.

Century.—Leroy Hardy, this company's assayer, brought down from Park Valley to Salt Lake, last week, a gold brick valued at \$3,000, representing the final clean-up for September. The September production is given as between \$9,500 and \$10,000. The mill is running full capacity. In the northeast drift from the upper tunnel workings fully 12 in. of fine carbonate ore that will average \$80 per ton in gold are reported opened.

CARBON COUNTY.

Raven Mining Company.—This company, which is mining elaterite at Soldier Summit, has placed an order with the Salt Lake Hardware Company for an aerial tramway to deliver the product of its mines at the foot of the hill on which they are located in order to avoid the difficult and expensive wagon haul. The new tram will be about 1,250 ft. long and will reduce the cost of transportation and allow the company to increase its output.

JUAB COUNTY.

(From Our Special Correspondent.)

Tintic Shipments.—The following are the reported shipments for the week ending October 4: Mammoth, 6 cars ore; Grand Central, 14 cars ore; Eagle & Blue Bell, 6 cars ore; Gemini, 12 cars ore; Bullion-Beck, 4

cars ore; Uncle Sam, 5 cars ore; Silver Summit, 1 car ore; Yankee Consolidated, 7 cars ore; Centennial-Eureka, 21 cars ore; Ajax, 2 cars ore; Carisa, 5 cars ore; Lower Mammoth, 2 cars ore; Dragon Iron Mine, 4 cars ore; Eureka Hill, 8 cars ore.

Boss Tweed vs. Victor.—It is reported that the ground and ore in dispute, to determine the ownership of which an upraise has been made to discover the apex, will go to the Victor. The workmen are about 30 ft. from the surface and are said to be 30 ft. over the line on the Victor's side.

Bullion-Beck vs. Eureka Hill.—This damage suit is now before P. L. Williams, referee. Arguments have been made by P. J. Farnsworth, Jr., for the plaintiff, and Judge W. H. Dickson, while Geo. Sutherland represented the defendant. The contention has been one of trespass, which each side does not deny, but the defendant claims a misunderstanding concerning boundaries long ago mutually agreed on.

Mammoth.—A test case will probably come before the courts to find out the force of the State law that forbids any company forcing its men to board at any particular hotel or boarding house, company or otherwise. This company has let out somewhere near 30 men who have gone to a new hotel. The claim is made that the company has been violating the law for some time.

Victor.—This Tintic property reports a new discovery of copper ore south from the 400-ft. level, in a drift. The vein has been followed but a short distance and has widened to 3 ft.

SALT LAKE COUNTY.

(From Our Special Correspondent.)

Bingham Shipments.—The following are reported from the Taylor & Brunton sampler: New Red Wing, 2 cars ore; New England Mining Company, 1 car ore; United States, 3 cars ore; Ben Butler, 2 cars ore; Phoenix, 3 cars ore. From Alta the City Rocks Company sent down 1 car ore, and the Silver Queen, of Cottonwood Canyon, 1 car ore.

American Smelting and Refining Company.—This company has put in commission 2 more furnaces, making 6 in use in the new plant and 4 at the Germania. The whole number have treated 1,400 tons of ore as a day's record.

Sampson.—This Bingham property has begun concentrating the second-class lead ores. The first lot of concentrates has reached the samplers. The Dewey Mill, in Bingham Canyon, does the work.

United States Mining Company.—Fire has been lighted under the first of the 5 furnaces to dry it; the others will follow soon. Ores continue to pile up in the bins from the Centennial-Eureka. Bingham ores will soon be coming in.

SUMMIT COUNTY.

(From Our Special Correspondent.)

Park City Shipments.—The output, as reported by the Mackintosh sampler, is as follows for the week ending October 4: Daly West, 3,089,220 lbs. ore; Ontario, 1,294,130 lbs. ore; Anchor, 212,390 lbs. ore.

Stockton Shipments.—The Ophir Hill reports 7 cars of concentrates shipped during the week ending October 4.

Black Diamond.—The property, close to the Honorine, at Stockton, has temporarily abandoned the attempt to get below the water level until the big tunnel of the Honorine drains the ground, and work will be confined to the upper levels until then.

Keystone Company.—The outbuildings are ordered built. The location of the shaft is chosen, and Superintendent Harrington, of Park City, is in charge.

Mackintosh Sampler.—The engine and boilers of the new mill are in place, and nothing prevents an early start but the wait for machinery from the East.

New York Bonanza.—This company has secured the Richmond claim, the only ground that separates it from the Naildriver. The sum of \$5,000 is reported paid for the claim.

Ophir Queen.—Judge Cherry has interested Illinois men in the purchase and development of this property, in Ophir Canyon, adjoining the famous Ophir Hill. Hoists, compressors, drills, etc., are on the ground, and work is going on steadily. Ore is being found at same depth as in the Ophir Hill.

Park City Gold and Silver Mining Company.—This new company has been formed to work 5 claims on what is known as the "southern tier," overlooking Bonanza Flat, at Park City. The capitalization is 300,000 shares of \$1 par. Geo. Romney is president; Willard Thompson, vice-president, and C. B. Stewart, secretary and treasurer. These, with J. W. West and Geo. Romney, Jr., will serve as directors. I. S. Free will be superintendent.

St. Lawrence Group.—W. M. Wantland has returned from Butte, Mont., whither he went to secure a remaining interest in this property, held by Geo. G. Tate.

WASHINGTON.

FERRY COUNTY—REPUBLIC.

(From Our Special Correspondent.)

Apollo Consolidated Mining Company.—The California Mine is turning out the usual average of ore. E. R. Delbridge, the superintendent, is preparing to open the Apollo and Mormon groups, near the Mountain Lion Mine. The Apollo has a tunnel in 350 and another one in 70 ft. The Mormon has a 50-ft. tunnel.

Black Tail.—Two men are cross-cutting the main vein north from the tunnel.

Blue Horse.—This mine is 2 miles south of the California. Considerable surface work shows ore running from \$20 to \$150 per ton in gold and silver, with a little copper and lead. Exploration work is suspended to build a wagon road up the south fork of the San Poil River to the mine.

Golconda.—On this group, owned by Dr. A. R. Le-doux, of New York City, work for this year is under way.

Quilp.—The Republic & Kettle River Railway Company has track laid to the mine.

Republic Gold Placers.—A. E. Mathewson, H. A. Atcherson, of Wisconsin, and Dr. A. F. McLeod, of Spokane, Wash., have made the last payment on the Ruby claim and secured options on the Blue Jay and Old Joe adjoining. Other claims further down the stream are sought. The object is to work all the claims by hydraulicking. The use of the flume and water right of the Republic Power and Cyaniding Company has been secured for 1 year.

Trail & Tenderfoot.—Work has been resumed, driving on the vein in the main tunnel.

KING COUNTY.

Lawson.—An explosion 1,400 ft. from surface in the south end of the 4th level of this coal mine, at Black Diamond, badly wrecked that part of the mine, killed 4 men and injured 3 others. The mine is owned by the Pacific Coast Company.

WEST VIRGINIA.

Coal Miners' Strike.—The strike in the regions shipping to tidewater practically fizzled some time since. In the Kanawha Valley, where the men have been holding out, it is stated that 17 operators have granted a 9-hour day and agreed to pay every 2 weeks, and each mine is to have a check weighman. This virtually settles the strike in West Virginia. The miners apparently did not gain much since the concessions granted by the operators were not considered of importance, while the miners have not secured the recognition of their union.

MERCER COUNTY.

Pinnacle Coal and Coke Company.—W. A. Wal-bridge, of New York City, and a company of coal operators of Lonaconing, Md., have purchased 5,000 acres of big vein coal land at McComas, and will greatly increase the capacity of the mine. The deal includes 65 houses and the same number of coke furnaces. The price in the transaction is not known.

FOREIGN MINING NEWS.

AFRICA.

RHODESIA.

The gold production for August is reported at 15,747 oz. crude. For the 8 months ending August 31, the total was 130,122 oz. crude, against 112,028 oz. for the corresponding period in 1901; an increase of 18,094 oz., or 16.2 per cent. The total this year was equal to 115,808 oz. fine gold, or \$2,393,751.

CANADA.

BRITISH COLUMBIA—CASSIAR DISTRICT.

British American Dredging Company.—O. T. Swit-zer, general manager of this company, accompanied by W. J. Robinson, of Philadelphia, Pa., is at Atlin perfecting plans for putting in a dredge on the Race Horse and Feather hydraulic leases on Pine Creek. It is stated that a contract has been placed with the Bucyrus Company of South Milwaukee, Wis., for a ladder dredge of large capacity, to be operated by a 500-h. p. electric plant, the surplus power to be used for lighting Atlin and Discovery.

Carmichael & Moran.—These parties have been working with a small hydraulic plant on Otter Creek this season, and have opened an old channel that carries good values in coarse gold. Work will continue all winter.

Senator Mining Company.—Mackenzie & Ray have sold out their interests in the property on Boulder Creek, near Atlin, to their partners, Grant & Black, for \$6,000 cash. A yield of \$15,000 is reported from a cut 125 ft. long, 10 ft. wide and 22 ft. deep. The company is putting in a drain ditch 400 ft. long and 22 ft. deep. Drifting will continue all winter. T. Rayl is manager.

Societe Miniere.—This French Company is clean- ing up its flumes and sluices for the season.

Spruce Creek Diggings.—A 3,000-ft. flume, com- pleted the past summer by E. M. Bannon, crosses the creek at a height of 45 ft. and supplies water to the McNichol, Walker, Ferguson, Clay and Bannon prop- erties, where work has been active. On the upper part of the Woodbine a tunnel of 145 ft. and a cross- cut of 165 ft. have been run by Mr. Gould and his as- sociates. The flume was not completed till August, but the gravel from the Woodbine washed since then yielded \$8,000.

BRITISH COLUMBIA—ROSSLAND DISTRICT.

Rossland Ore Production.—Shipments from Rossl- and for the week ending September 27 and for the year to date are as follows, according to the Rossland Miner:

	Week.	Year.
Le Roi	4,125	169,000
Le Roi No. 2	1,344	49,069
Centre Star	1,680	12,110
War Eagle	1,170	5,466
Rossland Great Western		2,400
Giant	180	2,325
Cascade		300
Columbia-Kootenay		30
Bonanza		30
Velvet	60	630
Spitzee		20
White Bear		5
Totals	8,569	241,545

BRITISH COLUMBIA—SLOCAN DISTRICT.

Montana Mining Company.—This company has shipped the machinery for a 50-ton concentrator 2½ miles, from the Blue Bird Mine at Deer Park. The stock is owned by Ontario people. At present the company is only working a small force. William Lam- bert is president and general manager of the com- pany.

(From Our Special Correspondent.)

Calumet & British Columbia Gold Mining Company.—This company, of Nelson, B. C., has been organized by Houghton County, Mich., men with a capital of \$500,000, divided into \$1 shares. The company has purchased the Eva group of free-milling gold prop- erties in Fish River Camp. Fully 2,000 ft. of develop- ment work is reported done.

BRITISH COLUMBIA—VANCOUVER ISLAND.

Crofton Smelter.—The copper smelting plant at Crofton is now in blast. H. C. Bellinger is assistant manager and chief metallurgist. The Garrettsen furnace is used.

NOVA SCOTIA—CAPE BRETON.

Dominion Coal Company.—This company's coal shipments for September were 313,947 tons, the larg- est on record for one month. For the 7 months of the fiscal year, from March 1 to September 30, the total shipments were 1,840,069 tons, against 1,536,594 tons in the corresponding period in 1901, and 1,226,500 tons in 1900.

NOVA SCOTIA—GUYSBORO COUNTY.

(From Our Special Correspondent.)

Blue Nose Company.—This company, at Golden- ville, has for several months confined its work largely to development, several new lodes having been dis- covered by a cross-cut north from the 300-ft. level. All the new lodes carry good values. September milling of 1,000 tons of ore yielded 276 oz. gold, value \$19.80 per oz. Extensive surface improvements are being made at this mine.

Dolliver Mountain Mining Company.—The 2 large reservoir dams from which the company obtained power for the mine and mill have gone out, entailing a heavy loss and retarding work materially for some months. The development done has been satisfac- tory, a large saddle ledge some 30 ft. thick at 150 ft. depth having recently been cut. This ledge or belt of ore is 1½ miles west of the Richardson and of the same formation, both are low grade, \$2 to \$6, ore.

Nova Scotia Mining Company.—This company, that owns 160 acres in the center of Goldenville Dis- trict, has begun erecting a large sinking plant on the Palmerston belt.

Royal Oak Company.—This mine, in Goldenville District recently opened several new lodes showing high values. The last mill returns are 277 oz. from 400 tons of ore. The company is enlarging its plant by the addition of a 10-drill air compressor, a large rock breaker, a large new boiler in the mill and 10 stamps.

NOVA SCOTIA—HALIFAX COUNTY.

(From Our Special Correspondent.)

Harrigan Cove District.—A find of extraordinary richness has recently been made on the property of Archibald & Co., a few tons through a little 5-stamp mill yielded some 370 oz. of gold, besides several hun- dred ounces in specimens retained. The permanency of the find has not been determined.

Renfrew District.—The Thompson Brothers are again operating their mine, having been successful in the courts and established their sole ownership. This mine bids fair to maintain its former phenomenal

yield, the last 60 days with the work of 15 men giving 750 oz. from 200 tons of ore.

Warwick.—This company, in Renfrew District, has recently completed the erection of a modern 10-stamp mill.

MINING STOCKS.

(Complete quotations will be found on pages 504 and 505.)

New York.

Oct. 9.

Notwithstanding easier money rates speculation in the stock market is dragging, in the hopes that out- siders will come forward at present low prices. The copper stocks are weak, and show comparatively small trading. Gold and silver securities are only in lim- ited demand, as Western markets are slow to respond to the efforts of the bullish element.

Amalgamated Copper sold in small lots at \$64¼@ \$62¾, while Anaconda, with transactions in a few hundred shares, weakened to below par, of \$25. The curb coppers have their supporters, but public buying is on a narrow margin. United of Montana sold down to \$29½, later recovering to \$31, but few share lots were offered. Greene Consolidated, of Mexico, hovers around \$25½, with the tendency downward. Tennes- see touched \$16½ without attracting attention. White Knob, of Idaho, holds at \$17½ on inside trad- ing. British Columbia sold at last week's range of \$6@8½%. Montreal & Boston brings \$2¾@2½%. Union, of North Carolina, is at a standstill at \$27%.

On sales of 300 shares Bamberger-De Lamar Gold, of Nevada, brought \$10¼@10½.

The Colorado gold stocks have not been materially affected by the smaller output of the Cripple Creek District in September, as it is known that the month was shortened by the Labor Day celebration. It is gratifying to see so many lessees at work who pay good royalties to companies with stockholders in the East and elsewhere. Portland continues to sell at \$1.90. Elkton and Isabella are only a few cents apart, the former selling at \$2@35c. and the latter at 20@30c. A year ago the difference was at least \$1 in favor of Elkton. Both stocks have been dividend payers, Isabella having declared 33 per cent on its capital stock of \$2,250,000, and Elkton, about 56 per cent on a stock issue of \$2,500,000; but neither has paid in months.

Ontario Silver is up, selling at \$9.

Comstocks are dumpish. Consolidated California & Virginia sells at \$1.05, and Ophir at 95c.

Auction sales were 210 shares Doe Run Lead Com- pany, of Missouri, par \$100, at \$115 per share; 700 shares St. Joseph Lead Company, of Missouri, par \$10, at \$17.75 per share; 5,000 shares United Verde Extension Gold, Silver and Copper Company of Ari- zona, at \$39 for the lot; 5,000 shares Peuetecito Cop- per Company, of Delaware, at \$31 for lot.

Boston.

Oct. 7.

(From Our Special Correspondent.)

Dominion Iron and Steel has been practically the only feature in this market the past week, with its \$15.50 break to an even \$50 to-day. Of this drop \$12 occurred in the past 2 days, and represents a whole- sale liquidation. The decline has been steady, with no recovery at all. Stop orders have been reached at times, which has accelerated the declining market. The stock has done just what has been looked for ere this. The two Canadian elements have been clashing for some time, and the Montreal clique has finally won out. Dominion Coal has sympathized to a de- gree, but dealings of the latter have been light. Those of Dominion Iron have been exceedingly heavy. Do- minion Coal rose \$9.25 last week to \$135.25, but broke to \$124, closing at this price to-night.

Copper shares have been extremely dull, and reflect the general conditions of the metal market itself. Prices, as a rule, have yielded, but not enough to call for extended comment. Copper Range Consolidated and Mohawk are the only buoyant stocks, while United States Mining continues to be absorbed as it is of- fered. Without doubt the coal strike and firmer money has tended to restrict the demand for the metal, while the production in the Lake district continues to increase steadily. The present monthly output of that district is about 7,000 tons, which is shipped East as fast as it is smelted. That something is brewing in Copper Range there is no doubt. Consolidation with Trimountain has been mentioned, while in some quar- ters it is reported that large interests are looking for the railroad, which is owned by the Consolidated Company through stock ownership. The stock ad- vanced \$3.12½ to \$59.87½, reacted to \$56.50, and recovered to \$58. Mohawk rose \$2.75 to \$47.75, re- acting to \$46. United States has varied from \$21.75 to \$21. Calumet & Hecla has lost \$15 to \$520 on very limited dealings, but Tamarack holds steady around \$170@165, and Osceola around \$57. Utah has fluctuated from \$20.50 to \$21, and sales of Quincy have been made at \$130@125. Bingham has yielded to

\$28.25, United States Coal and Oil to \$14, Massachusetts to \$15 and Trinity to \$10.

President Thomas W. Lawson, of the Trinity, has issued a circular in which he states that the work is being concentrated on the Shasta King and the Lost Desert groups, it being the endeavor to open up in substantially one place the ore deposit rather than to open up other deposits known to exist, until the smelter is in full operation. The company has erected 30 buildings. Owing to the unsettled condition of the metal market, plans to consolidate or purchase a property in full operation have not been consummated. Including the main working tunnel of 1,145 ft., 7,230 ft. of development work has been done underground. In addition, 5,119 ft. of diamond drill work has been accomplished. The general manager estimates 500,000 tons of ore is in sight and blocked out, besides what is on the dumps.

Colorado Springs. Oct. 3.

(From Our Special Correspondent.)

A listless market with declining prices and contracted trading is the state of affairs this week. While the camp maintains an average production approximating \$1,750,000 a month, there is little in the general situation to warrant any prediction of a marked improvement in mining shares in the immediate future. As has been said repeatedly in previous letters, the water problem in Cripple Creek will have to be solved before mining shares will regain any considerable portion of the value that they have lost in the last 18 months. An honest effort is apparently being made to solve the problem, and a strong committee is at work devising the best plan to be followed. But in view of the fact that any deep drainage tunnel that will permanently solve the water question will require from 2 to 3 years before becoming available, it is apparent that some temporary mode of relief must be devised. Outside the incidental pumping being done by a few of the big mines, no impression can be made on the water which is threatening to drown the lower workings of some of the big mines, for at least 6 months to come. This will doubtless be a disappointment to many well wishers of Cripple Creek in the East, and this conclusion is only arrived at upon the developments which have occurred during the past 2 or 3 weeks in connection with the water question.

Elkton declined gradually during the week, selling down from 37c. on Saturday last to 34 $\frac{3}{4}$ c. to-day. The board of directors this week canceled the order for the 2 1-000-gal. pumps which were being built by an eastern shop, as the present pumps are totally inadequate to handle the present flow of this mine. El Paso was one of the bright spots on the market this week; the stock sold from 70c. to 73 $\frac{1}{2}$ c., touching the high point to-day. Vindicator was another cheering trader this week, selling at \$1.10 yesterday; the closing quotation to-day being \$1.02 bid, with \$1.10 asked. Isabella declined this week, selling from 36c. down to 34c., with no new developments at the mine. Portland lost from \$1.95 to \$1.88, recovering to \$1.90 to-day.

Frederick W. Baker and other officials of Stratton's Independence, Limited, of London, arrived in Denver this week, and announced that their corporation would institute legal proceedings for \$5,000,000 damages against the estate of W. S. Stratton. While the case has created a sensation, it is not believed in Colorado mining circles that any claims can be substantiated.

Salt Lake City. Oct. 4.

(From Our Special Correspondent.)

This week the whole tendency must be called a receding one. With the exception of 4 stocks, all on the board register a lower limit of variation in price than was shown on the tables of last week. The volume of business was very near as large, however. The most active traders this week have been Carisa, which placed 11,600 shares at 20@18c.; Consolidated Mercur, 16,550 shares at \$2.02@1.98 $\frac{1}{2}$; May Day, 37,500 shares at 22 $\frac{3}{4}$ @18 $\frac{1}{2}$ c.; California, 87,300 at 42 $\frac{1}{4}$ @34 $\frac{1}{4}$ c. Among those moving up a point or two is the Sacramento, 6,100 shares at 27 $\frac{3}{4}$ @24c.; Star Consolidated, 300 shares at 16@13c.; Grand Central, 500 at \$5.90@5.65; Victor, 6,000 at 32@21 $\frac{1}{2}$ c. This last stock has made a gain of 7 points, having advanced steadily all week from the opening. The Wash, of Park City, records 22,400 at \$2.44@2.31. The Daly, the Daly West and the Daly-Judge have recorded a dropping away for some reason.

The Exchange closed on sales of 347,485 shares, which brought \$205,149 for the week.

San Francisco. Oct. 4.

(From Our Special Correspondent.)

Business was light this week, and a lower range of prices obtained for most stocks. Caledonia was about the only exception. The little spurt in Potosi last week did not last, and this week the stock dropped back to about the old figure.

Consolidated California & Virginia sold at \$1.05@1.10; Ophir, \$1; Caledonia, 98@99c.; Confidence,

68c.; Mexican, 27@28c.; Best & Belcher, 13c.; Overman, 11@12c.; Potosi, 8c.

On the Oil Exchange business was quiet, and prices showed very little change. Sterling sold at \$1.65@1.70; Junction, 17c.; Occidental, 13c.; Independence, 5@7c. The largest dealings were in Independence and Junction.

London Sept. 28.

(From Our Special Correspondent.)

The South African mining market has been put into a great flutter by the claim made by the British income tax commissioners for income tax on the whole of the profits of the De Beers Company. To understand the position correctly, I may say that under English law the whole of the profits of companies with their headquarters in London, though trading in any part of the world, are liable to assessment for income tax, while companies with their headquarters abroad and with sub-offices or special agencies in Britain are liable for assessment on the profits made by trading in Britain and on dividends distributed to shareholders in Britain. Up to the present time it has always been held that the De Beers Company had its headquarters at Kimberley, as the company is registered under the laws of Cape Colony, and the chief business is obviously at the mines. The London office is used for the distribution of dividends to English shareholders, for the purposes of transfer of shares, and for the general convenience of the officials and shareholders, and cannot be said to have any productive value. The claim of the income tax commissioners on the other hand is that the London office is really the head office, and that therefore the company is liable for income tax on the whole of its profits. The claim is of course to be contested in the courts for the principle is of wide application. All of the South African companies registered locally will be liable to pay full tax in England, though their business is not in Britain, and in many cases their shares are chiefly held in Germany and France, for practically every South African house has a London office. Presumably also such companies as the Broken Hill Proprietary, whose head office is in Melbourne, and which has a London office, will be pounced on in the same way. In America there is a mistaken idea that England is full of tyranny and oppression, but as a matter of fact it is really a free country, and the only tyrant is the income tax commission. In the present case I can hardly see that the courts can uphold the commissioners' claims. The move has had a very disturbing effect on the South African market, which for a long time has been in a very depressed condition, and could have done well without another cause for grumbling.

Numerous American oil properties from the southwest are from time to time being introduced in London, but with the exception of those handled by the Samuels they do not get into very influential circles. A company of this sort that has been a good deal advertised lately is the Alameda Oil Company, which has been formed to take over some 20 acres of land in the Sunset Oil district in Kern County, California. The company has a fair amount of cash capital, and the wells so far sunk are yielding an oil rich in asphaltum. Some news from the spot would be of interest to shareholders here, as the directors paint the story in bright colors.

COAL TRADE REVIEW.

New York. Oct. 10.
ANTHRACITE.

President Roosevelt's attempt to settle the strike and the efforts of politicians to get some personal gain from its settlement have so far accomplished little except to show that recognition of the United Mine Workers is the sole issue involved. Governor Stone's action in calling out the entire Pennsylvania militia is believed to be due to political motives rather than to an intention to repress all violence and intimidation in the coal regions at whatever cost. Still, if reports are to be trusted, the position of Mr. Mitchell and the leaders of the Mine Workers is weaker, and the fact that the various locals in the anthracite district have voted "unanimously" to hold out counts for little since the reported action does not necessarily represent the real feelings of a large majority of the strikers. If there is an end to violent acts and the men who want to work feel that they can without endangering themselves or their families the strike will be broken in short order.

Mild weather has taken some of the urgency out of the demand, but prices all over the country are at a very high level for the simple reason that the market is bare. In Lake Superior territory, at Chicago, along the lower lakes and at Atlantic seaboard points the story is the same. At the head of the lakes but about 3,000 tons of anthracite have arrived since May 16, and present indications are that the shortage at the close of navigation may exceed 300,000 tons. At Chicago what little anthracite has arrived recently has been picked up among dealers at out-of-town points

who have been willing to let it go at the prices offered. Still householders object to paying \$14@15 for anthracite, and instead of it are preparing to burn wood and soft coal. Much the same is true of consumers along the lower lakes, and in Canadian territory. Consumers at points on or near the seaboard have felt the scarcity of anthracite most—first because they have been educated to regard anthracite as a necessity rather than a convenience, and second because of the short supply of bituminous available and the consequent high prices. If bituminous coal falls to \$4 f. o. b. New York Harbor shipping ports, the talk about Government ownership of the anthracite mines and the iniquities of the Coal Trust will be amazingly less.

We note these retail prices: Lincoln and Omaha, Neb., \$15; Duluth, Minn., \$8.50; Utica, N. Y., \$17; Boston, \$20; Bangor, \$15; New Haven, \$15; New York, \$20@25; Richmond, Va., \$10.

BITUMINOUS.

In the Atlantic seaboard bituminous trade the speculative market is weaker than for 10 days. Speculative prices for Clearfield grades range from \$8 to \$8.75, f. o. b. New York Harbor shipping ports, and there are rumors of coal being offered for below \$8. There are two reasons for this weakness in the speculative market. In the first place the high prices along the seaboard have started coal shipments from outside points. Thus Canadian coal and even coal from Europe is reported on the way or under contract. If the total amount thus covered does not amount to over 200,000 tons, yet the knowledge of its coming has taken the scare out of the market and checked any tendency toward higher prices. Again a lot of coal from fields west of those that ordinarily ship to tidewater may be expected to come in if prices stay up, since the additional rail freight cuts little figure with the speculative market offering such inducements for shipments as those of the past week. A second reason for lower prices is that many industrial plants will not pay \$8 and \$9 for coal, but will close down first. A number of such, including one or two large smelting concerns, may be cited at New York Harbor points. In fact many industrial plants have notified the concerns supplying them with coal that \$4.50 is about as much as they care to pay, and coal at higher figures is not wanted. The market is somewhat nervous yet, thus last week the announcement of a possible settlement of the anthracite strike through President Roosevelt's intervention resulted in prices tumbling from \$8 to \$6.

In the general trade operators with few exceptions are taking care of their contracts very well and fully up to their ability considering the car supply. As regards this factor, it may be said that the general sentiment of the trade is that the matter is still up to the Pennsylvania Railroad in spite of excuses offered, such as the Grand Army of the Republic reunion at Washington, the movement of troops and the old excuse, lack of motive power. These excuses are generally called weak, and the poor car supply is attributed to inefficiency or some reason that the railroads do not care to give out. The statement is made that it is in the power of the railroads, by furnishing more cars, to put the price of Clearfield grades down to \$4 f. o. b. New York Harbor shipping ports. From present indications, when the anthracite strike is over and cars are wanted to get a lot of anthracite forward in a hurry, bituminous producers will find themselves left high and dry.

The speculative market in the far East and along Long Island Sound is not as hungry for coal at high prices as it has been, but there is still considerable speculative demand at New York Harbor points. In the all-rail trade conditions show little change from last week. Those concerns with good storage capacity have more or less coal and are not troubled much; other concerns that buy from hand to mouth are badly off.

Transportation from the mines to tidewater is fairly prompt, coal coming through in a week. Car supply has been continuously poorer than during any week this fall, and probably has not averaged better than 40 per cent of the demand. Seizures of coal in transit or standing at tidewater, amounting to 10 or 15 cars at a time here and there, have made trouble for operators and strengthened the speculative market. The tonnage actually seized has been of less importance than the result of seizures in making operators uncertain whether they would be able to fill a certain order or not.

In the coastwise vessel market the larger vessels are fairly plentiful at the lower ports, while few, if any, smaller vessels are to be had. Freight rates vary to the extent of 50@75c. per ton, according to whether or not charters call for prompt loading. We quote, for usual dispatch, from Philadelphia as follows: Providence, New Bedford and Long Island Sound, 55@60c.; Boston, Salem and Portland, 65@70c.; Wareham and Portsmouth, 70c.; Lynn, 80@85c.; Newburyport, 80c.; Bath, 75@80c.; Gardiner, 90c.@95c., with towages; Bangor, 85@90c. Rates from the further lower ports are 10@25c. higher than above figures.

Birmingham. Oct. 6.

(From Our Special Correspondent.)

There is trouble in the mining districts of Alabama, and the production has been decreased considerably during the past week. The United Mine Workers of America in the employ of the Tennessee Coal, Iron and Railroad Company suspended work at all the mines in the Pratt Division last week, and this week the work is to be suspended in the Blocton and Blue Creek divisions. If the orders of the president of the district organization are carried out between 4,000 and 4,200 men will be idle. The trouble is as follows: The United Mine Workers called on the Tennessee Coal, Iron and Railroad Company to collect from every miner in their employ the sum of \$1 per week for the anthracite district strikers. The company refused to collect this amount except from such men as signed an order to that effect. The company appears to be determined in its stand, and the miners say they have precedence and that the company should collect from everybody when a majority is willing. The company claims that it has no legal nor moral right to make the collection without consent of the men from whose earnings the amount is to be deducted. The production is off considerably, something like 7 mines losing almost the entire week, and now 6 more are to be added. It is believed that the differences will be settled shortly. The press is not with the miners.

The manufacture of coke is becoming an important matter in this district, and preparations are being made to increase the output of this commodity considerably. No less than 1,000 coke ovens are either in the course of construction or being contracted for. The Central Coal and Iron Company will erect 300 by-product coke ovens at Holton, in Tuskalooza County, the Smet-Solvay process to be employed. The De-Bardeleben Coal and Coke Company, in Tuskalooza County, is figuring on the erection of 300 coke ovens.

The Sloss-Sheffield Steel and Iron Company has been assured that the 200 ovens at the Flat Top Mountain mines will be completed by Christmas. Contractor J. M. Meighan asserts that he will be able to turn them over by the middle of December, or shortly thereafter. Several other companies are preparing to build ovens also so as to relieve the pressure.

Chicago. Oct. 7.

(From Our Special Correspondent.)

Wholesale coal business continues to be very good. Retailers and consumers of large quantities of steam and domestic grades are laying in stocks for the winter, and prices have advanced notably for Illinois and Indiana coal—the only kind now to be had in any quantity. Hocking, West Virginia and Pittsburg coal is out of the market, owing to the shortage of cars everywhere complained of. Maryland coal is very slow in coming forward. Smithing coal shares the fate of the smokeless grades in being unobtainable, though nominally quoted at \$6@87. There is a lively sale for such cannel coal as can be had at \$8. Indiana and Illinois grades bring \$3.25@4 in Chicago.

To all appearances there will be no relief from the car shortage during the winter, and nobody is planning on the possibility of getting anthracite before spring. Instructions as to the burning of bituminous are being issued by dealers, and makers of stoves are flooding the market with new patterns of stoves, all warranted to burn bituminous freely.

An inquiry is to be made by a committee of Chicago Aldermen, aided by Mayor Harrison, into the advisability of the city's establishing coal yards at which the products of Illinois mines may be sold to citizens at cost. It is proposed to use the city's existing yards for the purpose, thus making no large permanent investment necessary.

Reports from Milwaukee and the Northwest indicate that there is less likelihood of shortage of bituminous coal there than in Chicago, because supplies by boat have been larger. Every wholesale dealer in this city and the region supplied by it, however, looks to see much trouble everywhere before the winter is over, on account of car shortage. On account of this apprehension, stocks of rail coal are being accumulated generally.

Cleveland. Oct. 8.

(From Our Special Correspondent.)

The coal situation is increasingly distressing. The demands upon the sources of bituminous supply are so numerous and varied that the shippers are in somewhat of a quandary as to which market to supply. They are inclined, however, to take care of their regular customers, except in those instances where the new markets are offering much better prices than it is safe to ask here. The competition of the outside buyers, however, is strengthening the market at home and public sentiment alone is preventing an almost abnormal advance in prices. Even as it is the quotations have been jumping. The domestic situation is such that many of the shippers by lake have given up hope of mending their year's movement this fall, and will go into the winter with a shortage of coal at the upper lake docks. A good deal has been said

along this line, but it is apparent that the bituminous coal shipment has not been so much less than last year as has been popularly supposed. The complete absence of anthracite coal shipment has added to the impression that the coal has been going forward slowly. This, too, is emphasized by the fact that there was need for more coal up above this year than customary. The shortage in the Eastern district has become so pronounced that for the first time in years Cleveland is now shipping bituminous coal by lake to Toronto and other Canadian ports. Some of the boats coming out of Buffalo are running with a minimum amount of coal possible for fuel, because they can get little or none. Adding to all of this distress the car supply is getting shorter and shorter, and railroad men say they have never seen a time when they came so far from meeting the demand for equipment.

Pittsburg. Oct. 8.

(From Our Special Correspondent.)

Coal.—The situation, so far as transportation facilities are concerned, has never been so bad as this week. Monday always has been a good day for railroad cars, as they were rounded up on Sunday, and there was a full supply at all the mines in the district. During the rest of the week the number of cars furnished ranged from 50 to 75 per cent of the number required. On Monday of this week not more than 50 per cent of the cars needed were sent to the mines, and yesterday the supply was not more than 33 per cent. To-day many mines are closed for lack of cars. Inquiries continue to come in for coal for Eastern shipment, and fancy prices are offered. For run-of-mine coal that has been sold at \$1.35 a ton at the mine \$4 and \$4.50 is offered. None is being shipped, as all the coal the operators in this district can mine and ship is under contract. The mines of the Monongahela River Consolidated Coal and Coke Company continue in full operation, and about 25,000,000 bush. are loaded and read for shipment south as soon as the rivers are navigable. The waters are rising, and there may be a boating stage before the end of the week.

Connellsville Coke.—Shipments have fallen off considerably, owing to a shortage of railroad cars, but the production continues to show gains. Heavy premiums are offered for prompt delivery, but in many instances the most favorable prices are rejected, as it is impossible to ship the coke. The *Courier* in its last issue gives the production in the Connellsville region for the previous week at 265,509 tons, a gain of 159 tons. The shipments for the week aggregated 11,311 cars distributed as follows: To Pittsburg and river tipples, 3,656 cars; to points west of Pittsburg, 5,558 cars; to points east of Connellsville, 2,088 cars. This was a decrease of 811 cars.

Foreign Coal Trade. Oct. 9.

Imports are now talked of, and little or nothing is heard of exports. A contract for 50,000 tons of Welsh coal for shipment to New York has been definitely closed. Other negotiations reported are for 100,000 tons from the Tyne and for 50,000 tons of Scotch coal from Glasgow. These orders will doubtless be filled, at least in part.

Charters for Welsh coal for shipment to the United States are increasing, and a large tonnage has already been booked. Simultaneously with the growing demand ocean freight rates have been advanced about 3s. (72c.), to 8s. 6d.@9s. (\$2.04@2.16), according to receiving port and time of sailing. Higher rates are anticipated by importers, who are taking numerous small orders to make up cargoes.

Messrs. Hull, Blyth & Co., of London and Cardiff, report under date of September 26 that the general tone of the Welsh coal market remains steady, but owing to the limited amount of tonnage in dock the supply of Cardiff coal is sufficient for present requirements, hence an easier feeling in some directions. Quotations are: Best Welsh steam coal, \$3.90@4.02; seconds, \$3.78; thirds, \$3.60; dry coals, \$3.72; best Monmouthshire, \$3.30@3.42; seconds, \$3.30; best small steam coal, \$2.10; seconds, \$1.98; other sorts, \$1.80. The above prices for Cardiff coals are all f. o. b. Cardiff, Penarth or Barry, while those for Monmouthshire descriptions are f. o. b. Newport, exclusive of wharfage, but inclusive of export duty, and are for cash in 30 days, less 2½ per cent discount.

There is little change to report in the freight market. Mediterranean and eastern rates remain unaltered. South American rates are weaker. Some rates quoted are, from Cardiff: Marseilles, \$1.05; Genoa, \$1.14; Naples, \$1.08; Singapore, \$3.48; St. Vincent, \$1.62; Rio Janeiro, \$2.76; Santos, \$3; Buenos Aires, \$2.40.

IRON TRADE REVIEW.

New York, Oct. 9.

Trouble continues with deliveries of coke and production is considerably affected thereby. The short-

age of coal and the high prices in the East resulting from the anthracite strike, are also affecting business. The trade is in an unsettled condition, and many are holding back for the time.

Foreign pig iron and steel billets continue to be sold in a large way. Eastern foundries, in fact, are depending chiefly on imported iron for their present wants.

Birmingham. Oct. 6.

(From Our Special Correspondent.)

Some of the furnaces in this district continue to deliver iron on old orders. The production in this district right now is quite satisfactory, though it could be larger. The Sloss-Sheffield Steel and Iron Company has placed its No. 1 city furnace in operation again after 2 weeks' repairing. All 7 of this company's furnaces are in blast. The suspension of work at coal mines belonging to the Tennessee Coal, Iron and Railroad Company is likely to interfere a little with their pig iron production if it continues longer than two weeks. There is very little coal accumulated.

The following quotations for pig iron are noted: No. 1 foundry, \$20@21; No. 2 foundry, \$20; No. 3 foundry, \$18; No. 4 foundry, \$16.50@17.50; gray forge, \$16@17; No. 1 soft, \$20@21; No. 2 soft, \$19@20.

Furnaces being repaired are nearing completion daily, though several of them will not be ready at the time first announced they would. The Tennessee Coal, Iron and Railroad Company will hardly be ready to blow in Oxmoor Furnace before the last of November or the middle of December. A good force of men is working day and night on this furnace, and among other things the stack is being relined. Williamson furnace will hardly be ready for the torch until November 1.

There is some inquiry as to iron for delivery the latter part of the first half of next year. Beyond that period nothing is being said.

In finished iron and steel there is great activity. The rolling mills are short of hands. All departments at the mills in this district are in full operation. The Anniston mills, belonging to the Southern Car and Foundry Company, are now on double turn. A good force of hands was gathered in this district.

The strike of machinists continues at the foundries and machine shops in this district, but imported men are keeping up the work quite well. There is plenty of work on hand, and the prospects for the future are very bright.

Chicago. Oct. 7.

(From Our Special Correspondent.)

Lack of coke is still causing a general slackness in the pig iron industry. Sales of coke are readily made at \$13@14, but this price is in the case of many foundries prohibitive, even were the fuel plentiful. Consequently, the foundries are closed or running in the slackest manner possible. Many foundries, however, have contracts that will not allow stopping, and these are scouring the country for coke. One furnace at South Chicago is still closed for lack of coke; others in or near Chicago that have been closed are reported open again, temporarily at least.

Sales of iron are, perhaps, a trifle larger than last week, though small compared with those a month ago. Prices are somewhat higher: No. 1 Northern is quoted at \$24@25; No. 2 Northern at \$23.50@24.50; No. 3 Northern at \$23@24. Southern is still very uncertain; probably most sales are being made around a minimum price for No. 2 of \$20, Birmingham, or \$24.15, Chicago. Above this the price ranges \$3 to \$4 for No. 2, with No. 1 50c. higher and No. 3 50c. lower for corresponding lots as regards time and size. The above quotations are all for delivery in the second quarter of next year. For delivery this year a premium of \$3 to \$5 is readily obtained. It is hardly necessary to say that there is very little iron to be had this year.

The great scarcity of coke is affecting the People's Gas Light and Coke Company, which supplies practically all the gas used in Chicago, to such an extent that the South Chicago concerns using coke in furnaces are likely to be called upon to give up part of their coke for public use by Mayor Harrison. The Mayor has announced that he will make such a request should the situation become critical. Furnacemen appear to think such an appeal will be productive of favorable responses from the furnaces, though no definite promises have been made. The principal difficulty will be that the furnaces can hardly get any coke at all for any purpose.

Cleveland. Oct. 8.

(From Our Special Correspondent.)

Iron Ore.—The iron ore shippers are beginning to withdraw from the market as active bidders for tonnage because of the heavy movement to date and the little remaining to be done. September shipments were 3,657,080 tons, which brings the total to 20,708,610 tons to October 1. The increase to the latter date is 5,551,505 tons over the shipment to the same date

last year. Should the shippers move the same amount of material this year in October and November as was moved last year the lake movement alone would amount to 26,000,000 tons, to which would have to be added the all-rail shipment. Rates of carriage remain at 75c. from Duluth, 65c. from Marquette and 60c. from Escanaba.

Pig Iron.—The temporary banking of fires in a few furnaces in the valleys, due to the coke shortage, caused a further curtailment of production. No foundry iron is left for this year's delivery, and very little remains for the first half of next year. Some iron is being sold for delivery during the third quarter of next year. The prices are \$23 for No. 2, Valley furnace, for first half delivery and \$21 for No. 2, Valley furnace, for second half delivery. Southern irons are bringing \$18.50@20 for No. 2 Birmingham for first half delivery. Scotch No. 1 is bringing \$25.50 delivered and Nova Scotia No. 1 is quoted here at \$23.50 delivered. Some Pittsburgh jobbers sold a small consignment of bessemer this week at \$23.20. Valley furnace, for fourth quarter delivery and \$23 is being obtained for the same material for first half delivery. Association furnaces are quoting no prices for second quarter delivery. Basic producers are so far behind with their orders that they are quoting no prices for second quarter delivery. There is no material for sale now.

Finished Material.—A reduction in the price of sheets was made during the week amounting to \$5 a ton. This brought out a good volume of business. The quotations now on black sheets are 3.10@3.25c. for No. 27 one-pass cold-rolled; 2.85@3c. mill sales for the same gauge, both being considered as a basis. Bar iron prices are also off a little, as are iron bands and iron sheets. The extent of the reduction made to get business is not told. It is understood, however, that the bar iron prices have been cut about \$2 a ton. The nominal quotation is 1.80c., Pittsburgh. Bar steel prices do not change from 1.60c., Pittsburgh, for bessemer and 1.70c., Pittsburgh, for open-hearth. The supply for this year has been used up, and some of the capacity for next year has been covered. Plate sales have been confined largely to the jobbers and to the smaller mills, as the larger mills have no material left for either this year or for the first half of next year. One small mill has taken an order which entails delivery up to April 1 next year, the price being 2c. at the mill. Stock sales have been on the basis of 2.50c. at Cleveland on both universal and sheared plates. Shapes are easier, there being some uncovered capacity for the first quarter of next year, and still more for the second quarter. Inquiries are good, and the prospects for heavy business have never been better. Small mills are still selling material for this year's delivery at 2.60c. at the mill, while jobbers have been getting 2.50c. to 3c. Light rails are in good demand, with deliveries possible within three to six weeks, the prices ranging between \$39 and \$42.

Scrap.—The scrap market has been weak, with the collectors asking more than the middlemen can pay. Prices to the consumers do not change.

Philadelphia. Oct. 9.

(From Our Special Correspondent.)

Pig Iron.—The scarcity of coal is manifesting itself in many ways in the iron and steel industry, among foundries, and in many manufacturing establishments connected with iron and steel. Reports received from a number of sources to-day all show a feverish and unsettled feeling among manufacturers. Very few are willing to say openly for print just exactly how they are fixed, and where information is grudgingly given, it is on condition that names are not connected with the facts. There is a visible restriction in pig iron making, and this will probably increase in a very few days. The banking up of a number of furnaces still running is now a probability. This fact makes very little difference with buyers, because the production of all furnaces is already sold, and the strike will not last forever. Some consumers are already short on deliveries promised, and there is a curtailment of work this week from that cause, in and near Philadelphia. So far as the actual market conditions are concerned this week, there is scarcely anything new to be said. Even if coal mining is resumed our people say they will not be able to get coal for some time to come, and they are unable to see how they can continue working. The supply of coke is also seriously interrupted, and everything is in a mixed up condition. Importers, however, are kept quite busy, and are booking orders from points quite remote both East and West.

Just how much iron has been ordered abroad since writing my last report it is impossible to say, as the figures are not to be had. Quite a number of buyers are now putting in their orders, and if we are to judge by appearances the coming 2 or 3 weeks will witness the placing of an unusually large amount of iron from England and Scotland. Scotch irons range from \$23@23.50; Middlesboro iron, c. i. f., \$20@21; No. 1 American foundry, \$24@25; No. 2, \$22.50@

\$23; standard gray forge, \$20@21; basic iron is nominally \$21; low phosphorus, \$26@26.50.

Steel Billets.—Prices still remain about what they were, and the upward tendencies indicated last week have not resulted in an actual advance. No business is being done in steel billets at home sources. Considerable foreign steel is arriving, and new orders are being placed. Quotations for billets are \$27.50 for foreign; American, \$30@31.

Merchant Bar.—The situation in merchant bar is apparently unchanged, but the production has decreased. Some buyers are negotiating with Pittsburgh for steel bars, where they are able to obtain some slight advantages. Retail transactions at stores are also still increasing, and prices are away above the usually quoted figures.

Sheets.—It is impossible to give exact quotations on sheets, owing to the uncertain policy of sellers. Two or three concerns are anxious to secure business, and it is known they have made concessions to obtain it.

Merchant Steel.—In a retail way there has been quite a little boom in merchant steel since Monday because of the anxiety of a number of small consumers to have stock on hand.

Pipes and Tubes.—There is also a little additional activity this week in tubes. The buyers want small lots, and they want almost immediate deliveries. The consumption of all kinds of tubes continues to be very heavy, and the mills are doing well, although obstructed somewhat on account of fuel.

Skelp Iron.—Some inquiries have been received this week for skelp, but so far as known nothing has come from them.

Plates.—Perhaps as fair a statement as can be made to cover the plate situation is that there is a heavy demand. Manufacturers have not booked many orders this week. They have had pressing demands for quick deliveries to cover disappointments of some buyers who have not received promised plates, but this kind of business cannot be accommodated. All the mills are crowded as usual. As to quotations, ¼-in. plate averages 2c.; universals in a small way a trifle higher; flange in small lots, 2.25@2.30c.; in large lots business was done at 2.10c. this week.

Structural Material.—The badly oversold condition of the structural mills does not prevent large consumers from placing orders and getting the best deliveries they can. The other class of consumers, the smaller ones, are paying no attention whatever to the mills, are giving them the go-by, and are doing their best with the importers. A great deal of business has been done since last week in structural material, and the promptness with which importations are made is not only encouraging this sort of business, but making buyers feel very easy. Specifications have been received on a basis of 2.50c.

Steel Rails.—We have it on good authority that orders are going abroad through Philadelphia importers, and that they think they will handle a good bit of business within the next 30 days.

Old Rails.—Old iron rails are quoted as usual at \$25@26.

Scrap.—A stronger demand has broken out for heavy scrap not for immediate but for forward delivery. Certain large consumers are laying their pipes to have plenty of scrap later on in the winter. It is understood they are placing contracts at rather high prices. Heavy steel scrap is quoted to-day at \$21; railroad scrap, \$25; country scrap, \$22.50; No. 2 light scrap, \$17.50.

Pittsburg. Oct. 8.

(From Our Special Correspondent.)

The blast furnaces had just begun to recover from the severe coke famine of several weeks ago when confronted by another that promises to be attended with serious results. It was with great difficulty that furnaces were kept going throughout the week, a number operating very irregularly. The exact situation was not made public in anticipation that the movement of coke on Sunday would be large, and banking would not be necessary. Instead the smallest record of any recent Sunday was made. As a result a number of furnaces had to be banked, and the production of pig iron this week will be greatly curtailed. One cause assigned for the exceptionally demoralizing condition of affairs was the taking of locomotives out of the freight service and using them to accommodate the increased travel due to the Grand Army encampment at Washington. Prices of pig iron have advanced in consequence of the coke shortage and inability to operate the furnaces steadily. The outlook is for a remarkably strong market extending throughout the first half of next year. There is considerable inquiry for bessemer iron for 1903 delivery, but little is doing in forge or foundry iron, and prices are very firm. There is some inquiry for foreign iron, and unless domestic production improves it will be necessary to make large importations despite the fact

that foreign iron is not entirely satisfactory, and that prices are practically the same as those held by the valley furnaces. The steel mills are getting short of material, and unless better deliveries can be obtained some soon will be forced to suspend operations.

The cut of \$5 a ton in the price of sheets by the American Sheet Steel Company has resulted in bringing in considerable new business, a number of large orders having been booked during the week. Some of the idle mills of the combine are to be put in operation. The new Philadelphia works will be started on Sunday. Several of the independent mills are able to operate, as they still have some low price steel on hand. It is reported that three independent sheet plants have been offered for sale, and while it seems to be a reliable report no public announcement has been made. Some mills have gone on galvanizing sheets, as they are better able to meet the cut price on this grade than on black sheets. A heavy reduction is announced in wire and wire nails. The new prices for car-load lots to jobbers are for plain wire, 1.80c. and wire nails, \$1.90 a keg. This is a reduction from the former price of plain wire of \$4 a ton and 15c. a keg for nails. The old prices, however, were nearly nominal, having been shaded for several weeks on desirable orders.

The first meeting since spring of the plate pool will occur in New York to-morrow. It is not probable that any change will be made in prices, as the leading producer, the United States Steel Corporation, has sold up for about six months ahead. The Jones & Laughlins Steel Company is also sold into next year. Plates command premiums of from \$5 to \$7 a ton above the pool price. Specifications for steel bars are coming in from agricultural implement manufacturers, and all the mills are in full operation.

The stockholders of the Jones & Laughlins Steel Company met this morning and voted to authorize the issue of \$10,000,000 bonds. This action, however, does not indicate that the bonds will be issued. The charter of the re-organized concern, which was formerly Jones & Laughlins, Limited, and which went into effect on August 1, provided that such bonds might be issued, but the law requires publication 60 days before the stockholders can authorize the issue, and this is the cause of the delay. There is no intention on the part of the company, it is announced, to issue the bonds at once. This will be determined by the Board of Directors. So far no plans have been formulated for using the money that will be acquired by the sale. Bonds will be issued in blocks from time to time as may be decided by the board. The entire issue is authorized at once, so that all bonds may be the same lien on the property.

The Tin-plate Scale Committee of the Amalgamated Association of Iron, Steel and Tin Workers that had been in conference in New York with representatives of the American Tin Plate Company since last Monday week, returned this morning. The conference adjourned last night. No official announcement was made of the result, and will not be until the members of the association have been notified. It is believed that arrangements are being made to hold a special convention to consider the proposition of the tin-plate combination to accept a reduction of 25 per cent in wages in order to permit the company to accept orders for export trade. This business amounts to about 1,500,000 boxes annually, and if the American Tin Plate Company is enabled to compete with the Welsh manufacturers who now supply this tonnage it can put its idle mills in operation. It is estimated that fully 50 per cent of the tin-plate combine's mills are now idle for lack of orders.

Pig Iron.—The crippling of the blast furnaces by the shortage of coke has stiffened prices. A sale of bessemer iron for fourth quarter delivery is reported at \$23.50, Valley furnaces. Gray forge is firm at \$21@22 and foundry No. 2 at \$22.75@23.50, Pittsburgh.

Steel.—The steel billet market is very firm, but there is a limited demand. Bessemer billets are quoted at \$30 at mill and \$31 delivered at Pittsburgh. Open-hearth billets can be had at about the same price as bessemer. Plates cannot be had at less than 1.85c., and steel bars are still quoted at 1.60c.

Sheets.—Sales of black sheets No. 28 gauge are still being made at 2.75c. by the American Sheet Steel Company, and galvanized sheets at 75 and 10 per cent off.

Ferro-manganese.—Domestic 80 per cent is quoted at \$52.50, but no sales are noted. The foreign product continues at \$51@51.50.

New York. Oct. 10.

Pig Iron.—Prices continue at the same high level. We quote for 1903 delivery, Northern irons at tide-water: No. 1X foundry, \$22@25.50; No. 2X, \$22@23; No. 2 plain, \$21@22. For Southern iron on dock, New York, No. 1 foundry, \$23@23.50; No. 2, \$22@22.50; No. 3, \$21@22. Middlesboro pig is quoted at \$19.50.

Steel Rails.—No large sales have been reported recently. Standard sections are still quoted at \$28, f.

Gold and Silver Exports and Imports, New York.

For the week ending October 19 and for years from January 1, 1902, 1901 and 1900:

Table showing Gold and Silver Exports and Imports for the week ending October 19 and for years 1902, 1901, and 1900.

There were no gold exports; the silver went chiefly to London. Imports of gold were principally from Europe and the silver from Central and South America.

Financial Notes of the Week.

General business is beginning to be seriously affected by the anthracite coal strike. The actual scarcity of coal in the East, and the general apprehension of further trouble are hindering manufacturers and creating a state of feeling which is not at all favorable to trade.

The statement of the New York banks, including the 59 banks represented in the Clearing House, for the week ending October 4 gives the following totals, comparison being made with the corresponding weeks of 1901 and 1900:

Table comparing financial data (Loans and discounts, Deposits, Circulation, Specie, Legal tenders, Total reserve, Legal requirements, Balance, surplus) for 1900, 1901, and 1902.

Changes this week were an increase of \$583,000 in circulation, and decreases of \$1,878,100 in loans and discounts, \$4,343,100 in deposits, \$710,900 in specie, \$1,792,300 in legal tenders, and \$1,417,425 in surplus reserve.

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

Table showing specie holdings (Gold, Silver) for various countries (N. Y. Ass'd., England, France, Germany, Spain, etc.) for 1901 and 1902.

The returns of the Associated Banks of New York are of date October 4 and the others October 2, as reported by the Commercial and Financial Chronicle cable. The New York banks do not report silver separately, but specie carried is chiefly gold. The Bank of England reports gold only.

Silver has been quiet during the past week, and fluctuations have been small. No special features have developed. The Continent has not been much of a buyer, and no advance of consequence appears probable in immediate future.

The United States Assay Office in New York reports receipts of 63,000 oz. silver for the week.

Shipments of silver from London to the East for the year up to September 25 are reported by Messrs. Pixley & Abell's circular as follows:

Table showing silver shipments (India, China, The Straits) for 1901 and 1902, including changes.

Receipts for the week were £124,000 in bar silver from New York, £2,000 from the West Indies, and £6,000 from Australia; total, £132,000. Shipments were £102,700 in bar silver to Bombay, and £16,200 in coin to Australia; total, £118,900.

Indian exchange has been a shade weaker, as the demand for remittances has fallen off, and there is for the time an abundant supply of money in the Indian banks. The Council bills offered in London sold at an average of 15.9d. per rupee. Buying of silver for Indian account has been light.

The Treasury Department's estimate of the amounts

and kinds of money in the United States on October 1 is as follows:

Table showing money in the United States (Total, In Treasury, In Circulation) for Gold coin, Gold certificates, Silver dollars, Silver certificates, Subsidiary silver, Treasury notes of 1890, U. S. notes, Currency certifi., and Nat. Bank notes.

Population of the United States October 1, 1902, estimated at 79,458,000; circulation per capita, \$28.64. 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 Depositories, to the credit of the Treasurer of the United States, and amounting to \$126,102,429. The amount in circulation was \$10,753,706 greater than on September 1, and \$87,498,160 greater than on October 1, 1901.

Prices of Foreign Coins.

Table showing prices of foreign coins (Mexican dollars, Peruvian soles and Chilean pesos, Victoria sovereigns, Twenty francs, Twenty marks, Spanish 25 pesetas) with Bid and Asked prices.

OTHER METALS.

Daily Prices of Metals in New York.

Table showing daily prices of metals (Silver, Copper, Spelter) with various grades and prices.

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

Copper.—The flat tendency on the Stock Exchange and the unsettled condition of affairs in the coal regions have not failed to influence the copper market, and consumers are disinclined to cover more than their immediate requirements. Under the circumstances, transactions have been few and far between.

The closing quotations are rather nominal at 11 1/2 @ 11 3/4c. for lake; 11 1/4 @ 11 1/2c. for electrolytic in cakes, wirebars or ingots; 11 @ 11 1/4c. for cathodes; 11 1/2 @ 11 3/4c. for casting copper.

The market for standard, which closed last week at £52 7s. 6d., opened on Monday at £52 2s. 6d., and the closing quotations are cabled as £51 15s. @ £51 17s. 6d. for spot and £52 @ £52 2s. 6d. for three months.

Refined and manufactured sorts are quoted as follows: English tough, £54 10s. @ £55; best selected, £55 @ £55 10s.; strong sheets, £67 10s.; India sheets, £66; yellow metal, 6 1/4 @ 6 3/4d.

Exports from Atlantic ports in the week ending October 8, are reported by our special correspondents as follows: Great Britain, 589 tons; Germany, 445; Holland, 646; Italy, 75; France, 75; Belgium, 390; Austria, 405; Russia, 370; Norway, 16; Brazil, 2; total, 3,013 tons. Imports of copper were 428 tons, and of ores 100 tons.

The detailed statement of imports of copper and copper material into the United States for the 8 months ending August 31, as given by the Bureau of Statistics of the Treasury Department, is as follows, the figures being in long tons:

Table showing imports of copper and copper material (From Canada, Mexico, Cuba, West Indies, South America, Great Britain, France, Germany, Other Europe, Other countries) for 1901 and 1902.

The imports of metallic copper this year were valued at \$6,312,289, against \$7,694,310 in 1901; those of ore and matte at \$7,661,943, against \$9,236,770 last year.

Imports and exports of copper in Germany for the 8 months ending August 31 are reported as below in metric tons:

Table showing imports and exports of copper in Germany for 1901, 1902, and changes.

The balance represents approximately the consumption of foreign copper.

Tin has ruled quiet but steady throughout the week, and there is no news of special interest. The business transacted has been of more or less a retail character. At the close we quote spot 25 1/4c.; October, 25 1/4c.; November, 25c.; December, 24 3/4c.

The foreign market, which closed last week at £114, opened on Monday at £113 15s., and the closing quotations on Thursday are cabled as £114 @ £114 2s. 6d. for spot and £113 @ £113 2s. 6d. for three months prompt.

Lead is steady without any change. The ruling quotations are still 4 @ 4.05c., St. Louis, and 4.05 @ 4.10c., New York.

The foreign market is easy, Spanish lead being quoted £10 13s. 9d. @ £10 16s. 3d., with English lead 2s. 6d. higher.

St. Louis Lead Market.—The John Wahl Commission Company telegraphs us as follows: Lead is firm at 4c. for Missouri brands and 4.05c. for desilverized. Trading is fairly active.

Spanish Lead Market.—Messrs. Barrington & Holt report from Cartagena, Spain, under date of September 20, as follows: The price of silver during the week has been 12.75 reales per oz. Exchange has gone down by 33 centimos, making it 33.90 pesetas to £1. The local quotation for pig lead on wharf has been 59.50 reales per quintal, which on above exchange is equal to £9 17s. 1d. per ton of 2,240 lbs., f. o. b. Cartagena. Exports of pig lead have been: 606,000 kgs., to London; 443,684 kgs., to Marseilles; 101,600 kgs., to Liverpool; a total of 1,150,634 kgs. Other exports have been 1,790 kgs. silver bars to Marseilles.

Spelter is quiet but firm, and prices unchanged at 5.20 @ 5.25c., St. Louis, and 5.40 @ 5.45c., New York.

The foreign market is again somewhat firmer, good ordinaries being quoted at £19 7s. 6d. and specials 5s. higher.

St. Louis Spelter Market.—The John Wahl Commission Company telegraphs us as follows: Spelter is quiet at 5.20c. for both prompt and deferred delivery.

Spanish Zinc Ore Market.—Messrs. Barrington & Holt, of Cartagena, Spain, write us under date of September 20 as follows: Zinc ores remain the same as per last report. Exports for the week were 150 tons calamine to Hamburg.

Antimony is unchanged at 9 1/2 @ 9 3/4c. for Cookson's; 7 3/4 @ 7 1/2c. for Hallett's; 7 1/4 @ 7 1/2c. for Hungarian, Japanese, Italian and U. S. Star.

Nickel.—The price is now quoted by leading producers at 40 @ 47c. per lb., for large quantities down to ton lots, according to size and terms of order. The price for smaller lots, according to quality, runs as high as 60c. per lb.

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

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

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

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

Table showing prices for various minor metals and alloys (Aluminum, Ferro-Tungsten, Magnesium, Manganese, Alum-bronze, Nickel-alum, Bismuth, Chromium, Copper, Ferro-Molyb'dum, Ferro-Titanium).

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

Table showing Average Prices of Metals per lb., New York, for Tin, Lead, and Spelter for various months (January to December) and Year.

Average Prices of Copper.

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

New York prices are in cents, per pound; London prices in pounds sterling, per long ton of 2,240 lbs., standard copper. The prices for electrolytic copper are for cakes, ingots or wire bars; prices of cathodes are usually 0.25 cent lower.

Average Prices of Silver, per ounce Troy.

Table with columns: Month, London (1902, 1901), N.Y. (1902, 1901), Y. Y. (1902, 1901). 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, Per Share, Total. Rows: Annie Laurie, Central Coal & Coke, etc.

ASSESSMENTS.

Table with columns: Name of Company, Location No., Dnlng., Sale, Amt. Rows: Alma, Alta, Andes, Belcher, etc.

STOCK QUOTATIONS.

NEW YORK.

Table with columns: Company and Location, par, Oct. 2, Oct. 3, Oct. 4, Oct. 6, Oct. 7, Oct. 8, Sales. Rows: Amalgamated c. Mont, Anaconda c. Mont, etc.

†Assessment Paid.

Coal, Iron and Industrial Stocks.

Table with columns: Company, par, Oct. 2, Oct. 3, Oct. 4, Oct. 6, Oct. 7, Oct. 8, Sales. Rows: Am. Agr. Chem., Am. Agr. Chem. pf. U.S., etc.

Total sales, 482,499 shares.

BOSTON, MASS.*

Table with columns: Name of Company, par, Shares Listed, Oct. 2, Oct. 3, Oct. 4, Oct. 6, Oct. 7, Oct. 8, Sales. Rows: Adventure Con., Aetna Con., Allenez, etc.

Total sales, 94,774 shares.

PHILADELPHIA, PA.‡

Table with columns: Name and Location of Company, par, Oct. 2, Oct. 3, Oct. 4, Oct. 6, Oct. 7, Oct. 8, Sales. Rows: Am. Alkali, Mich., Am. Cement, Cambria Iron, etc.

‡Reported by Townsend, Whelen & Co., 308 Walnut St., Philadelphia, Pa. Total sales 11,529 shares.

STOCK QUOTATIONS.

COLORADO SPRINGS, COLO.*

LONDON.

Sept. 26.

Table of stock quotations for Colorado Springs, Colo. listing companies like Acacia, Alamo, Anaconda, Ben Hur, Black Bell, Blue Bell, C. R. & N., Dante, Dr. Jack Pot, Elkon Con., El Paso, Fanny Rawlings, Findley, Gold Bond, Gold Dollar Con., Golden Cycle, Golden Fleece, Gold Sov'n, Hart, Iron Lad, Isabella, Jack Pot, Last Dollar, Lexington, Little Puck, Mol. Gibson, Moon Anchor, Morning Star, National, Nellie V., New Haven, Pappoose, Pharmacist, Phosphate, Portland, Prince Albert, Republic, Rose Maud, Sunset Eclipse, Uncle Sam, and Vindicator Con. with columns for par value, Sept. 29, Sept. 30, Oct. 1, Oct. 2, Oct. 3, Oct. 4, and Sales.

*Colo. Springs Mining Stock Exchange. All mines are in Colorado. Total sales 253,700 shares.

Colorado Springs (By Telegraph.)

Table of stock quotations for Colorado Springs (By Telegraph) listing companies like Acacia, Alamo, Anaconda, Cripple Creek Con., Doctor Jack Pot, Elkon Con., El Paso, Fanny Rawlings, Gold Dollar Con., Golden Fleece, Isabella, Jack Pot, Last Dollar, Little Puck, Mol. Gibson, Moon Anchor, Morning Star, National, Nellie V., New Haven, Pappoose, Pharmacist, Phosphate, Portland, Prince Albert, Republic, Rose Maud, Sunset Eclipse, Uncle Sam, and Vindicator Con. with columns for par value, Oct. 2, Oct. 3, Oct. 4, Oct. 5, Oct. 6, Oct. 7, Oct. 8, and Sales.

MEXICO.

Sept. 27.

Table of stock quotations for Mexico listing companies like Durango, Ca. Min. de Penoles, Guanajuato, Angustias, Pozos, Cinco Senores y An., aviadora, Cinco Senores y An., aviada, Providencia, San Juan de la Luz, Guerrero, Garduno y Anexas, Hidalgo, Amistad y Concordia, Carmen, aviada, Ca. Real del Monte, El Encino, aviador, Guadalupe Fresnillo y Anexas, La Blanca, aviadora, La Blanca, aviada, Maravillas y An., aviador, Maravillas el Lobo, Palma y An., aviador, Sta. Gertrudis y An., aviadora, Sta. Gertrudis y An., aviadora, Santo Tomas Apostol aviador, San Rafael y An., Trompillo, San Rafael y An., aviada, Soledad, aviada, Sorpresa, aviada.

ST. LOUIS, MO.*

TORONTO, ONT.

Oct. 6

Table of stock quotations for St. Louis, Mo. and Toronto, Ont. listing companies like Am. Nettie, Colo., Catherine Lead, Mo., Central Coal & C., pf., Central Lead, Mo., Columbia Lead, Mo., Con. Coal, Ill., Doe Run Lead Co., Granite Bimet, Mt., St. Joe Lead, Mo., Center Star, Fairview, Lone Pine, Mt. Lion, North Star, Payne, Rambler Cariboo, Republic, War Eagle Con., White Bear, Winnipeg, Develop. Co., and Can. G. F. S.

*From our Special Correspondent.

Total sales, 10,500 shares. † Ex-Dividend.

Table of stock quotations for London listing companies like Anaconda, c. s., Montana, Arizona, c. Ord., Arizona, pref., ord., Arizona, Cuna., pf., Copiapo, c., Chile, De Lamar, g. s., Idaho, Enterprise, g., British Col., El Oro, g. Mexico, Frontino & Bolivia, g., Colombia, Hall Mfg. & Sm., c. s., British Col., Le Roi, g., British Col., Le Roi No. 2, g., British Col., Montana, g. s., Montana, Stratton's Independence, Colorado, St. John del Rev., g., Brazil, Utah Con., g., (High Boy), Utah, Utah, g., British Col., European, Linares, l., Spain, Mason & Barry, c., sul., Port'g'l., Rio Tinto, c., Spain, Rio Tinto, pref., Spain, Tharsis, c., Spain, Australia and New Zealand, Assoc. Gold Mines, W. Australia, Broken Hill Pr.p., s., N. S. Wales, Great Bo'd'r Pr.p., W. Australia, Hannan's Brownhill, g., W. Australia, Ivanhoe Gold Corp., W. Australia, Kalgurlye, g., W. Australia, Lake View Cons., g., W. Australia, Mt. Lyell M. & R. l., c., Tasmania, Mt. Morgan, g., Queensland, Waihi, g., New Zealand, Indian: Champion Reef, g., Colar Fields, Mysore Gold, Colar Fields, Nandydroog, g., Colar Fields, Ooregum, g., Colar Fields, Ooregum, pref., g., Colar Fields, African: British S. Africa, chartered S. Africa, Cape Copper, S. Africa, Cape Copper, pref., S. Africa, City and Sub'n (New), g., Transvaal, Crown Reef, g., Transvaal, De Beers Con., d., pref., Cape Colony, De Beers Con., def., Cape Colony, Ferreira, g., Transvaal, Geldenhuis Est., g., Transvaal, Henry Nonse, g., Transvaal, Jaegersfontein, d., Orange F. S., Jubilee, g., Transvaal, Landlaagte Est., g., Transvaal, May Con., g., Transvaal, Meyer & Charlton, g., Transvaal, Namaqua, c., Cape Colony, Primrose (New), g., Transvaal, Rand Mines, g., S. Africa, Robinson, g., Transvaal.

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

PARIS.

Sept. 18.

Table of stock quotations for Paris listing companies like Acieries de Creusot, Firmin, Huta-Bank, Anzin, Bolco, Brianks, Champ D'Or, Courrieres, Dumbrowa, Explosives, Escobercera-Bleyberg, Fraser River, Huanchaca, Laurium, Malifano, Metaux, Cie. Fran. de, Salines de Hadid, Napthe Baku, Napthe Nobel, Nickel, Penarroya, Rebecca, Salines de l'Est, Salines du Midi, and Vielle Montagne.

SALT LAKE CITY.*

Oct. 4.

SPOKANE, WASH.*

Sept. 26

Table of stock quotations for Salt Lake City and Spokane, Wash. listing companies like Ajax, Ben Butler, Bullion Beck, California, Carisa, Century, Con. Mercur, Daly, Daily-Judge, Dan-West Central, Eagle & B. Bell, Grand Central, L. Mammoth, Mammoth, May Day, Ontario, Sacramento, Star Con., So. Swansea, Swansea, Uncle Sam, Victor, West Mfg. Glory, and Yankee Con.

All mines are in Utah. *By our Special Correspondent. Total sales, 212,580 shares.

Total sales 65,000 shares. *Reported by Hunner & Harris.

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

Table listing various chemical and mineral products such as Abrasives, Barium, Barytes, Bauxite, Bismuth, Bitumen, Bone Ash, Borax, Bromine, Cadmium, Calcium, Cement, Ceresine, Chalk, Chlorine, Chrome Ore, Clay, China, Coal Tar Pitch, Cobalt, Copperas, Copper, Cryolite, Explosives, Feldspar, Flint Pebbles, Fluorspar, Fuller's Earth, Graphite, Gypsum, Infusorial Earth, Iodine, Iron, Kaolin, Lead, Lime, Magnesite, Manganese, Marble, Mercury, Mica, Nitre, Oil, Potash, Potassium, Quartz, Salt, Sulphate, Sulphur, Tar, Tin, Uranium, Zinc, and Zirconium. Includes columns for product name, quantity, and price.

THE RARE EARTHS.

NOTE.—These quotations are for wholesale lots in New York unless otherwise specified, and are generally subject to the usual trade discounts. Readers of the ENGINEERING AND MINING JOURNAL are requested to report any corrections needed, or to suggest additions which they may consider advisable.