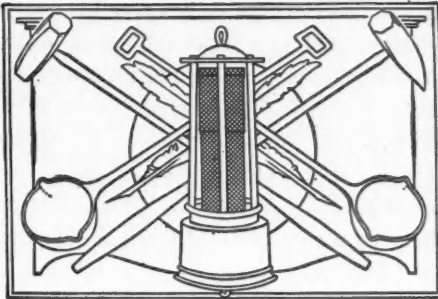


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Contents PAGE

| | |
|--|-----|
| Editorials: | |
| Copper Statistics for September..... | 747 |
| Zinc Smelting in Kansas..... | 748 |
| Progress in Publicity..... | 748 |
| Metallurgy—By the Way..... | 749 |
| Correspondence and Discussion: | |
| California Oil Dividends...Foaming of Converter Slags...Sampling Low-grade and Irregular Orebodies...Smelting Briquetted Zinc Ore...Breaking of Highland Boy Tramway..... | 750 |
| Questions and Answers..... | 751 |
| Details of Practical Mining: | |
| *Gravity Planes at Cheever Mine... *A Timber Carrier...Magnetic Particles in Copper Bullion Sampling... *Handling Coal in Low Rooms... *Shaft Plumbing...Placing Shaft Timbers... *Barrel Distributer for Concentrating Tables... *Labor and Tonnage Chart as Aid in Reducing Costs..... | 752 |
| Concluding Session of American Mining Congress...Special Correspondence | 756 |
| Annual Report of Kerr Lake Mining Company..... | 757 |
| Water Frontage on New York Harbor... Discovery of American Nettle Mine... *Economic Conditions in the Joplin District.....T. Lane Carter An Important West Virginia Gas Deal...Special Correspondence | 761 |
| Ray Consolidated Copper Company..... | 761 |
| September Dividends..... | 762 |
| Chronology of Mining for September, 1910..... | 762 |
| Minerals and Mines Department of the Appalachian Exposition.....Ray V. Myers | 762 |
| *Notes on Operations at Jarbidge Camp, Nevada.....Winthrop W. Fisk | 763 |
| *Notes on the Construction of California Dredges.....John Tysowski | 765 |
| Electrolytic Refining in Australia—II. G. H. Blakemore | 769 |
| Capitalization of Small Mines. A. W. Warwick | 771 |
| Useful Clues for the Mining Geologist. W. H. Hendrickson | 772 |
| *Facts Concerning Present Fuel Situation.....Floyd W. Parsons | 773 |
| Notes on the Coal Industry in West Virginia.....R. B. Brinsmade | 775 |
| Statistical Results of Coal Mining in Russia in 1909..... | 776 |
| Lehigh Valley Coal Company..... | 777 |
| The Fuel Situation in Texas..... | 777 |
| New Publications..... | 778 |
| Personal, Obituary and Societies..... | 779 |
| Editorial Correspondence..... | 780 |
| Mining News..... | 782 |
| Markets..... | 788 |
| *Illustrated. | |

The Copper Statistics for September

Expectations that the September copper statistics would be favorable were fulfilled. European stocks decreased 7,168,000 lb.; American, 20,087,531; total 27,255,531 lb. Since July 1 the total stock has been reduced 41,000,000 lb. This manifests, at least, a turn of the right direction in the copper situation.

The reduction in the stock in this country was due to a further swelling of the exportation, a maintenance of the domestic deliveries and a decrease in the production. The decrease in production did not reflect the curtailment by the smelters, which has not yet had time to manifest itself. It is to be ascribed to refinery conditions and the status of the stocks of crude copper among the refiners and in transit to them.

We are under no illusion as to the huge exports of September, which in part went undoubtedly into the invisible stock of Europe, but the fact remains that actual consumption in both Europe and America is going on at an unparalleled rate, and with the certainty of further decrease in the production the prospect is good for further improvement in the copper situation. The smelters' figures for August show a decrease of about 9,000,000 lb. in the production of North America as compared with July. The September figures, so far as received, are running smaller. This curtailment should begin to show in the refinery statistics for October.

The fear that has haunted producers during the last month has been the status

of consumption in this country. There has been so much talk of recession in business in general that copper manufacturing would naturally be expected to suffer along with other industries.

We have been persistently of the opinion that recession in business in the United States in 1910 has been greatly exaggerated. In copper consumption there has been no recession statistically observable.

In 1909 the deliveries were 705,051,591 lb., an average of 58,750,000 lb. per month. In the first quarter of 1910 the monthly average was 69,207,000; in the second, 60,218,000; in the third, 62,980,000. Consumption and deliveries differ as to monthly comparisons, but the statistics for the first nine months of 1910 indicate that the domestic consumption has been in the neighborhood of 65,000,000 lb. per month, which is the highest rate in the history of this country. The consumption in Europe having also been extraordinary, it is evident that the low price for copper has stimulated the use of the metal in many fields wherein it ordinarily suffers from the competition of other substances.

Copper consumption having thus more than held its own during a year of commercial disturbance and reactionary tendencies, we may expect to see it gain largely when the time comes, following this late period of liquidation, for the inauguration of new enterprises. This condition will probably create an actual need for the new production of copper that will begin to materialize in 1911, but hardly will become large until 1912. In the meanwhile a monthly decrease of 25,000,000 lb. in the accumu-

lation, which is not improbable, would in six months more reduce the total to but little upward of 200,000,000 lb., or only slightly in excess of a month's supply of the world's present requirements, and that situation would, of course, imply a higher price for the metal than prevails at present.

Zinc Smelting in Kansas

The coming winter will probably mark what will be practically the end of zinc smelting at Iola, Kan., which place for nearly a decade was the chief center of this industry. The works of the United Zinc and Chemical Company have already been abandoned. At the three works of the Lanyon Zinc Company, with their 15 furnaces, but four furnaces are now in operation, and the chances are that all of these works will be abandoned before next spring. The other smelters are limping along at reduced capacity, as well as their scanty supply of gas permits, but the end of their operations also cannot be long delayed.

Substantially the same condition exists also at Cherryvale, Altoona and Neodesha. Caney alone seems to have an ample supply of gas. The life of the other smelteries is prolonged only by extensions of pipe lines and other expedients normally accompanying the exhaustion of gas fields, which cause the fuel to be of high cost. At Cherryvale some of the furnaces are being fired with oil.

It was in 1896 that the first smelting works was built at Iola, but not until 1899 that heavy drafts began to be made upon that pool. Of all the gas pools discovered in Kansas that of Iola was distinctly the best. It has lasted for 12 years, disregarding the relatively small drain upon it previous to 1899. Smelting has been conducted at Cherryvale for about the same time. There is no other gas smelting work in Kansas that is yet 10 years old, though Neodesha and Chanute are nearly of that age.

The history of gas smelting in Kansas has been a close repetition of the experience in Indiana, where several small works were erected in 1892. By 1900 the industry in that district was practically dead, although one smelter continued to operate fitfully for two or three years longer. Indiana was a region of denser population than Kansas, and nat-

ural gas there became, of course, more quickly an article of luxury and beyond the reach of the zinc smelters, dependent upon cheap fuel.

Natural gas is still abundant in Oklahoma, and Bartlesville has now become to the zinc industry what Iola used to be. The smelters operating there have lately been increasing their capacity. Caney, Kan., also draws gas from Oklahoma. However, the fate of the works at Bartlesville and Caney will sooner or later be the same as of those at Iola and in Indiana.

We long ago foretold the eventual transfer of the zinc smelting industry to the coal fields of Illinois. During the last few years the works at Lasalle and Peru in that State have been added to by those at Depue, Springfield and Danville. In 1909 the spelter production of Illinois rose to 75,000 tons, or 28 per cent. of the total of the United States. In the course of time we may expect the ratio to become larger.

Progress in Publicity

It has lately been announced that the Anaconda company will report monthly the amount of its copper production, thus adopting the policy of publicity upon which nearly all of the important copper-producing companies have entered during the last year or two. At the present time all of the producers of blister copper with but three or four exceptions report officially their production, as soon as possible after the close of each month, and this enables us to supplement the refiners' statistics with a compilation showing reliably the supply to the refiners, which the latter are going to report in form available for manufacturing two or three months later. We have no doubt that the few concerns that have not yet adopted this policy of reporting will shortly do so.

All of this is great testimony of the progress of ideas in the right direction. We remember the trials and tribulations of the old producers' association of the '90s. Its reports were incomplete, were published only in the aggregate, and were finally abandoned owing to suspicion of bad faith in certain quarters, justified or unjustified is no longer a question. Now we have most of the producers making voluntarily to their stockholders and to the public a prompt statement of their

production, to be entered openly under each name, and there is no question as to reliability.

The benefit of this policy is obvious. The stockholders of the companies know right along something of importance as to the operations in which they are interested, and all parties to the trade in copper are put in possession of information that is mutually useful. Not long ago there was expressed some dissatisfaction respecting the publication of the refinery statistics. The monthly reiterations of increases in production and stocks were indeed depressing, but if the association had been abandoned there would have been no means of giving out such good news as that for September and what we expect in months to come. The smelters' figures have fully justified themselves by showing that the recent curtailment is actually a fact and promptly dispelling doubts that otherwise would have existed for several months. The publication of unfavorable statistics may sometimes be vexatious to the producers—we speak of them only because it is they alone who give them—but nevertheless it is wholly to their interest. We have seen many occasions when the best informed among producers have been entirely wrong respecting the situation in their trades, when knowledge of the facts has finally come as a sheer surprise and has led to disturbing rises or falls in the market. Accurate statistics serve without doubt to temper fluctuations, steadying the market and reducing extremes. In this they are good for both producers and consumers.

It is particularly gratifying that the Anaconda company has adopted this new policy of publicity. Time was when its secrecy was a great subject of criticism. Under the enlightened management of Mr. Thayer, aided by Mr. Mathewson, Mr. Gillie and Mr. Goodale and their able staff of technicians, this company has been raised to an industrial organization of wonderful efficiency, and it is now a shining example of the best that American engineers can do and is an enterprise of which in its technical aspects the country has reason to feel proud. Its mines are in no immediate prospect of petering out, its cost of production does not compare unfavorably with that of the other large producers and there is no reason why it should not tell freely about its affairs. As time goes on it will probably do so more and more.

Metallics

The best method for the production of pure boron is the reduction of boron chloride by means of an arc discharge through a mixture of the vapor of the chloride with oxygen. The boron is obtained partly as a fine powder and partly as fused lumps.

In sampling dredging ground, or, indeed, in any sampling work, attention should not be wholly confined to the determination of the mineral specially sought. A careful inspection, particularly of concentrates, may show the presence of quite another substance which will allow the working of an otherwise unprofitable deposit.

The addition of a small percentage of cadmium to low-grade German silver increases the hardness, general working qualities and color to that of a first- or second-grade alloy containing 22 to 30 per cent. of nickel. An example of such a "modified" German silver is 57 per cent. copper, 12.5 nickel, 28.5 zinc and 2 per cent. cadmium.

Throughout a mine, and especially in the stopes, there are many openings which must be carefully avoided. Some of these openings, such as manways, timberways, chutes, etc., are in constant use. Others, not so constantly used, are frequently temporarily open. Miners should be warned of the latter class of openings and instructed to keep them protected by lagging or other means when not actually in use.

The maximum weight attainable by the ordinary gravitation stamp is obviously determined by the limit in size of cam shaft and stem, and also by the increased wear on the faces of cam and tappet. Up to a certain weight there should be an increase in the efficiency of the stamp battery, while above that point the benefits to be derived from the extra weight will be greatly minimized by the extra expense in first cost and particularly in maintenance. This weight is tentatively placed at 1750 lb. by C. O. Schmidt, a South African engineer.

Gypsum is readily decomposed when intimately mixed with sand or silica and strongly heated, a mixture of sulphur dioxide, oxygen, and water being evolved; the small proportion of iron oxide contained in ordinary sand or sea-sand acts catalytically and hastens the decomposition. From the mixture of gases sulphuric acid may be obtained by the contact process, and, on account of the purity of the product and the fact that the residue may be utilized for making glass, it is considered that gypsum could possibly compete as a raw material for sulphuric-acid manufacture, especially in countries possessing large deposits of gypsum but no pyrites.

By the Way

A "Constant Reader" has contributed the following definition of copper oxide given by a reputable (?) engineer in a report: "A limonite infiltration of ferruginous clay subsequently impregnated by a cupric efflorescence." This would undoubtedly present a serious difficulty in the ultimate recovery obtainable, still it must have sounded impressive to the shareholders and to promoters, who would employ an "engineer" of that type.

One of the most remarkable escapes from death in the annals of Lake Superior mining occurred on Aug. 29 at the Red Jacket shaft of the Calumet & Hecla, when Mike B. Sunrich, a timberman, in stepping from the repair cage to the main cage fell into the shaft. He fell 150 ft. before he could grasp the rope attached to the skip and save himself from a fall of a quarter mile to the bottom of the shaft. His hands were badly burned on the wire rope, but otherwise he was unhurt. He was dangling from the cable when rescued.

A forest on a mountain or a running stream are promptly described as unlimited sources of power, by many mine owners. It is surprising, however, to note how quickly the edge of the forest recedes and how low the river gets in summer. One water-power promoter says: "We will not consider a water-power project unless after doubling the cost, cutting the available power in two, and reducing the market price of power by 40 per cent. it will still show an interest on the required capital." It is more often the case than not, with mining companies, that both types of power must be provided.

A mining engineer once said that in his examination of Mexican mining properties, as a sort of homage to the custom of padding the usual mine report with a certain amount of irrelevant geologic adornment, he coolly contributed to this verbosity by terming as Cretaceous all sedimentary rocks, and as Tertiary the intrusive and eruptive rocks. And, indeed more often than otherwise he hit the truth; awakening, presumably, due respect from his employers and economizing his time and energies for, let us hope, investigations of some real significance. There are, however, certain regions where such classifications would not serve.

The report of the Commissioners in Lunacy for the year ended Jan. 1 last shows a further increase in lunacy in England and Wales. Some interesting hints, not necessarily conclusions, as to the effect of occupation on mental health can be gathered from the report, giving the ratio of insane per 10,000 according

to occupations. In professional occupations the teacher shows best with the low rate of 7.9. Physicians have an insanity rate of 12.9, barristers and solicitors of 15.2, clergymen of 13.1, civil servants of 10.4, artists (painters and sculptors) of 27.3 and civil and mining engineers the very high rate of 52.5. Pursuance of the profession of mining engineering has frequently been considered as increasing the disciples of Ananias, but heretofore so far as we are aware, it has not been thought to lead to insanity. Yet, when our recollection is thus directed, we recall many incidents that would thus be adequately explained.

The automobile has found much application in connection with the mining industry. Especially in such regions as Nevada has it been very useful in enabling mining men to pass quickly over country that has no facilities for railway or tramway transportation. In some cases automobiles have been made advantageously to take advantage of railway lines. The superintendent at Nacozari, Mexico, which has railway connection with Douglas, Ariz., but only a train every other day, used to have an automobile with flanged wheels, enabling him to use the line to Douglas at any time desired. A recent number of the *Inca Chronicle*, published at La Fundicion, Peru, shows a photograph of the automobile of Charles F. Shelby, equipped for railway service in similar manner. He is thus able to make the journey quickly from Cerro de Pasco to Lima. Arrived at Lima the change of steel for ordinary rubber tires is a matter of but a few minutes, and the automobile is then ready for ordinary service.

The report of a certain steady, dividend-paying mining company for 1909 contains no technical information of its operation save the following: Average grade of all ore mined in per cent. copper, grade of smelting ore and grade of concentrating ore, but no reference to the tonnage of either the total ore or smelting ore mined; tonnage of ore concentrated, but no reference to extraction or grade or quantity of concentrates; résumé of development and general mine conditions, but no reference to ore reserves; statement of the total costs of mining, concentrating and smelting per ton of ore mined; cost of concentrating per ton of ore concentrated; cost of smelting per ton of charge smelted, and of smelting and converting per pound of fine copper produced; production of copper, silver and gold; and a statement of the cost per pound of refined copper. We leave it to our readers (as the company evidently did) to suggest a way for the recipient of this report to decide whether or not the mine is being economically handled. A mere array of figures may suffice now, but there have been some rude awakenings.

CORRESPONDENCE and DISCUSSION

Views, Suggestions
and Experiences of Readers

California Oil Dividends

In the JOURNAL of Sept. 17, page 550, the reduction of \$404,000 in the total paid in dividends during August as compared with July by California oil companies listed on the San Francisco Stock Exchange, is attributed "in a large measure to the heavy reduction in the price of oil." The Thirty-three Oil Company is stated in the list to have distributed in August \$400,000, which is a dividend on a capital disbursement, the company having been sold lately to a British syndicate. The May, June and July statements were also swelled to over \$1,000,000 by the capital disbursements of the Imperial Oil Company, which was bought by the same syndicate.

The dividends paid by the listed companies for the last 12 months, referring to dividends from earnings, have been uniformly about \$600,000 per month. The unlisted companies probably paid from \$200,000 to \$400,000 per month in addition, making a distribution of current earnings of approximately \$1,000,000 per month by the operating companies of the State.

RECENT CUT IN PRICE ONLY EFFECTS SMALL PERCENTAGE OF PRODUCTION

The recent cut in price of oil (meaning the daily-run sales) from 50c. to 30c. per bbl. affects low-gravity fuel oil only, and only about 10 per cent. of the State's production, the remainder (exclusive of that controlled by the Independent Oil Producers Agency) being under contracts, for periods and quantities, and varying in price from 30c. to 65c. per bbl. The higher gravity refining oil sells, at the wells, at from 65c. to \$1 per bbl. It is, therefore, apparent that the cut by the Associated Oil Company which went into effect on Sept. 1, for the daily-run oil could not affect returns so quickly as indicated by the JOURNAL.

MANY PRODUCING COMPANIES UNLISTED

The statement that the "grand total of dividends paid to date by California oil companies amounts to \$34,682,082" should likewise be qualified by noting that the above sum represents only the amount disbursed by the listed companies. The exact figure may be half again as much; the earnings of the Standard Oil Company are not included, and it is a most important factor in the business, both as a marketer, refiner, and lately, producer. As an illustration to what ex-

tent oil companies list their securities, it may be noted that of 60 producing companies in the Kern River field but 27 are listed on the San Francisco and Los Angeles exchanges.

J. H. G. WOLF.

San Francisco, Cal., Sept. 22, 1910.

Foaming of Converter Slags

Redick R. Moore in his article on "Recent Practice in Copper Matte Converting," published in the JOURNAL of Sept. 3, 1910, mentions the foaming of converter slags, if not removed when the "high" point is reached, owing to the violent reaction between copper oxide or silicate and copper sulphide. He also states that the exact conditions under which this foaming takes place have not been thoroughly worked out.

I am convinced, after many years' experience in converting all grades of matte, that the following explanation is correct, and accounts for many mysterious "foamings."

FOAMING OCCURS WHEN MATTE LEVEL IS BELOW TUYERES

"Foamy" slags in a converter, long before the matte has reached the high point, are caused by the matte in the converter becoming so reduced in bulk, that it falls below the tuyere level and allows the air to be blown directly through the slag. This can be easily proved, by turning down the converter as soon as the slag in the converter shows the least sign of foaming, pouring off all slag and then turning the converter back to the identical position in which it was when foaming commenced. It will be observed, if the slag has been run off clean, that the matte in the converter is on a level with the tuyeres and in order to continue the blow, more matte must be added or the converter tilted so that the matte in the converter is above the tuyere level.

FOAMING RARE WITH HIGH-GRADE MATTES

The lower the grade of matte at the time of charging matte into the converter, the lower will be the grade of matte in the converter at the time of foaming. The depth of the inside of the converting chamber below the tuyeres will also affect the grade of matte at the time of foaming. The deeper the converter, with the same weight of charge, the lower will be the grade of matte during foaming, as it will take less time for the matte to reach the tuyere level. Matte between 35 and 50 per cent. copper (which is the

ordinary grade for converting) will rarely become so small in bulk, as to fall below the tuyeres, before its grade has been raised to 75 per cent., at which time the slag is skimmed off. In converting a 15 per cent. matte, foaming might take place when the matte in the converter has reached only about 50 per cent. grade.

A. R. MCKENZIE.

Great Falls, Mont., Sept. 27, 1910.

Sampling Low-grade and Irregular Ore Bodies

In sampling the low-grade so called "porphyry" deposits in the Globe and associated districts, strips averaging 3 in. in width and $\frac{1}{4}$ to $\frac{1}{2}$ in. in depth, are cut horizontally along either wall of drifts and crosscuts by means of a moil and single jack. Samples of about 40 lb. each are broken. Raises and winzes are sampled in the same way, vertical strips being cut on two sides. Another method of sampling is the commonly known ring method, in which a sample is taken by cutting a ring around the drift at stated intervals. The cut is about the same size as that in the strip sampling, and is started at the floor line at one side of the drift, continued vertically up the wall across the back and vertically down the other wall. The planes of such rings are vertical except in raises, shafts, etc., where horizontal cuts must necessarily be taken. It will be noted that the ring method is diametrically opposed to the strip method in that in the latter the planes of the cuts in drifts are horizontal and in raises are vertical.

ERRORS INTRODUCED BY USUAL METHODS

Considering that the rich ore in low-grade disseminated deposits often occurs in a large number of small stringers, not much thicker than a piece of cardboard, which may or may not have a general trend in one direction, any method of sampling which runs chances of either striking and running along these stringers or omitting them altogether is clearly at fault.

I have in mind one property in which there are two large fissure veins over 100 ft. apart. Joining these two large fissures are minute and fragmentarily occurring stringers of ore. However, notwithstanding its spotted appearance, the rock between these two veins is of commercial value. By taking samples on vertical planes five feet apart, through the crosscuts, as in the ring method, nothing

like a representative sample can possibly be secured. It is true that if the ring samples were taken every six inches, practically every one of the small stringers would be cut and would yield its proper proportion of the true content of the block. If a horizontal strip were cut along either wall, a more representative sample would be obtained, but as the stringers vary considerably in width, even in the height of the crosscuts, it is a difficult question to determine at just what height it would be most accurate to start the cut. Again in this method, only an average of samples taken every five feet is obtained. Of course, in the true sense, this is not an example of a disseminated orebody but the applicability of the argument I believe extends to the low-grade orebodies as well.

SPIRAL METHOD A COMBINATION

The method I have used in several instances is a combination of the ring and strip methods in the same way that a screw motion is a combination of rotary and straight-line motion. In sampling the various crosscuts in the case above mentioned, I started a cut 3 in. wide and $\frac{1}{2}$ in. deep near the floor line on one side of the crosscut. This cut was carried in a diagonal direction up the wall, across the back and down the opposite wall along the same diagonal, ending five feet ahead of the starting point but on the opposite side of the crosscut. I had then progressed in a longitudinal direction as far as a strip sample, and at the same time had attained the rotary motion of the ring method. There could not be a plane passed through the crosscut at any point except on the floor line, that would not have intersected my cut proportionally. It is obvious that in both the ring and strip methods an infinite number of planes can be passed through the drift and not be intersected by the sample cuts. The next sample cut was started on the same side of the drift as the first one, at the floor line and directly opposite the point where the first cut ended.

In raises and shafts this method can be carried on to a finer degree as a complete spiral can be cut around the four walls and with such a pitch as to gain any vertical distance desired in one revolution. I may be mistaken as to the originality of this system and as to its efficiency. Suggestions and criticisms by other members of the profession will be greatly appreciated.

D. A. McMILLEN.

Globe, Ariz., Sept. 26, 1910.

Smelting Briquetted Zinc Ore

In the article "Smelting Briquetted Zinc Ore" in the JOURNAL of Aug. 13, 1910, the analysis of the zinc ore, given in the second paragraph on page 323, is incomplete. It should be: Zinc, 31.70

per cent.; lead, 24.38; copper, 0.28; iron, 5.80; manganese, 1.69; lime, 1.18; alumina, 1.74; sulphur, 24.49; silica, 8.08; oil, 0.40; loss, 0.26; silver, 24.7 oz. per long ton.

THEODORE J. HOOVER.

London, Sept. 26, 1910.

Breaking of Highland Boy Tramway

We note in the JOURNAL of Sept. 24, 1910, a paragraph stated that the standing cable of the Highland Boy tramway, at Bingham, Utah, broke at one of the tension stations, distributing the buckets along the line.

This statement is true, but it fails to state that the reason for the cable breaking was a piece of flying rock from a blast in connection with the construction of the Utah Copper Company's new railroad from Bingham to the Garfield smelter. The paragraph as it stands might leave the impression that the cable broke due to a fault or defect in the cable itself, which was not the case.

As we were the builders of this tramway, we naturally feel interested in having the entire facts stated, and trust that you may find occasion to make the correction.

TRENTON IRON COMPANY.

Trenton, N. J., Oct. 5, 1910.

QUESTIONS AND ANSWERS

POISONING BY CYANIDE WASTE

I am having difficulty in preventing the poisoning of animals on nearby ranches from the flow of cyanide solutions in the arroyo during the rainy season. Another difficulty is to handle slimes so as to prevent their being carried down the arroyo and spreading over agricultural land. Have you any suggestions?

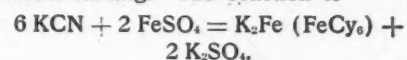
J. H. H.

It is probable that the addition of a small amount of copperas (ferrous sulphate) solution to the water of the arroyo, or to the influent water flowing through the tailings, would precipitate the cyanide. The chief point is to get a thorough mixture of the ferrous-sulphate solution with the cyanide solution, and it is not sufficient simply to empty a large amount of copperas solution into the tailing launder, or to feed it on any one portion of the dump.

A recent paper by Moir and Gray,¹ on rendering cyanide residues innocuous, in order to use as "sand filling" in worked-out stopes, states that excess alkalinity retards the destruction of the cyanide by ferrous-sulphate solution; as does also a temperature of over 58 deg. F.; that the reaction is ordinarily complete in 10 sec. and that an excess of iron

¹Journ., Chem., Met. and Min. Soc., South Africa, 1910; p. 433.

seems to be no better than the theoretical quantity, although, of course, the use of the theoretical quantity presupposes a perfect mixing. The reaction is



The destruction of cyanide is not absolute, but the unaltered cyanide is negligible in quantity. In the discussion of the above paper, H. A. White gives the result of experiments on the destruction of cyanide by permanganates, picrates and ketones. An alkalinity of 0.1 per cent. of NaOH, which amount is usually present in waste solutions, was sufficient, with the permanganate, to destroy cyanide completely. Assuming a ton of tailings carries 200 lb. of a 0.025 per cent. solution of KCN, the permanganate treatment costs about 1.2c. per ton. Aldehydes and ketones act slowly or require heat for their action, but formaldehyde reacts instantly in the cold. On the same basis as above this treatment costs 1.8c. per ton. It is still doubtful whether or not one of the reaction products with picric acid is stable (potassium isopurpurate, $\text{C}_6\text{H}_4\text{KN}_2\text{O}_6$) so it would probably not be well to use this method without further experimenting on this point.

In the JOURNAL of March 5, 1910, page 502, and Aug. 6, 1910, page 262, there are articles on impounding tailings.

COATING OF MAPS

Will you kindly advise me if there is some transparent preparation used for coating maps to prevent them from becoming soiled, and if so where it may be obtained?

A. H. S.

In many places where drawings are kept flat by being tacked or pasted on a board, a colorless shellac is used to coat the surface. A grain-alcohol varnish containing a small amount of gum is supplied by the DeVoe & Reynolds Company, under the name of "French Varnish." A similar "fixative" is also supplied by the Keuffel & Esser Company. These preparations are applied with a brush or spray, but we do not think they would be suitable if the maps are to be handled in the ordinary manner. Perhaps some readers of the JOURNAL can supply further information on this point.

Statue of Humboldt

Emperor William, of Germany, has appropriately presented to Mexico on the Centennial occasion a statue of Baron Alexander von Humboldt, which has been erected in Mexico City, near the National Library. Humboldt's books on the mineral resources of Mexico, written nearly a hundred years ago, are today accepted as authentic and helpful and at the time they were published, were no small factor in the turning of European capital to Mexico for mining operations.

DETAILS of PRACTICAL MINING

Notes of Interest to Prospectors and Operators of Small as Well as Large Mines. Things That Have to Be Done in Everyday Mining

Gravity Planes at Cheever Mine

BY GUY C. STOLTZ*

The Cheever Iron Ore Company, operating at Port Henry, N. Y., trams the concentrates resulting from magnetic separation, by gravity planes to the loading chutes of the Delaware & Hudson switch on the shore of Lake Champlain. Topography favored the installation of two planes, the first plane being 700 ft. long with a drop of 55 ft., and the second about 2000 ft. long and a drop of 193 ft. The grade is not at all regular. The tracks conform, wherever possible, to the surface of the ground.

Three 30-lb. rails are laid at 3-ft. gage on each plane and four rails with the spread for turnouts are laid at the half-way points.



GRAVITY PLANE, CHEEVER IRON ORE COMPANY

Side-dump steel cars of 4½-ton capacity are used. A trip of two loaded cars is released on the slight down grade at the storage bin and on their downward journey to the first turntable they pull the two empty cars, attached to the other end of the cable, to the loading bin. At the turntable the loaded cars are deflected about 60 deg. and attached to the free end of the cable for the second plane and on their downward course pull up two more empties.

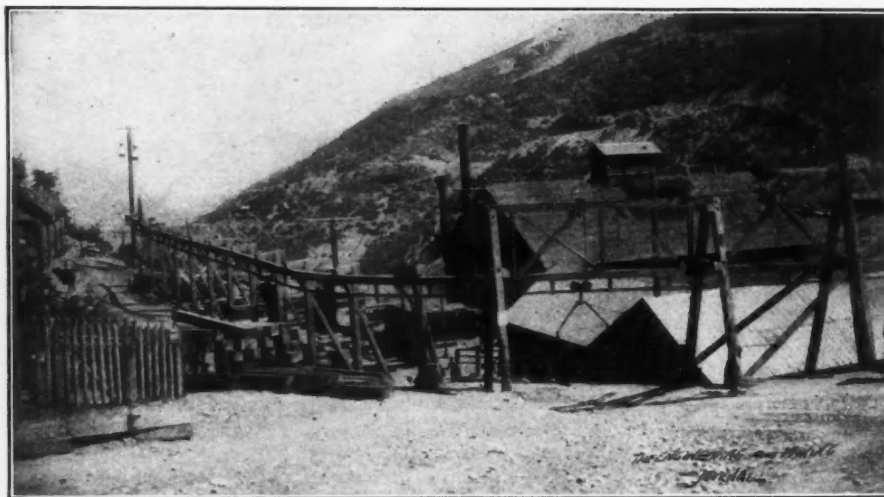
Sheaves with brakes are installed at the top of each plane. At the terminal of the second plane the cars are delivered to a turntable and trammed by hand to the several loading chutes. The Cheever plant is now entirely equipped with electrically driven machinery, power being supplied by the Witherbee-Sherman

*Mining engineer, Mineville, N. Y.

plant at Fort Henry. Before electrification, all coal used was loaded by bucket and derrick from gondolas to the empty gravity-plane cars and pulled to the mine plant by the descending loaded trip. Plans are now underway for replacing the first turntable by a steeply banked curve. This change will increase the capacity of the system and lower the surface-tramming cost by almost one-half.

A Timber Carrier

At many mine-timber yards a carrier suspended from an overhead trolley could be used with great advantage to take timbers from the yard to the framing shed. When the timber is piled parallel to the line of the overhead track,



TIMBER CARRIER AT HIGHLAND BOY MINE, BINGHAM, UTAH

such a system of transporting the timber is often much better than the use of the ordinary trucks. This is especially true where a good deal of short timber is used, and the sawmill is placed far from the timber yard. At the Highland Boy mine at Bingham, Utah, such a method of handling the timbers has been adopted. The first cost of the trolley system is considerable, but that is relatively unimportant when a large amount of timber is used at the mine.

An accompanying halftone engraving shows the timber trolley and a portion of the timber yards at the Highland Boy mine. The carrier should be fastened to the trolley carriage by a swivel and the timber cradle should be so designed that, when it is loaded symmetrically, the center of gravity of the load is directly under the swivel pin.

Magnetic Particles in Copper Bullion Sampling

BY DONALD M. LIDDELL

The occurrence of magnetic particles in copper-bullion samples is a source of some perplexity to the assayer, the question being whether or not to remove them before assaying. While there can be no doubt of the propriety of so doing in the case of wirebar, cathode and well refined anode samples, it is questionable whether they should be taken out of converter bar drillings.

This matter has been tested in two ways, first by the direct method of weighing the drills and the grinding machinery on silver-bullion scales, and noting the

loss sustained on treating a known weight of copper; second, by removing the magnetic particles from bullion samples, and assaying the portion removed. In order to reduce the experimental error incident to the first method, the same drills and grinder parts were used again and again

IRON INTRODUCED BY GRINDING MILLS.

| Coarse Grinding. | Fine Grinding. | Total. |
|------------------|----------------|-----------|
| Per Cent. | Per Cent. | Per Cent. |
| 0.0014 | 0.0165 | 0.0179 |
| 0.0048 | 0.0122 | 0.0170 |
| 0.0048 | 0.0098 | 0.0146 |
| 0.0035 | 0.0159 | 0.0194 |
| 0.0024 | 0.0130 | 0.0154 |

on consecutive experiments, so that the error of one experiment was absorbed by the next. The contamination of the sample occurred in three stages; drilling; rough grinding; fine grinding—in the drug mills made by Hance Brothers & White.

The amount of steel lost by the drills amounted to the negligible quantity of 0.0043 per cent. of the weight of copper drillings made. In the grinding mills the results for five consecutive weeks are shown in an accompanying table. The introductions of iron particles was greatest when the mills were new. About 900

Shaft Plumbing

The problem in shaft plumbing is to carry the azimuth of a surface line underground. In the method I use, which differs from that described in the JOURNAL of June 4 the transit is set up at the

by the surface party as described in the JOURNAL of June 4. The underground survey will proceed from H—I. Large iron plumb-bobs may be used, or cylinders with wings may be substituted. Steel wire is better than copper wire for deep shafts and oil is better than water to steady the plumb-bobs. It is often convenient to let the wires swing slightly for sighting.

To lower the bobs, spools turned by means of a crank and supported on uprights which in their turn are made fast to planks placed across the shaft should be used. If the wires are far out of line the planks can be moved or slid along by striking them on the end with a hammer. Finer adjustments are obtained by operating a micrometer screw placed below the spool, the wire being fastened to the screw. In case a check survey should later be desired the planks can be marked with lead pencil so that the approximate wire positions can be quickly relocated.

ANALYSES OF BULLION AND MAGNETIC PARTICLES.

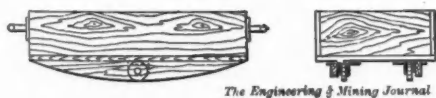
| | Bullion. | | | Magnetic Particles. | | | |
|--------------|---------------|---------|---------|---------------------|---------|---------|---------------|
| | Cu, Per Cent. | Ag, Oz. | Au, Oz. | Cu, Per Cent. | Ag, Oz. | Au, Oz. | Fe, Per Cent. |
| Brand A..... | 99.050 | 75.65 | 14.035 | 46.95 | 47.3 | 4.30 | ..... |
| Brand B..... | 97.825 | 352.20 | 8.375 | 34.00 | 143.8 | 13.60 | ..... |
| Brand C..... | 99.000 | ..... | ..... | 36.40 | ..... | ..... | 31.28 |

lb. of copper was ground in the coarse grinding and about 200 in the fine grinding in each week. It was, of course, impossible to run the drills continuously for this long a period, owing to their needing regrinding. The results as to the loss by the drills cover two days only.

On the direct analysis of the magnetic particles themselves, the results shown in the table indicated that to remove all of the magnetic particles from copper bullion is an error, as they consist chiefly of converter slag. The nearest approach to theoretical perfection would be to remove all particles just after the coarse grinding, the introduction of foreign iron up to that time being less than 0.01 per cent.; perform the fine grinding, again remove all magnetic particles and throw them away, then replace the particles removed after the first grinding.

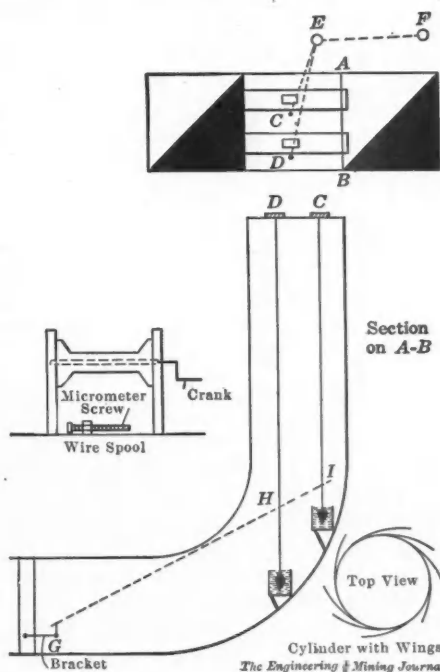
Handling Coal in Low Rooms

The accompanying figure illustrates a simple, homemade contrivance for alleviating some of the laboriousness associated with the mining of coal in the thinnest seams, seams so thin that it is almost impossible to make a car on wheels low enough to pass in to the working face.



GERMAN CONTRIVANCE FOR HANDLING COAL IN LOW PLACES

It consists of a shallow, wooden box, to the bottom of which is fastened a pair of wooden runners, curved on their lower edges like the rockers of a chair. Two iron-bound, wooden wheels are axled at the middle of the box in such a way that when the box is held just level, the weight comes on these wheels instead of on the runners. These appliances have been tried with a fair amount of success in some of the mines at Deister, Germany.



METHOD OF PLUMBING SHAFT

point marked E on the accompanying drawing, the azimuth of the line E—F being known. The two wires C and D are suspended in the shaft. The setup underground is made before the surface setup or else two parties can work together, one on the surface and one underground. The surface party determines the azimuth of the line C—D from E—F which gives the underground azimuth of H—I.

The underground party proceeds from H. The instrument is set at G and a sight taken on the wire D at H. For convenience of taping and reading the vertical angle an ordinary paper clip is fastened on the wire D at H. After sighting on the wire D, a sight is taken on wire C and it is moved until it comes into the line of sight, a check sight is then taken on wire D.

The wire C is moved by one of the party at the surface by methods to be described hereafter. The azimuth of the line H—I or C—D will be determined

Placing Shaft Timbers

At the Iron Blossom mine, in the Tintic district, Utah, shaft sets are put together at the bottom of the shaft and then hoisted into position. When a set of timbers is to be put in, the framed pieces are lowered on the cage, temporary guides being used so as to allow the cage to drop below the point to which shaft timbering has advanced.

The wall plates are laid upon a 5-ft. board placed across the bottom of the cage. The end plates and dividers are then dropped into place and the sets drawn tightly together. Wooden dowels may be used to secure the framed ends to the wall and the end plates. When the set is put together, the cage is hoisted to the proper point and the rigid set drawn up against the posts by hanging irons from the next set above. By thus making up the shaft set before it is put into position it is claimed that time is saved and more rigid sets are insured.

Blasting in Wet Ground

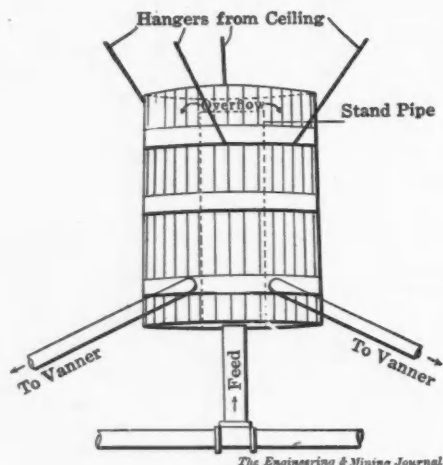
Where a blast is to be fired in wet ground, soap or tallow should be smeared over the safety fuse at the place where it enters the blasting cap in order to keep the charge in the latter perfectly dry. Oil or grease should never be used for this purpose as they are likely to soak into the fuse and destroy the efficiency of the powder which it contains. A cap crimper should always be used with a safety fuse and blasting cap. This tool is inexpensive and will wear for years. Crimping caps with a knife or the teeth is an exceedingly dangerous and ineffective method and is often responsible for expensive misfires.

Barrel Distributer for Concentrating Tables Labor and Tonnage Chart as Aids in Reducing Costs

BY CLAUDE T. RICE

The scheme used in the new Bunker Hill & Sullivan mill, at Kellogg, Ida., for distributing pulp to the Frue vanners is extremely simple and satisfactory. The distributors are merely barrels suspended about 5 ft. above the table tops, from which pipes radiate to the feed troughs of the concentrating tables. The distributors are suspended above the aisle between rows of vanners by iron rods fastened to the ceiling.

The barrels are 1½ ft. in diameter and 2 ft. high. Each is tapped at a point at the center of the bottom, for a short length of 2½-in. pipe from the feed pipe carrying pulp, which is run below all the distributors. Inside the barrels there are 6-in. central pipes (extending nearly to the top of the barrels) over the top of which the intake solution overflows into the outer compartments from which the



FEED DISTRIBUTER FOR CONCENTRATING TABLES

outlet pipes discharge. The outlet pipes are 1½ in. in diameter and radiate from the barrels as shown in the accompanying illustration. One barrel serves to distribute pulp to four or six tables, and the desired regulation of feed can be had by placing the barrels at the proper elevation above the concentrating tables. This is one of the simplest distributors for feeding concentrating tables that is in use in the mills in the country, and it is claimed to be quite satisfactory in its operation.

A recent test of some vanadium steel eye-bars at the Ambridge works of the American Bridge Company, gave an ultimate strength of 96,795 lb. per square inch, and an elastic limit of 81,210 lb. The composition of the material in the bars was as follows: Carbon, 0.25, vanadium 0.17, nickel 1.45, manganese 0.32, phosphorus 0.02, chrome 1.20, silicon 0.12. The bars were 2x14 in. section.

To get the mining costs as low as is compatible with good mining it is essential to instill a healthy rivalry among the men and let them know that the mine superintendent, and every one in authority on the job, knows how much work they are doing. A great aid in accomplishing this at the Highland Boy mine is the posting of labor and tonnage charts where the bosses and men can see them.

The tonnage chart shows the tonnage mined by each shift, the combined tonnage of the two shifts and the tonnage sent out over the tramway (at the Highland Boy, the ore is shipped in that way from the mine), the total number of machine drills at work in the mine, the number of machines working in ore and the number working in waste. On the labor chart, which is carried on another piece of cross-section paper tacked up directly under the first, the total number of men employed at the mine, the number underground, the tons mined per man employed at the mine and per man working underground are shown.

BLANK CHARTS EASILY MADE

The charts are drawn on cross-section paper ruled 10 squares to the inch and a negative made from a tracing ruled with cross-section lines. From the negative a print with white background and blue lines is obtained. The scale and the headings, as well as the days of the month, are put on the original tracing cloth so that the final prints are all ready for use.

The data for the last day of the preceding month are shown as the start of each curve. The days of the month are plotted as the abscissas and the other data as the ordinates, the horizontal scale being a day to the inch, while the vertical scale varies with the different curves. The various curves are drawn in with different-colored crayons so that there is no trouble in following the curves, even where they are close together or where they may happen to cross as sometimes occur. The eye soon gets to know the colors used to represent each quantity.

TONNAGE CURVES AFFORD CHECK ON DEPARTMENTS

The tonnage curves are drawn to a vertical scale of 100 tons to the inch, as at the Highland Boy mine the tonnage does not fluctuate more than 200 tons per day and this scale is ample to show with sufficient emphasis the variations in the tonnage mined from day to day. The shift tonnages are plotted from the tonnage reported by the respective

shift bosses, who estimate this from the number of cars dumped in the tramway bins. The tramway tonnage is reckoned from the number of buckets sent out over the line and the average weight of a loaded bucket as determined over a long period of time by checking it against the weighed ore shipped to the smeltery. The tramway curve is therefore the more accurate curve. The curves reported by the shift bosses give checks on how full the cars are loaded underground, so by comparing the curves of the tonnages mined by each shift, it is possible to see which is, in all probability, failing to load the cars properly. At the Highland Boy mine, the saving effected by correcting the practice of underloading cars, through the use of these curves has resulted in a saving greater than has been the cost of keeping them.

MACHINE CURVES SHOW RATIO OF OUTPUT TO DEVELOPMENT

Below the tonnage curves, and on the same chart are plotted the machine curves. The vertical scale used on these is five machines to the inch. This scale is sufficient to give emphasis to the variations in the number of machines at work which is usually only about twenty-five. As one of the curves shows the total number of machines running on ore and another the number working on waste, and as most of the machines on development work would be working in waste, an indication is given as to whether the development work is being kept uptodate or whether it is being shirked so as to make a tonnage showing. It might be well to show the number of machines working in ore and the number working upon development work instead of in waste as such a curve would be more important than the waste curves unless the filling were being broken underground.

CURVES SHOULD SHOW IF MEN ARE LOAFING

The vertical scale used on the curves representing the number of men working about the mine is 10 men to the inch, which is large enough so that the variations in the number of men employed is shown with sufficient emphasis. It might be well at mines where the square-set method of mining is used or where stull timbering is done, to show how many men are working at timbering, for the job with the biggest possibilities for loafing at the mine is that of timbering. It always pays to keep close track of the timbermen. On the labor chart it might also be well to plot a curve showing the number of sets or stulls put in each day so as to keep still better track of the work of the timbermen.

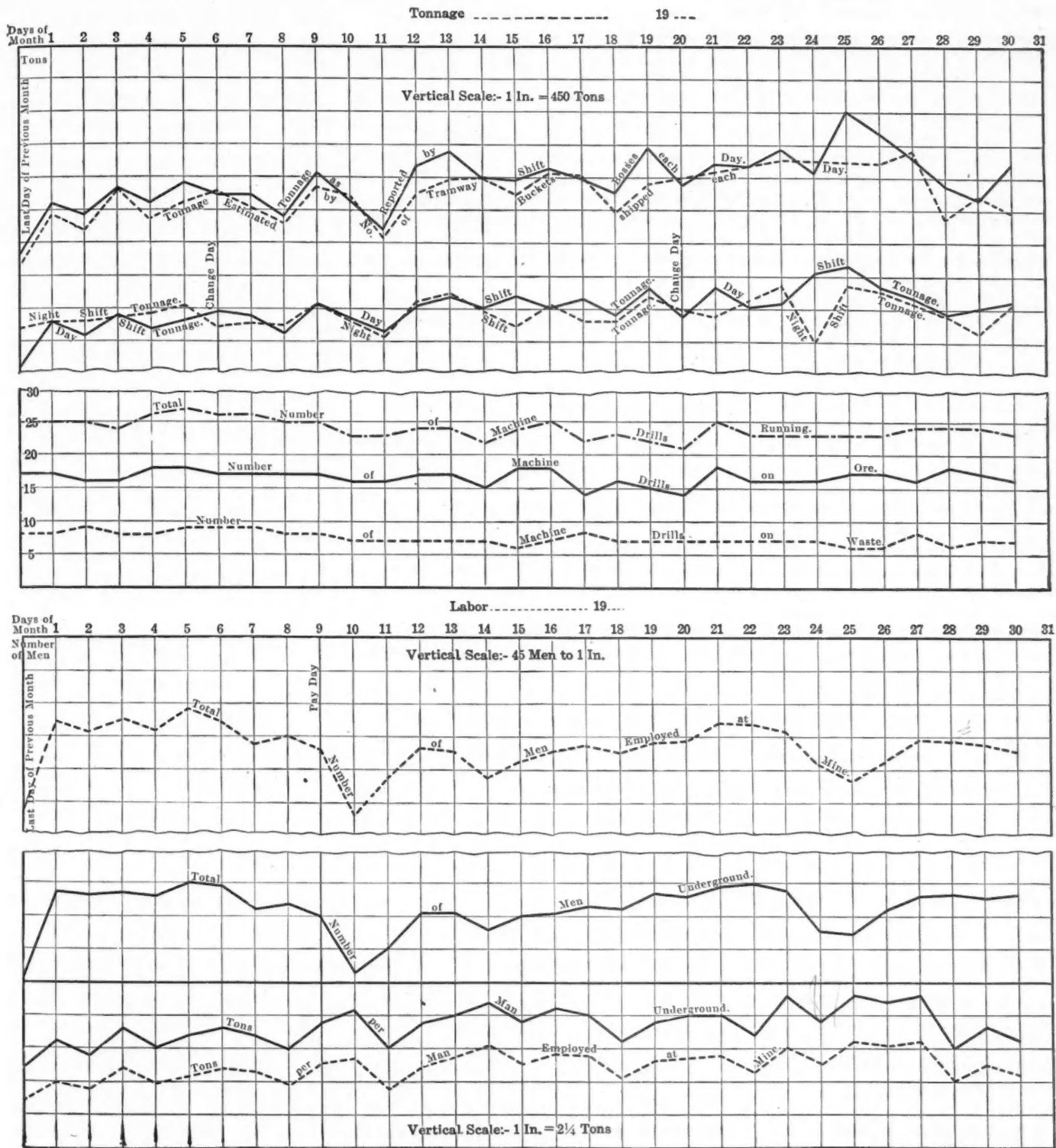
On the tons-per-man curves a vertical scale of half a ton to the inch is used so as to show plainly the variations. The

importance of this is evident. The drop in the labor curves shows clearly which day of the month is pay day, even if it is not marked. The tons-per-man curves also show that the best workers are not the drinking men, although this increase in the tons mined per man is due partly

tons or cars of waste filling that is being dumped into the stopes. This would give a check on the progress in the filling of the stopes and the tendency to let that important element in the mining lag behind in the scramble after ore would be reduced.

per cent. of the total expenditures in the mining of the ore. The curves have been in use at the Highland Boy mine nearly a year and have been found of great aid to those in charge.

Their introduction was due to Ivan DeLashmutt, engineer at the mine. The set



LABOR AND TONNAGE CHARTS SHOWING RECORD OF OPERATIONS FOR TYPICAL MONTH AT HIGHLAND BOY MINE, UTAH

to the doing of less development work on pay day.

The only other addition to the tonnage chart that would seem advisable at a mine where the stopes are being filled would be a curve showing the number of

The importance of these curves representing graphically the important steps in the operation of the mine is evident. They afford, in a manner such that the men are spurred on to do better work, a means of keeping close check on 60

of curves shown are taken from the charts showing the details of the work for a fairly typical month. The work in keeping these charts up to date is quite small. Charts 22 in. wide and 34 in. long are used.

Concluding Sessions of American Mining Congress

SPECIAL CORRESPONDENCE

The 13th annual session of the American Mining Congress concluded its deliberations in the Mason opera house, Los Angeles, Cal., on Saturday, Oct. 1.

At the Thursday morning session resolutions with the following provisions were submitted and referred to the committee on resolutions: Urging legislation to prevent a repetition of recent unjust decisions of the Land Office embracing the withdrawal of land already entered upon in good faith and the denial of patent to such land; the prosecution of the Southern Pacific railroad in an attempt to secure from it the vast amount of oil lands illegally held; that no monuments be erected or parks established on public lands before it is determined whether or not the land is mineral bearing; urging that the Government take immediate action on applications for patents on coal lands in the State of Washington that have been pending for four years.

The secretary read the report of the committee on Federal legislation, reviewing the work of the committee in connection with the establishment of the Bureau of Mines and recommending that a similar committee be appointed for the ensuing year. The report of the committee on Alaskan mining laws pointed out the need of better laws, their intelligent application, and less red tape, stating that the greatest needs are intelligent and energetic officials and prompt action on local matters. These reports were referred to the resolutions committee.

RESOLUTIONS ON CONSERVATION

The most important work of the day was the reading of the report of the committee on resolutions on those resolutions having to do with conservation, and the discussion of these measures. Chief among these was the substitute for resolution No. 10, afterward adopted, reading as follows:

"Resolved, That, in common with citizens of the United States engaged in other industries, we approve the theory and practice of true conservation, which means utilization and developing with the least possible waste the natural resources of our country:

"We recognize, as men engaged in one of the most important industries of our country, the value of true conservation and its intimate relation to the mining interests, and recommend the enactment of such legislation, both State and National, as will bring about a beneficial development of the mines, the public lands, the public water rights, and the timber contained within our great west-

ern country for the best interests of the present and future generations without unnecessary waste.

"We condemn, however, as unwise, as opposed to the best interests of the American people, and as wholly unnecessary to the success of any plan of true conservation, legislation or proposed legislation which tends to make the miners and other citizens of the public land States who invest their time, labor and capital in the development of the natural resources contained within such States, lessees of or tribute payers to the National Government.

"We believe that every legitimate means should be adopted in the control of public lands to eradicate or lessen the evils of monopoly, but fail to find in any of the remedies suggested by the advocates of the leasing system how this can be accomplished by changing the present laws so as to take from the citizen a clear title and substitute therefor a lease."

STATE CONTROL OF RESOURCES URGED

The substitute to resolution No. 12 urged greater harmony between the prospector and miner on the one side and the Government on the other, that the laws be administered without burdensome and discouraging departmental rules and regulations and in such a manner as to encourage the mining industry, and condemned those who locate fictitious mining claims in order to secure the timber contained thereon. The substitute for resolution No. 30 recommended that laws be enacted speedily which shall accurately define the rights of citizens to utilize the waters of the streams and the rights of way on the public lands adjacent thereto for water-power purposes, and that all water-power sites upon the public domain be placed under the control of the respective States.

The substitute for resolution No. 33 classed as inimical to the development of our country's resources, any conservation policy that places obstacles in the way of free and unrestricted prospecting and location of metalliferous mineral lands, or that favors any lease or royalty upon the future tenure and production of such locations. It indorsed the work of the Forestry Service but opposed unqualifiedly any and all withdrawals of metalliferous mineral lands from public entry. The substitute for resolution No. 32 favored State regulation and control of all natural resources within the boundaries of every State, in the largest measure compatible with present Federal statutes.

OPPOSED TO LEASING MINERAL LANDS

In discussing the above resolutions, each speaker was allowed 10 min. Resolution No. 10 came in for the greatest amount of discussion, and was finally passed, as were the others above mentioned. It may thus be seen that the congress has put itself on record as favoring conservation only to a limited extent, and as opposed to any system of leasing public mineral lands. It was noteworthy that few professional men, those who might have been looked to for some expression of opinion, availed themselves of the chance to discuss the subjects of these resolutions. This was particularly noticeable in cases where the chance presented itself to rectify misunderstanding.

Thursday afternoon, J. Parke Channing, one of the representatives appointed by President Taft, spoke on the subject "The Prevention of Mine Accidents." Mr. Channing submitted the report of the committee on mine accidents appointed at the last meeting of the congress at Denver, an extract of which was printed in this JOURNAL, Sept. 24, 1910. The committee was made up as follows: Walter Renton Ingalls, chairman, J. Parke Channing, James Douglas, J. R. Finlay and John Hays Hammond. The report of the committee on the standardization of electrical equipment was also read.

CONCLUDING DAYS OF THE CONGRESS

The Friday and Saturday sessions of the congress were devoted chiefly to the discussion of resolutions, selecting a place for the next meeting, and the election of officers. A resolution was adopted, expressing sympathy for the California oil men in their struggle to secure legislation, and pledging the help of the congress, as was the resolution on mine accidents and liabilities, which had been referred back to the resolutions committee for revision. The committee reported favorably the resolution permitting prospecting for minerals on all parts of the public domain; this was adopted. The resolution urging the establishment of smelters by the Government was laid on the table. The resolution urging that the Government establish no national parks or erect no monuments on public lands until the Geological Survey has pronounced the land non-mineral was reported without recommendations. After some discussion it was adopted. A resolution was adopted providing that the next meeting of the Congress be held either at Douglas or Phoenix, Arizona.

NEW OFFICERS

The resolution recommending that the oil and metal-mining interests be kept separate was reported unfavorably and the report was sustained by the congress. The board of directors of the congress reported that it had elected John Dern, of Utah, president; Samuel A. Taylor, Pennsylvania, first vice-president; D. W. Brunton, Colorado, second vice-president; E. A. Montgomery, California, third vice-president; and James F. Callbreath, Jr., Colorado, secretary, to succeed himself. After the reading of Governor

Sloan's letter on conservation, Dr. Harvey W. Shields, of New Mexico made an address opposing some principles of conservation but favoring others. The report of the forestry committee was presented, after which a paper by Gov. A. O. Eberhart, of Minnesota, on "State Leasing of Mineral Lands," was read.

An effort was made at the final session of the congress to couple with a resolution of thanks to Gifford Pinchot for his address an expression of sentiment favoring in a large measure his conservation policy. Attention was called

promptly to the fact that the congress had already gone on record in this connection and that the adoption of any such resolution would nullify the work of the committee which had spent a week in threshing out the conservation question. The resolution was laid on the table and a vote of thanks tendered to Mr. Pinchot.

The entertainment of the members and delegates to the congress by the Sierra Madre Club and various civic organizations of Los Angeles has included many receptions, smokers and pleasure trips.

Annual Report of Kerr Lake Mining Company

The annual report of the Kerr Lake Mining Company, of Cobalt, for the year ended Aug. 31, 1910, includes a summary of operations by President Edward Steindler, a report by Manager S. R. Heakes and one by J. H. Susmann, treasurer. The president summarizes the report of the manager and secretary, adding that the explorations on the 150-ft. level through shaft No. 7 developed a hitherto unknown vein, with numerous cross veins. He feels that there is every indication that a large amount of silver will be taken out of this portion of the mine, and he also states that the general condition of the property as to the equipment and ore reserves is excellent and promises a most satisfactory year to come.

ORE RESERVES ESTIMATED FROM PROBABLE ORE

The report of the manager gives data on production, development and costs. The question of ore reserves is dismissed with the following statement: "In the matter of ore reserves the situation is too uncertain for the ordinary type of report. There are unusual difficulties in estimating values where the character of the veins vary so greatly within a small area. From accurate data of the values secured from ground removed up to the present, and by comparison with these results, we may estimate with reasonable certainty from 6,000,000 to 7,000,000 oz. of silver in probable ore." This statement would seem to convey the idea that there is little ore blocked out or actually proved.

YEAR SHOWED LARGEST PRODUCTION AND LOWEST COST

The manager gives as the result of the year's work: "The largest production at the smallest cost in the history of the mine." The production of silver for the year ended Aug. 31, 1910, is stated as 3,046,295 oz., produced at a cost of \$212,727, or 7.54c. per oz. These figures in-

clude the cost of mining the ore, development, additions to plant, salaries and every expenditure at the mine.

Ore shipments for the year were as follows: First class, 1,311,120 lb. containing 2,473,128 oz., thus averaging 3775 oz. silver per ton; second class, 2,359,875 lb. containing 427,057 oz., average 362 oz. per ton; dump, 4,883,436 lb. containing 225,213 oz., average 92 oz. per ton; making a total of 8,554,431 lb. of ore containing 3,125,400 oz. silver.

The total expenditures for surface improvements and plant maintenance amounted to \$7583, this including a shaft house at No. 9, equipped with winding engine and cage, the installation of steam-heating system in employees' sleeping quarters, mess hall and officers' residence and upkeep of the surface equipment.

Development work for the year amounted to 6040 ft., as follows: Drifting, 3406 ft.; sinking, 306 ft.; crosscutting, 2005 ft.; raising, 323 ft. The underground workings of the mine are stated to have attained an extent of over three miles.

LOWEST WORKINGS AT 400-FT. DEPTH

The greatest depth continues to be on vein No. 3, where the bottom level is driven at 400 ft. from the highest point on the surface where the vein outcrops. The ore mined between 350- and 400-ft. depth has averaged 1800 oz. in silver. Vein No. 2 has so far failed to respond to development, but it is proposed to explore this vein at a greater depth than 50 ft. At No. 7 shaft the fourth level has been opened up at a depth of 190 ft., and in two winzes high-grade ore has been held for 25 ft. below this level. All the ore mined during the year from this section of the workings came from below the third or 150-ft. level, so that it was possible to avoid drawing on the reserves of high-grade ore on the upper levels.

An interesting and important development was the extension of the 150-ft. level to the east, where a new orebody

was located. From this were mined 165,000 oz. of silver. Crosscutting showed several new veins from 2 to 6 in. in width. The ore in three of these veins runs 2000 oz. per ton, while the others are of lower grade and little work was done on them.

ORE FROM VEIN NO. 8 AVERAGED 1600 OZ. PER TON

Vein No. 8 is a regular producer and was developed by a winze for 40 ft. below the 150-ft. level. At this depth the silver content of the ore is irregular, varying from 52 to 2000 oz. to the ton. The average silver content of the ore produced from development on this vein during the year was 1600 oz. per ton. The reserves on other pay veins on the property, including Nos. 4, 6, 9 and 12 were not drawn upon. In order to secure good ventilation and also to provide a second egress from the mine the third or 150-ft. level was connected with the No. 9 shaft.

WORK ON KERR LAKE-MAJESTIC GIVEN UP

The Kerr Lake company also did 1120 ft. of underground development work and systematic trenching of the surface on the Kerr Lake-Majestic Mines, Ltd., property, situated on the north shore of Kerr lake. This work failed to disclose pay ore, and on Jan. 19, 1910, all work was discontinued.

SILVER PRODUCED AT A COST OF 13.27C. PER OUNCE

The treasurer's report on the financial operations of the company for the year ended Aug. 31, 1910, comprises a summary, profit and loss account and balance sheet. It is stated that 2441 tons of dump material were shipped, on which the charges were as follows: Shipment expenses, \$3554; freight, \$26,485; ore treatment, \$15,825. The total shipments are stated as 3,125,400 oz., while the smelter settlement aggregated only 2,976,611 oz. This was due to deductions by

the smelting works for the losses and treatment charges.

The costs of production per ounce of silver were: Mining, 7.54c.; shipment and treatment, 2.29c.; metal deductions, 2.71c.; administration and general, 0.73c.; total, 13.27c. The cost was somewhat increased by the large cost of the treatment of the low-grade dump material, which amounted to 22.92c. per oz. The dividends paid from year to year by the Kerr Lake Mining Company are: 1906, \$90,000; 1907, \$210,000; 1908, \$360,000; 1909, \$480,000; 1910, \$990,000; total, \$2,130,300.

MINING COST 37 PER CENT. OF PRODUCTION COSTS; DEVELOPMENT 35; SORTING, 8.2 PER CENT.

The total cost of production and development are segregated as follows: Mining, \$78,737; development, \$74,510; ore sorting, \$17,393; repairs to plants and buildings, \$1421; stable expenses, \$2610; office expenses, \$3168; surface expenses, \$2619; general expenses, \$2595; taxes, \$28,440; Cobalt Mines Hospital, \$1230; total, \$212,727. Other charges were: Shipment, \$7147; freight, \$41,174; ore treatment, \$44,935; concentration, \$4551; assaying, \$4348; insurance, \$4308; foreign shipments of silver, \$9304; total, \$115,669. Administration and general expenses amounted to \$15,577; total proceeds of ore sales, interest, etc., were \$1,542,194; thus leaving a profit of \$1,198,220, carried to the balance sheet.

DIVIDENDS PAID AMOUNTED TO \$1,050,000

From the profits, \$1,050,000 were paid in dividends to the Kerr Lake Mining Company of New York, which latter company distributed, as heretofore stated, \$990,000 in dividends. The assets of the Kerr Lake Mining Company, Ltd., on Aug. 31, 1910, are stated as \$1,187,910.

The administration and general expenses of the Kerr Lake Mining Company of New York for the year ended Aug. 31, 1910, were \$18,286; United States internal-revenue charges, \$9103. A balance of \$34,981 was carried to the balance sheet. The assets of the Kerr Lake Mining Company of New York, on Aug. 31, 1910, are stated as \$3,023,702; \$3,000,000 in shares of the Kerr Lake Mining Company, Ltd., of Ontario, Canada; \$23,605 in cash and \$96 in interest accrued.

Water Frontage on New York Harbor

New York harbor is one of the greatest centers of metallurgical enterprise in the world, and for this and other purposes the value of land fronting on the water has increased greatly during the last 10 years. The International Nickel Company has just acquired property of about 110 acres for a consideration of

\$600,000. The land is in the town of Cartaret, about four miles below Elizabeth, N. J., and is said to be the last remaining available property along the Sound which is being deepened by the United States government to a depth of 24 feet.

Among other large industries which have recently located in this vicinity are the Standard Oil Company, the United States Metals Refining Company, Chrome Steel Works, Sound Shore Chemical Company, and the Grasselli Chemical Company.

Regarding the further improvement of Staten Island sound for deep draft vessels, there was recently incorporated the Deep Waterways Association, which has in view the increasing of the depth of Arthur kill and Staten Island sound from 24 to 32 ft., so as to permit its use by vessels of the deepest draft, thus increasing the use of this waterway.

Discovery of the American Nettie Mine

DENVER CORRESPONDENCE

About 1885, two "tenderfeet" made a discovery near Ouray that has added to the world's supply of gold about two and one-half millions of dollars. Up on a sheer cliff of Dakota quartzite, about 1800 ft. above the valley and town of Ouray, might be seen a big hole, denoting a cave, but no one seemed to attach any importance to it, nor did it excite the curiosity of the prospector; it was in quartzite, and therefore the knowing ones and old-time miners said the "wrong formation for ore." But one fine day the two tenderfeet, who had no theories as to formations, thought they would investigate. They knew there could be no wild animal in the hole, owing to its situation, so they took up a rope, and made it fast to a stout quaking-aspen tree, and one of them went 20 ft. down the rope hand-over-hand to the mouth of the cave, and crawled in. It was a goodly sized room, the floor being covered about a foot deep with a red dirt. He filled his coat pockets with this, and climbed again to the top.

DIRT PROVES RICH IN GOLD

The two then went back to town, and an assay showed that the dirt carried about 10 oz. gold to the ton. Going back again, they staked out their claim, called the American Nettie, and made further examinations. Up in one corner of the roof, there was a hole evidently leading into another chamber, as a long pole poked into it it touched nothing beyond. The fame of the cave spread abroad, and capitalists being plentiful in mining camps in those days, the owners received many good offers.

The problem before them was, whether to put in a shot and blow down the partition, and take the chances of getting another chamber of ore, or an empty one showing that the first cave was the limit of the deposit; but an offer of \$14,000 from Lucas and the O'Fallons, of St. Louis, decided them, and they sold. Exploration showed that one cave led to another, and between 1889 and 1905 the American Nettie produced 23,641,316 lb. of ore of an average value of 6 oz. of gold to the ton.

ORE AN OXIDIZED PYRITE

The ore-caves occurred in the quartzite, above which was about 50 ft. of black shale, and on top of that a sheet of "birdseye" porphyry 500 ft. thick. The red dirt was oxidized iron pyrites, the original mineral of these replacement orebodies in the quartzite. A big diorite dike, which cut up from the valley through the sandstones and the quartzite was probably responsible for the solutions which passed laterally along the bedding and deposited the minerals in long irregular bodies. Oxidation of the iron pyrites then took place and the resulting oxidized material containing free gold, accumulated on the floor of the caves. As depth into the mountain was gained, however, the ore changed to iron pyrites associated with various other sulphide ores. In the quartzite below the American Nettie, was discovered later the Bright Diamond mine, of a similar nature, out of which about \$50,000 was taken, the ore averaging about \$120 per ton in gold.

FINANCE AND IRONCLAD ORE SIMILAR TO THAT FROM AMERICAN NETTIE

About 800 ft. below the American Nettie, at the junction of the quartzite with the lower red sandstones and limestones, another mine of a similar nature, the Finance and Ironclad claims, was discovered and a smaller cave on the former claim yielded \$4000 in gold. This property was then owned by Mrs. Thomas Gibson and William Weston, and was sold to the late Thomas F. Walsh and David Wegg, of Chicago. Little work was done by them, however.

Recently, a cave or vug has been opened on the Finance claim, the floor of which is reported to be covered about four feet deep with oxidized ore of the type described in the foregoing, the value of which, as shown by assayers, appears to be about \$200 per ton in gold. The Ironclad and Finance are now owned by the Wanakah company, also owning the Bright Diamond group. J. T. Roberts, of Buffalo, N. Y., is president; G. H. Bamhart, general manager.

During the year ended May 31, 1910, there were 1892 employees exposed to risk at the Alaska-Treadwell mine. The fatal accident rate was 2.64 per 1000 employees.

Economic Conditions in the Joplin District

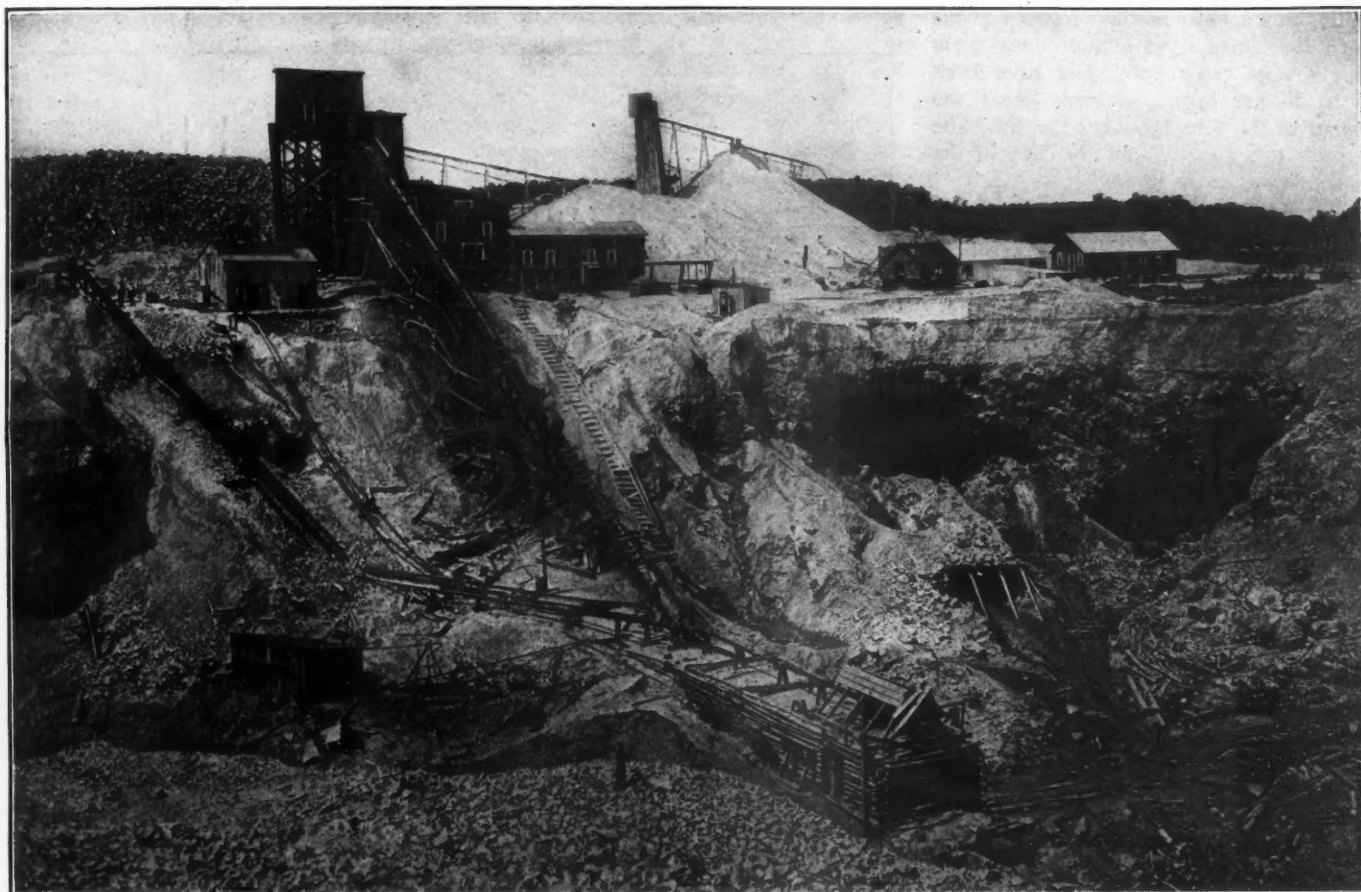
District Has Satisfactory Labor Conditions, Cheap Power and Enormous Resources. Elimination of Iron from Concentrates Presents Difficulties

BY T. LANE CARTER*

As a rule, mining camps and mining towns in America are not the most desirable places to live. No one would select, for instance, a residential site in the coal-mining districts of Wyoming, or the sagebrush regions of Nevada, for his home if he could help it. But there are mining centers in the United States where one enjoys the amenities of life and gets away from that hideousness so often concomitant with mining. Such centers are in the copper mines of Michigan, the gold mines of California, and the zinc district of Joplin, Missouri.

The romances of mining are not confined to gold, silver and diamonds. The Joplin district, the largest producer of zinc in the United States, has many stories of men who have started with nothing and made fortunes, and there are few places in the mining world where the chances are better for the man with a moderate amount of capital and experience, combined with conservative judgment, than in the Joplin district. With a capital of \$25,000 he may do a great deal, while with \$50,000 he may make an investment that will make him indepen-

through the crowded streets of Joplin and mingle among the miners, one will hear little foreign talk. Plain "United States," interspersed with a few emphatic "cuss words" of Cornish origin, is the language of the men. There are scarcely any foreigners. The camp is singularly free from labor troubles, and although agitators come along periodically and try to stir up trouble, the miners' unions, which have caused such trouble in many other camps, have not damaged the district yet. The visitor is surprised to find that there are practically no negroes at work in the



OPENCUT WORKING AND MILL OF THE MOLER-SMITH MINE, JOPLIN, MO.

From an eminence in the city of Joplin the visitor can see mines in every direction, stretching away into Kansas, toward the Arkansas boundary and into Oklahoma. But he does not see the landscape darkened by the clouds of black smoke which hang like a funeral pall over most mining cities. As most of the power is generated in gas engines, there are few smoke stacks and little smoke.

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dent for life. Capital is necessary for success, but compared with the large amounts required in gold and copper mining, the sum needed in the zinc district is small.

DISTRICT FAVORED WITH GOOD LABOR SUPPLY, ABSENCE OF UNION TROUBLE AND CHEAP POWER

Few mining districts have more favorable conditions than Joplin. In the first place the labor is of a good type. On Saurday nights or Sundays, if one walks

mines at Joplin. What negroes are there are employed in other occupations than mining.

Cheap power is also a great boon to the Joplin district. Within reasonable distance there is sufficient gas and oil in the wells of Kansas and Oklahoma to furnish Joplin cheap power for years to come. It is doubtful whether any district is better off from the power point of view than is this one. The gas is brought in pipes from distant points to the mines; and is used without any

trouble in gas engines, and under boilers for steam raising. Few hydroelectric schemes can show cheaper power costs than the gas-driven engines of Joplin. For the companies who own the gas wells, it was a sorry day when the gas engine was introduced into the district, for it so reduced the amount of gas required per horsepower, as compared with steam raising by this fuel, that the consumption went down to an alarming extent. In self defense the companies raised the price of gas used in the engines to nearly double the price asked when the gas is consumed in the boilers. With gas engines the fuel bill is from one-third to one-fourth what it is when coal is used for steaming purposes.

MINERAL LANDS LEASED ON ROYALTY

Joplin is preëminently the "poor man's district." The custom of the section is to lease out the mineral land to companies or individuals in lots of 10 acres or more, on a royalty basis, the owner of the land furnishing none of the capital. On this system the royalty paid runs from 5 to 20 per cent. In some cases the owner of the land furnishes the mill. The royalty asked then is 30 per cent. of the gross output of the mine.

The system has its advantages and disadvantages. In its favor is the fact that a larger number of men are successful, and the mineral wealth is more evenly distributed among the members of the community than when a mining district is gobbled up by a trust or syndicate and all the profits go to swell the fortunes of a few. The fact that so many working men are leasing ground on their own account is one of the reasons for the satisfactory labor conditions of the district. It is, in a measure, the profit-sharing idea.

But the system has its serious drawbacks from the engineer's point of view. While it is true that one can see some excellent mining work in the Joplin district, he also notices as slovenly, careless work as can be found anywhere. For lack of capital the small operator frequently uses methods which a well financed company would never employ. In consequence the mining is sometimes done in a poor way, insufficient prospecting is carried out, and the percentage of extraction of the zinc is not so high as it should be. Through these inefficient methods, observable in some cases, much zinc is lost that would be saved in the operations of a strong corporation.

IRON IN ORES CAUSES GREAT LOSS TO SMALL OPERATORS

Then too, with men working on a small scale it is out of the question to install machinery and carry out experiments, which could be done by a strong corporation. Take, for instance, the question of iron in the zinc ores. In the Joplin district it is customary to pay for the zinc blende on the basis of 60 per cent. zinc,

and a maximum of 1 per cent. iron. If the concentrates run over 1 per cent. iron, a penalty of \$1 per unit is charged. When the zinc assays under 60 per cent. a penalty of \$1 per unit is deducted from the market price for every unit below 60. When they assay above 60 a bonus of \$1 per unit is given.

The iron in the ore is the bane of many mines. In some sections the zinc is mixed with iron more than in others. In places the blende is practically free from iron, while in others there is from 15 to 20 per cent. iron present. Thousands of tons of zinc ore are lost in the Joplin district on account of the iron contents. For instance, take a man who strikes a large bunch of ore assaying 7 per cent. iron. Not only will this appear in the concentrates, but it will reduce the zinc in the product from 60, let us say, to 53 per cent. The seller of this ore will be penalized \$6 per ton for the iron contents and \$7 per ton for the seven points below 60 per cent. zinc content. In

important of the metallurgical problems in this great district.

KEEPING OF ACCURATE RECORDS OF OPERATIONS NEGLECTED

One is struck with the absence of system in keeping the records of the underground workings, drill holes, prospecting, etc., in the Joplin district. Were there a law that all mine workings be surveyed by competent surveyors, giving full details of the elevations of the workings, the drifts, the assay value of the ore found, the direction of drill holes and a definite report of what they disclosed, the Joplin district would be enormously benefited. There has been a lot of drilling in the past, but on account of the absence of records, much of this work, after a few years, must be done over again for a new man entering the district.

GEOLOGICAL DATA ASSURE PERMANENCE OF DISTRICT AS A ZINC PRODUCER

The geology of Joplin has been worked



NO. 2 MILL AT THE MOLER-SMITH MINE, JOPLIN, MO.

other words, the iron present reduces the value of his product \$13 per ton of concentrates, a serious condition of affairs.

Now a strong corporation, operating a large mill treating a large tonnage daily, could afford to experiment and devise ways and means to eliminate the iron at a cost, say of \$3 per ton, and thus save \$10 per ton of concentrates. At the present time a company is working on the iron problem. With the magnetic separators now in the market, the Wetherill, the Jobke, etc., the problem of dealing with the iron can be solved. This question is not so pressing in the Joplin district as in the Oklahoma and Arkansas fields, to the south. Here the amount of iron present makes the ores unprofitable. If a means of getting rid of the iron cheaply and effectively were available, there are millions of tons of zinc ore that would become profitable. The elimination of iron in concentrates is one of the most

out so thoroughly by the U. S. Geological Survey, and is so well known that I need not dwell on it here. Suffice it to say that, so far, the mining of zinc in this district has only been carried on in the top of zones, none of the ore having come from a greater depth than 300 ft. Deep drilling has proved that zinc ore is found occurring in distinct zones to a great depth. Enough is proved of this formation, one of the world's most remarkable mineral deposits, to know that so far it has "only been scratched" and that it will continue to be a profitable producer of zinc for decades to come. There are few districts in the mining world whose future is more assured than is that of Joplin. It will, of course, have its ups and downs, but there is sufficient zinc ore there for a long time to come. An enterprising gentleman is now proposing to mine zinc from the second zone, below the chert. It is hoped

that he will be successful in his undertaking, for it will mean a great deal, not only to him but to the district, if he shows that zinc can now be profitably mined in the second zone.

THE MOLER-SMITH AN EXAMPLE OF WELL OPERATED MINE

One of the most interesting mines in the Joplin district is the Moler-Smith, owned and operated by the Excelsior Mining Company. Its success is largely due to the energetic general manager, Ezra Allendorf, and shows what can be done with low-grade material in the district, when the conditions are favorable and the management of a high order.

The mine is worked in an opencut, a steam shovel being used to mine the ore. It reminds one of a Kimberley diamond mine on a small scale. The actual recovery is 1.8 to 2 per cent. zinc. This means that the ore as it stands in the mine does not assay over 2.25 to 2.4 per cent. zinc, an exceedingly low-grade material with which to deal. Of course, conditions must be ideal to make money with such ore. The material does not take much dynamite to bring it down or else the margin of profit would be greatly reduced.

As yet the mine is not in full swing, and it is expected in time to bring the total costs for mining and milling down to 30 to 35c. per ton. At present the costs per ton are: Mining, 35c.; milling, 12c.; total, 47c. About 12,500 tons are now being put through the two mills per month of 26 working days. Great care is taken to keep the surface water out of the opencut by a system of dike walls and trenches. The pumping is done with gas engines. An accompanying halftone engraving shows the opencut pit.

SHOVELERS WORKING ON CONTRACT DO EXCELLENT WORK

The shoveling is done on contract. In some countries, South Africa and Spanish America for instance, the engineer begins to think that the white man is losing the art of hard work. Let him visit the Joplin district and he will see what the white laborer, working on contract, can still accomplish. In the Moler-Smith mine the shovelers are paid 10c. per ton, and on this basis earn from three to five dollars per day. The ore is not shoveled off platforms, but must be lifted from the ground and dumped into cars. Under these circumstances the men do excellent work. Fancy a white man shoveling 50 tons per day in an eight-hour shift! The contract system is the only system. The miners are paid \$2.50 per shift, the usual rate in the Joplin district.

The ore is pulled out of the mine on an inclined plane, in one-ton cars made on the property. These are more satisfactory than three-ton cars formerly used. The hoists are operated by steam, all other

machines on the property being operated by gas.

MINING OPERATION IS SIMPLE

The company is operating two mills, which are shown in the accompanying halftone engravings. As the blende is not finely disseminated in the limestone, the crushing is coarse, and the extraction is good. At one of the mills the slimes are passed over a table and about 300 lb. of zinc concentrates are caught per day. The ore is first put through crushers, then rolls, and then through jigs. The tailings are elevated by buckets. The disposal of tailings is the biggest problem at this mine. As the country is flat the tailings must be elevated.

TARIFF PROTECTION A GREAT ASSISTANCE TO DISTRICT

Now that the Government has settled the question of protection of the zinc industry, the outlook for Joplin is cheerful. The operators begin to feel blue when the price of concentrates falls below \$40 per ton, but when the price advances over that the profits go up, and as it approaches \$50 the tone of the district becomes buoyant. At present conditions are healthy. The fact that the tariff on the zinc ores protects the material from Joplin to the extent of nearly \$8 per ton tends to make Republicans out of the people. Free trade in zinc ores would be a serious blow to the district.

An Important West Virginia Gas Deal

SPECIAL CORRESPONDENCE

Another step in the program by which one dominant interest will secure control of the natural gas production of Ohio and West Virginia, was taken recently in Pittsburg, when the United Gas Fuel Company, of West Virginia, one of the subsidiary corporations of the Ohio Fuel Supply Company, of Columbus, took over all the property of the Interstate Natural Gas Company, a West Virginian corporation, with headquarters in Pittsburg. The Interstate has a capital of \$1,000,000, and it owns a large number of producing wells in Lincoln county, W. Va. A short time ago it started to build a pipe-line to the Ohio river, at Huntington, W. Va., and to furnish gas in opposition to the United Fuel Gas Company. In addition it was preparing to ask for franchises in several towns in Ohio, West Virginia and Kentucky; but recently all work was stopped on the pipe-line. This was one result of the purchase of the company by the United Fuel Gas Company, which thereby controls, practically, the West Virginia gas situation, as it and the Hope Natural Gas Company, a Standard Oil subsidiary, already govern the

other fields. The Ohio Fuel Supply Company and the Hope Natural Gas Company, each own one-half of the capital stock of the United Gas Fuel Company, so it may be seen that all West Virginia gas is controlled by one interest.

The Hope Natural Gas Company has arranged to take over practically all the properties and the pipe lines in West Virginia of the Manufacturers' Light and Heat Company, of Pittsburg, for a cash consideration, which is said to be about \$1,000,000. The Hope Natural Gas Company under the agreement, will furnish an ample supply of natural gas to the Manufacturers' company at the Pennsylvania State line, at an agreed wholesale price, the contract running for 20 years and the scale of gas prices being graduated. This deal places the Manufacturers' company in the strongest financial position it has occupied since its organization in 1903, seven years ago.

Ray Consolidated Copper Company

The fiscal year of this company closes June 30, but in the recently issued report, operating data are given to Sept. 1. Development has been carried on by churn drilling, indicating an increase in ore reserves from 38 to 59 million tons, besides about 16 million tons on the Gila property, which has practically been consolidated with Ray. The number of holes drilled is 332, and the total number of feet of drilling on both properties, 141,194. The average thickness of ore on the Ray property is 118 ft., of the capping, 240; on Gila, 171 ft. of ore and 315 ft. of capping.

The total completely and partially developed area is 148 and 28 acres for the Ray and Gila properties, respectively. Part of the ground has been so incompletely drilled that it is not even considered partially developed in the above figures, while in a number of holes the drills stopped in ore. In addition about 400 acres of ground have not yet been prospected, although a geological survey indicates mineralization. Only five drills are now at work, but 1,824,000 tons were added in August to the reserves.

OVER A MILLION AND A HALF TONS OF COPPER

The assay indicates 2.17 per cent. Cu., which gives a total of 1,620,000 tons of copper content. There are over eight miles of underground workings, and 85 per cent. of the present indicated ore-bodies can be mined by the caving system with a maximum hoist of 300 ft. The ore will be crushed to 1-in. size and delivered to storage bins which will hold one week's output. At present 63,000 tons of ore are in stock, but by the time the mill is running there should be 150,000 tons.

REDUCTION WORKS 21 MILES FROM MINES

The power for the mines will be supplied from Hayden, 21 miles away. The plant will generate 10,000 h.p., of which 25 per cent. will be held in reserve. The concentrator and smeltery will also be at Hayden. The concentrator will be in eight sections, each good for 1000 tons per day. The main mill building is up, the power-plant building should be finished by Nov. 1, and parts of both power plant and mill be operating by Feb. 1, 1911. No part of the smeltery will be ready for two or three months after that, and arrangements have been made with a customs establishment for that period.

ULTIMATE PRODUCTION 80,000,000 POUNDS

When the plant is running at full capacity the annual production should be about 80,000,000 lb. of fine copper, which it is estimated will cost about 9 cents.

September Dividends

The accompanying table shows the amount per share and total amount of dividends paid during September, 1910, by a number of the leading mining and metallurgical companies in the United States, Canada and Mexico.

| U. S. MINES. | Situation. | Amt. per Share. | Total Amt. Paid. |
|--|------------|-----------------|------------------|
| Am. & Smelters, pf. B..... | U. S. | 1.25 | 375,000 |
| Bunker Hill & Sull. l. s..... | Ida. | 0.30 | 98,100 |
| Butte Coal..... | Mont. | 0.25 | 250,000 |
| Calumet & Arizona, c..... | Ariz. | 1.00 | 200,000 |
| Calumet & Hecla, c..... | Mich. | 7.00 | 700,000 |
| Cumberland-Ely, c..... | Nev. | 0.10 | 130,000 |
| Doe Run Lead, l..... | Mo. | 1.50 | 98,674 |
| Federal M. & S. l. Great Northern Iron Ore..... | Ida. | 1.75 | 210,000 |
| Hecla, s. l..... | Ida. | 0.50 | 20,000 |
| Homestake, g..... | S. D. | 0.50 | 109,200 |
| Intern'l. Sm. & Ref. Iron Blossom, s. l. Little Bell, s. l. Nevada Con., c..... | Utah. | 2.00 | 200,000 |
| North Star, g..... | Utah. | 0.06 | 60,000 |
| Parrott, C. & S..... | Utah. | 0.05 | 15,000 |
| Phelps Dodge & Co., c..... | Nev. | 0.37½ | 431,500 |
| Quincy, c..... | Cal. | 0.40 | 100,000 |
| Round Mt..... | Mont. | 0.15 | 34,477 |
| St. Joe, l..... | U. S. | 2.50 | 1,123,365 |
| Uncle Sam, g. s. l. Utah Copper, c..... | Mich. | 1.25 | 137,500 |
| Yukon Gold, g..... | Nev. | 0.04 | 34,650 |
| | Mo. | 0.15 | 150,000 |
| | Utah. | 0.02 | 10,000 |
| | Utah. | 0.75 | 550,257 |
| | Alas. | 0.10 | 350,000 |
| FOREIGN MINING COMPANIES. | Situation. | Amt. per Share. | Total Amt. Paid. |
| Kerr Lake, s..... | Ont. | 0.50 | 300,000 |
| Lucky Tiger Com., g..... | Mex. | 0.05 | 35,750 |
| McKinley-Darrah-Sav., s..... | Ont. | 0.05 | 112,384 |
| N. Y. & Hond. Ros. Peregrina M. & M., pf..... | C. A. | 0.20 | 30,000 |
| Rio Plata, s..... | Mex. | 3.50 | 35,000 |
| | Mex. | 0.10 | 37,343 |
| U. S. INDUSTRIAL. | Situation. | Amt. per Share. | Total Amt. Paid. |
| American Coal..... | Md. | 0.75 | 37,500 |
| Crucible Steel, pf. Gen'l. Chain, com. Nat'l. Lead, pf. Sloss, Sheffield, pf. Standard Oil. Texas & Pac. Coal. U. S. Steel, com .. | Penn. | 1.75 | 427,638 |
| | U. S. | 1.25 | 92,692 |
| | N. Y. | 1.75 | 426,433 |
| | Ala. | 1.25 | 125,000 |
| | U. S. | 6.00 | 5,820,000 |
| | Texas. | 1.50 | 35,910 |
| | U. S. | 1.25 | 6,353,781 |

Chronology of Mining for September, 1910

Sept. 1—Announcement of the abandoning of the LeRoi mine in British Columbia by the London company.

Sept. 4—Wage agreement between Southwestern coal operators and miners closed.

Sept. 5—Joseph A. Holmes appointed chief of the Bureau of Mines by the President.

Sept. 9—Phelps, Dodge & Co., Inc., acquire a large stock interest in the Rock Island railway.

Sept. 10—Wage agreement between Illinois coal operators and miners closed.

Sept. 14—Completion of transfer of Cumberland-Ely mine to Nevada Consolidated Copper Company.

Sept. 19—250,000 miners in Wales, employed by the colliery trust, went on a strike.

Sept. 26—American Mining Congress convened in Los Angeles.

Minerals and Mines Department of the Appalachian Exposition

BY RAY V. MYERS*

The exposition being held at Knoxville, Tenn., offers in its mineral exhibits splendid object lessons in the natural wealth of the Appalachian region. This feature of the exposition is not confined to the special building provided for the minerals and mines department. Specimens of mineral resources, and equipment used in the mines and quarries may be noted in nearly all the buildings and through the exhibits of widely diversified industries.

MINERALS AND FORESTRY BUILDING

The exhibits belonging to the department of mines and minerals were selected and arranged under the supervision of Prof. C. H. Gordon, of the University of Tennessee. The idea carried out in this department was to cover the wide range of valuable mineral products native to this region, and present them in such a way as to enable the average visitor to get a comprehensive idea of the whole in a short time.

The marble exhibit is excellent and will impress the visitor with the splendid quality of Tennessee gray, pink and fancy-colored marbles. Some beautiful specimens of Carolina marble in blended colors of pink, cream and white attract much attention. Lack of space permits only mention of the minerals which are found in commercial quantity within the southern Appalachian region, viz: granite, limestone, slate, talc, gypsum, barytes, asbestos, coal, coke, red and brown hema-

*Consulting engineer, Knoxville, Tenn.

tite, magnetic iron ore, copper and zinc. A collection of geological maps, relief maps and illustrative matter completes an instructive mineral exhibit.

TENNESSEE-KENTUCKY COAL EXHIBIT

The most important mineral industry in the Appalachian region in the matter of extent of resources, value, and present development is the production of coal and coke.

A number of the more enterprising coal-mining companies of Tennessee and Kentucky are calling attention to this important business through a unique exhibit in the form of a building about 20x56 ft., whose heavily buttressed walls are built entirely of bituminous and cannel coal. The large and durable lumps used in the construction of this building offer significant evidence of the stocking quality of east Tennessee and Kentucky coals.

MARBLE BAND STAND

The mineral industry of greatest importance in the immediate vicinity of Knoxville is the quarrying and finishing of marble for building and decorative materials. A beautiful exhibit of Tennessee marble is furnished in the large \$20,000 band stand, whose massive walls, columns and stairways are built of solid marble. The material used in its construction was donated by several of the leading marble-producing companies of Knoxville's large group of such concerns.

The Southern Railway, Louisville & Nashville Railroad, and Norfolk & Western Railway have prepared attractive exhibits of the principal commodities of their tributary territories. In each of these exhibits a large proportion consists of valuable minerals, comprising coal, coke, iron, copper, zinc and manganese ores, marble, limestone, talc, asbestos, granite, slags and pottery.

MINE AND QUARRY MACHINERY

Building space could not be furnished for all of the large assortment of machinery on exhibit at the exposition. In the main building in the machinery exhibit is a variety of mine machinery rigged up with power to give operating demonstrations. Notable among these are Ingersoll-Rand Company, exhibiting pick mining machines, air compressors, rock drills, electric-air rock drills and pneumatic hand tools; Fairbanks-Morse & Co. electric generators, motors, mine pumps, and steam pumps; Eureka Stone and Ore Crusher Company is operating rock crushers of several sizes; W. J. Savage company, electrical and steam pumps; Myers-Whaley company is exhibiting its coal-loading machine which has been for three years in operation in various mines on test runs, loading coal into mine cars. Out in the open air the John C. Duncan company is demonstrating the operation of the Williams rock crusher.

Notes on Operations in Jarbidge Camp, Nevada

Low-grade Gold Ores. Veins Large and Persistent although Much Faulted. Camp Suffering from Dearth of Capital. Promising Showings

BY WINTHROP W. FISK*

Jarbidge, although over six months old, is still a prospector's camp, and is being developed almost entirely by individuals with little outside assistance, other than from the ranchers and business men of Twin Falls, Idaho. There have been a few mining men representing outside capital in here, but the prices and terms at which the prospects were held did not encourage them to take up anything. However, conditions are changing, better ores are being developed and prices are being brought within more

the range for years, burn off the hillsides each year to improve the grazing.

Since the snow went off so that the surface could be seen, prospectors have been busy and many good showings have been opened, over an area extending about four miles east and west and nine miles north and south. This work has shown many large veins with good ore on the surface and most of these veins have bunches of high-grade ore in rich streaks, which in several cases is being sorted out and sacked for shipment.

first lease north of the Pavlak shaft on the Arizona No. 1 claim. They have run in on the vein for 65 ft., being in rich ore since the first 10 ft. At present they are sinking and are sorting rock from two feet of the vein width.

LESSEES ON ARIZONA CLAIMS HAVE PAY ORE

The next lease north of the 4-M is on the Arizona No. 2, and is held by F. W. Riddle and William Corrigan. They have three openings on the vein, showing from 5 to 8 ft. of ore that averages from \$12 to \$16 per ton, with occasional bunches of rich ore in which the quartz is liberally sprinkled with free gold. The lease on the Pavlak vein, south of Pavlak, covering 300 ft. on Arizona No. 1 and 300 ft. on Arizona No. 4 claims, is held by T. J. Curley. He has two veins, four to six feet wide, opened for about 10 ft. each, the ore panning \$10 to \$12 per ton and improving with depth.

To the north along the Pavlak vein on the Rainbow Fraction, which is between Arizona No. 2 and No. 4, the Amazon Rainbow Company has a lease on which it has advanced a tunnel 65 ft., nearly to the intersection of the Pavlak and Amazon veins. The Pavlak vein has a strike of south 17 deg. east, while the Amazon vein south 50 deg. west. There are two systems of veins throughout the camp with approximately the above strikes.

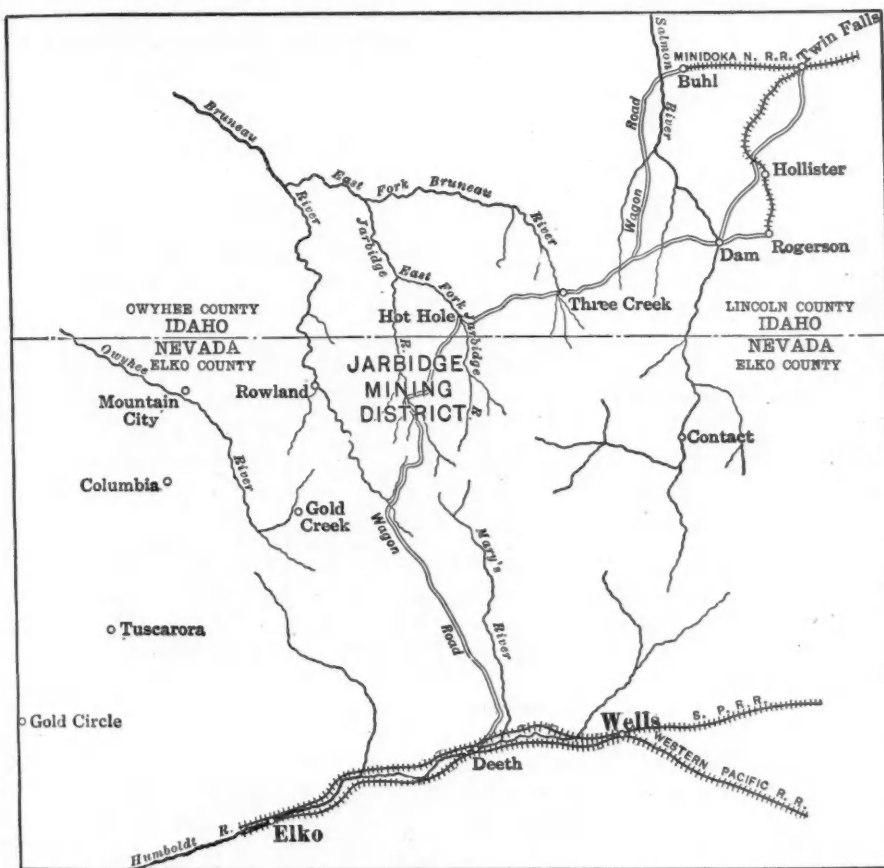
PAVLAK VEIN BEING DEVELOPED

The Pavlak company is running a crosscut tunnel from the level of the river bank to cut the Pavlak vein at a depth of over 300 ft., under the Pavlak shaft. This tunnel has been advanced over 380 ft. and from indications of the strata passed through, is about 50 ft. from the vein. This vein shows in the shaft, which is about 40 ft. deep, to have a width of 10 to 12 ft., and any part of the dump will pan well in free gold.

Directly to the east of the Pavlak claims, W. W. Williams has a lease and bond on the Red Bird and Duffy claims, on which he has exposed three veins which show on the surface a width of 4 to 6 ft. and in places ore of high grade.

LESSEES AT WORK ON NORTH STAR

North of these properties and near the town of Jarbidge is the property of the North Star Mining Company, where the original strike was made last winter. This is a great silicious dike 30 to 40 ft. wide,



GENERAL SKETCH MAP OF JARBIDGE DISTRICT, ELKO COUNTY, NEVADA

reasonable limits. It is, therefore, probable that before long there will be some companies operating with adequate capital to do proper development work.

The elevation of Jarbidge is about 6400 ft. and of the "crater" mines from 9000 to 10,000 ft. above sea-level. The country is extremely precipitous and hence offers opportunity for tunnel development. It is well watered and there is considerable small timber, although much of this is dead, as the sheepmen, who have had possession of

*Mining engineer, Jarbidge, Nev.

HIGH-GRADE ORE BEING SACKED ON 4-M LEASE

One party of lessees has about a car-load of high-grade ore sacked and expects to make a shipment soon. They estimate that their ore will yield them better than \$1000 per ton. Some days the ore sacked runs much higher than others, average samples from the sacked ore assaying from \$350 to \$4980 per ton. This lease is on the Pavlak vein, and is known as the "4-M" lease, being held by George Morris, Kessler Morris, E. L. Moffett and L. A. McCarthy. It is the

which carries gold throughout the greater part and shows some extremely rich ore. This company has about 150 ft. of development work, but is not at present operating.

Fletcher & Clark have a lease on the North Star No. 3 claim and are running a tunnel at a point 100 ft. down the hill to cut the orebody at greater depth. Buys & Riddle have a lease on the North Star claim and have two tunnels on a vein 6 to 9 ft. wide, in which the ore runs from \$10 to \$14 per ton, but as yet have encountered very little high-grade ore. On the Minnie B No. 3, which also belongs to the North Star company, a large vein, which shows some rich ore, has been opened just east of an extensive dike.

PROPERTIES TO SOUTH OF CAMP DEVELOPING

Joining the Pavlak, on the south end is the Pan claim, which has a tunnel 100 ft. long, that has cut a 5-ft. vein of quartz showing only low-grade ore, although there is a considerable rich float on the surface above the tunnel, indicating that an oreshoot exists nearby. Southeast of the Pan is the Pick and Shovel, one of the large properties of the camp. The outcrop here is nearly as wide as on the North Star, and on the 100-ft. level a crosscut shows the vein 30 ft. wide and of good average value with some high-grade ore.

Joining the Shovel claim is the success, on which has just been opened one of the best showings in the camp. The vein is 4 to 6 ft. wide and of high grade. On the east of the Success is the It claim, upon which a great deal of rich float is found. Surface trenching has so far failed to find the vein.

Just south of the It is the Rock Creek Fraction, on which a rich vein has been opened. It was only 6 in. wide when first encountered, but has widened to 2 ft. in 8 ft. of work. A one-third interest in this fraction was sold for \$1500, just before the strike was made.

RICH PROPERTY IN LITIGATION

What is considered the best property in Jarbidge is tied up in law suits between three claimants, the Bluster, Scenic and Mint. The property lies south of the Rock Creek claim and \$100,000 has been offered for a clear title to it, but at present none of the claimants show any disposition to compromise and it promises to be a bitterly contested case.

Promising showings are evident to the south on the Josephine, Red Rooster, Indian Camp and Stray Dog. About five miles south of Jarbidge the Pick and Shovel veins show 15 to 20 ft. wide for over 100 ft. on the strike in one place on the Good Luck claim, and for nearly as great a distance in another place. The vein can be traced across the river where it has been opened on the Free Gold

claims, and again on top of the ridge Mr. Shoemaker is opening the same vein. On the Good Luck, where they have a tunnel in about 30 ft., all the vein matter pans and some handsome specimens of free gold have been taken out. One mile further south a good showing is found on the Ozark claim and another mile to the south is the 15-ft. vein of the Mammoth claim, which shows on the surface ore assaying \$4 to \$9.

VEINS TO EAST OF RIDGE GIVE PROMISE

On the Fifth "crater," about two miles east of the Mammoth, near the top of the ridge between the head of the Jarbidge river and the East fork, a vein showing some fine free-gold specimen ore has been opened.

The Jarbidge range consists of a series of peaks which break off sharply to the east, forming small, deep basins which are called "craters." There are numerous veins showing along the sides of these basins or craters. It is only recently that any attention has been given to these veins as it means a climb of four to five thousand feet to reach them. However, a rich piece of quartz was found in the First, or Jack crater, a few weeks ago and since then there has been great activity all along the top of the range, relocating much of the ground and prospecting the veins.

The results have been quite successful. Two veins showing rich ore, which is being sacked, have been opened in Second crater and two in the Third crater that pan well over a width of 5 ft. The west veins from the Second and Third craters have been traced down into Snowslide, where large outcrops can be seen. Pay dirt has been found on the surface in the Bunch, Little Mud, Shadow, High Up and Brook properties near here.

FAVORABLE SHOWING ON WEST SIDE

On the west slope of the mountain between the craters and the river are numerous properties, where the surface rock will show more or less free gold in the pan. Among these are the Vulcan, Gold Coin, Miss Mc, Mother Lode, Cold Springs, Buster, Alice, May and Buster Brown.

The district is one of eruptive rocks, the quartz veins filling the cracks or fissures in the rhyolite porphyry. The veins, although much broken and faulted, show great size and persistence.

MAIL AND TRANSPORTATION FACILITIES TO BE IMPROVED

Jarbidge has heretofore had no regular mail service, which has been a great inconvenience. Recently the Commercial club took up the matter with Senator Nixon and President Taft, with the result that a special agent was sent to investigate. He signed up a contract for a mail three times a week, via Three Creek, Ida., and promised that as soon as the

new road to Deeth was finished he would recommend another mail route that way.

Another serious handicap has been the fact that the ranchers who are running the camp have charged an exorbitant rate of \$50 per ton for the 90-mile haul to or from the railroad ($2\frac{1}{2}$ c. per lb.). The Commercial club has taken up the matter of building a road to connect with the Southern and Western Pacific main lines, at Deeth.

The report of the engineer engaged to make the reconnaissance survey shows that this road will not be expensive to construct and will provide a 65-mile haul to the railroad. There is but one summit to cross between Jarbidge and Charleston and only 17 miles of road to build, of which over one-half will only require a little improving to the present road. From Charleston to Deeth there is a fine road over which autos can make the run in two or three hours. This road will give the camp much lower freight rates and supplies can be bought much cheaper at Deeth or Elko than at Twin Falls. Work will be pushed so as to have the road open before snow falls, so that the camp will have winter communication with the outside. The Twin Falls apology for a road cannot be used to any advantage during the winter months. The new road will permit autos to come into camp and will be available for transporting heavy machinery.

Electricity for Rand Mines

JOHANNESBURG CORRESPONDENCE

Great strides are being made on the Rand in perfecting the electrical equipment at the mines and mills. It is estimated the cost of the City Deep mill was reduced by £124,000, owing to the provision of power from a central station. The growth of the use of electricity on the Rand is shown by the following data, the successive figures under each head being for the years 1905, '06, '09 and '10: Number of electrical generators, 397, 500, 506, . . . ; number of motors, 724, 1754, 3027, . . . ; total horsepower, 17,594, 42,601, 76,299 and 200,000 estimated.

The cost per unit of steam is 0.918d. and the power cost per ton of ore crushed 24.7d. as compared with a cost per unit of electricity of 0.525d. and a power cost per ton crushed of 14.2 pence.

The estimated saving per ton by the use of electricity is, therefore, 10.5d. per ton crushed. The first figure is the present cost for steam at a typical large mine, the second is based on the price at which the Victoria Falls Power Company will supply current after October, 1912. J. A. Vaughan estimates that in some cases the saving affected will amount to one shilling per ton of rock crushed.

Notes on the Construction of California Dredges

New Boats Have Buckets of 13 1-2 cu. yds. Capacity. Spud Anchorage, and Close-connected, Two-eye Buckets Favored. Costs Reduced

BY JOHN TYSSOWSKI*

In the three great gold-dredging fields of California, at Folsom, Oroville and Hammonton (Marysville), a distinct type of dredge has been evolved. Modifications in the constructional details are necessitated by the different conditions under which the dredges must be operated, but a general tendency toward standardization of design is noticeable.

At the present time there are of the larger dredges nine operating in the vicinity of Folsom in Sacramento county, 14 about Hammonton on the Yuba, in Yuba county, and about 30 in the immediate vicinity of Oroville in Butte county. In all there are possibly 75 dredges operated in the State, scattered about the counties mentioned and in Calaveras, Siskiyou, Trinity, Shasta, Merced and Stanislaus counties. The yield in gold from these dredges now amounts to about seven and one-half

two and one-half cents per cubic yard of material handled.

COSTS IN CALIFORNIA DREDGE FIELDS

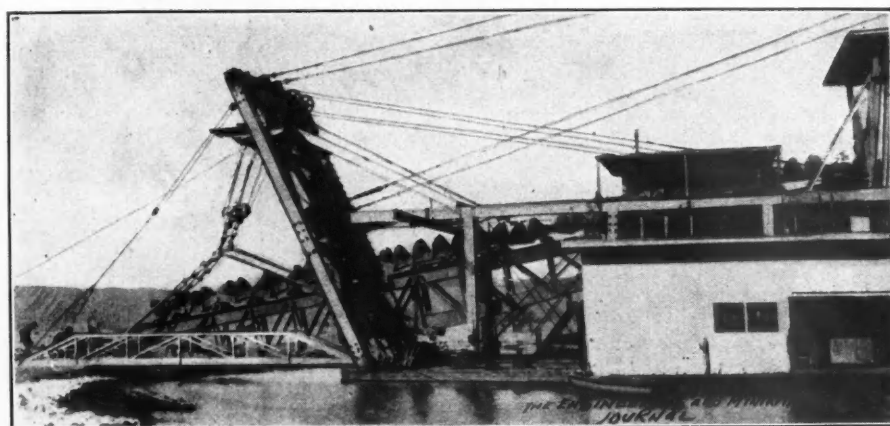
The following figures on dredging costs in California may be cited as being typical: The Folsom No. 4, 13½-cu.ft. dredge operated over a given period at a cost of 3c. per cu.yd. of material handled; the average cost for

The segregation of the costs for these various-sized dredges is given in Table II, in which the figures under the items of cost represent the percentage of the total cost.

Other available data on the cost of dredging at Oroville show costs per cubic yard ranging from five to nine cents. An approximate distribution of the costs for the Oroville district is: 18 per cent.,

TABLE I. DATA ON OPERATION OF CALIFORNIA DREDGES.

| Capacity of Buckets, Cu.Ft. | Period of Observation, Months. | Actual Operating Time, Per Cent. | Gravel Dug per Month, Cu.Yd. | Depth of Gravel. | Cost per Cu.Yd., Cents. | Character of Ground. |
|-----------------------------|--------------------------------|----------------------------------|------------------------------|------------------|-------------------------|----------------------|
| 3 | 12 | 82.3 | 38,200 | 27 | 7.00 | Favorable. |
| 3½ | 12 | 83.7 | 38,400 | 35 | 7.32 | Compact. |
| 5 | 12 | .... | 67,600 | 36 | 6.65 | Medium. |
| 7 | 12 | 79.0 | 84,700 | 28 | 4.51 | Compact. |
| 7½ | 12 | 73.2 | 113,900 | 70 | 4.16 | Medium. |
| 8 | 6 | 72.2 | 97,000 | 42 | 3.92 | Light. |
| 13½ | 8 | 77.7 | 225,000 | 19 | 2.30 | Fine and light. |



YUBA DREDGE WITH DIGGING LADDER AND LOWER TUMBLER ON BANK FOR REPAIRS

million dollars per year. In 1898, when dredging was commenced at Oroville, a yield of \$19,000 was recorded.

TENDENCY IN BUILDING

The tendency in dredge building has been steadily toward turning out stronger and larger boats. Thus the period of usefulness has been increased along with the capacity for handling material, until now the most modern dredges handle about 250,000 cu.yd. of material per month and probably represent an initial expenditure of \$250,000. The buckets on the largest dredges now operating in California are of 13½ cu.ft. capacity. Through the use of the improved and larger dredges, costs have been reduced in some cases close to

*Mining engineer, editorial staff, ENG. AND MIN. JOURN.

the Natomas Consolidated of California for eight months of 1909 was 3.85c. per cu.yd. (3.06c. Natomas division and 5.17c. Folsom division); records for six years' operation at Oroville with 5-cu.ft. bucket dredges show a cost of 5.63 per cu.yd.; with 3½-cu.ft. buckets, 7.9 cents.

It is probable that the larger boats in California are at present operating on easy digging material at a cost of between two and two and one-half cents per cubic yard. On the Yuba and Folsom fields the dredges handle from 100,000 to, under the most favorable conditions, 250,000 cu.yd. of material each month. The actual operating time on the better dredges averages close to 85 per cent. Table I accompanying this article shows approximate cost data for the operation of a number of dredges in California under typical conditions.

power; 45, repairs; 25, labor; and 12, general. It will be seen from the data advanced that, in the larger and more modern boats, the repair item seems to be decreasing and the charge to labor and power correspondingly increasing. This is the natural course with better machinery and larger yardages handled.

ECONOMIC CONDITIONS IN DREDGING FIELDS

Wages do not vary greatly in the different dredging fields of California. The winchmen receive 45c. per hour in the Folsom field, \$3.50 per day at Oroville and \$3.50 to \$4 per day on the Yuba. Oilers receive 35c. per hour at Folsom, \$2.50 to \$2.75 per day at Oroville, and \$2.75 to \$3 on the Yuba. Chinamen employed in cleaning off ground before dredges, etc., at Oroville, receive \$2 per day. The repair men at Hammonton receive \$2.50 per day. A regular dredge crew consists of one winchman and three oilers, besides extra men employed on extraordinary repair work. One clean-up crew usually attends to several dredges. Three eight-hour shifts are worked. Power costs range up to about 1½c. per kw.-hour, 1.25c. being a fair average for Oroville, and 0.65c. for Folsom. Power is supplied by a number of companies. At Oroville the Palermo Land and Water Company charges \$150 per year for water for each dredge. In most cases on the Yuba seepage fills the ponds, pumping sometimes being necessary to keep the water down to the proper level.

APPROVED CONSTRUCTION

Experience seems to have proved the superiority of the spud method of anchoring dredges to that of using head-lines to keep them up to their work, and the latter type is fast disappearing from the California dredge fields except where only very loose material must be dug. The close-connected bucket chain is also almost universally desired in preference to the open-link chain, although the latter type is doubtless better adapted to digging ground containing quantities of large rocks. Revolving screens for washing the gravel have proved in most

Yuba Consolidated Goldfields; and one of the Boston & Idaho Gold Dredging Company to operate at Idaho City, Idaho. The Natoma No. 8 will dig to a depth of 55 ft., the Yuba No. 13, 64 ft.; and the Boston & Idaho, 36 ft., below water line. The digging ladders on these boats will be of the plate-girder type. Gold-saving tables on the No. 13 and No. 8 boats will be built of wood; on the Boston & Idaho dredge, of steel. All will be double banked and the complete area on each will be 6300 sq.ft. As seen in Table III, the combined areas of the gold-saving

trusses, one along either side of the well hole and at about 20 ft. above the deck, extend from the bow to the stern gauntree. This has been found to give stiffness and add materially to the wearing qualities of the hull. Athwartship distortion is taken care of by trusses under the main drive and forward of the main housing. Partitions of heavy timber forming a continuation of the sides of the well hole run the full length of the hull, dividing it into three longitudinal compartments. Partitions of lighter timber extend from bow to stern, subdividing the outer compartments. An overhang usually of 4 to 6 ft. is usually provided on either side of the deck. Heavy timbers are laid crosswise to form the bottom framing of the hull, and upon these, between compartments, horizontal angle braces, butting at their ends, to form a lacing across the hull. This gives rigidity to the hull and takes care of the excessive strains that come to it from the spud.

On the boats of the Yuba Consolidated Gold Fields, operating near Hammonton,

TABLE II. PERCENTAGE SEGREGATION OF COSTS OF DREDGING IN CALIFORNIA.

| Capacity of Buckets, Cu.Ft. | Labor and Material. | Repairs. | Water. | Electric Power. | General. | Taxes and Insurance. |
|-----------------------------|---------------------|----------|--------|-----------------|----------|----------------------|
| 3 | 28.7 | 47.0 | .... | 9.9 | 9.0 | 5.4 |
| 3½ | 38.9 | 29.3 | 1.6 | 21.6 | 14.6 | .... |
| 5 | 34.5 | 44.2 | .... | 16.2 | .... | 5.1 |
| 7 | 24.4 | 48.5 | 3.3 | 14.4 | 6.3 | 3.1 |
| 7½ | 23.8 | 47.0 | .... | 18.5 | 10.7 | .... |
| 8 | 43.1 | 29.1 | .... | 15.1 | 7.1 | 5.6 |
| 13½ | 44.4 | 26.0 | .... | 20.4 | 5.3 | 3.9 |

cases satisfactory and are generally used except where light sandy gravel free of clayey material is being handled, in which case the shaking screen is considered advantageous.

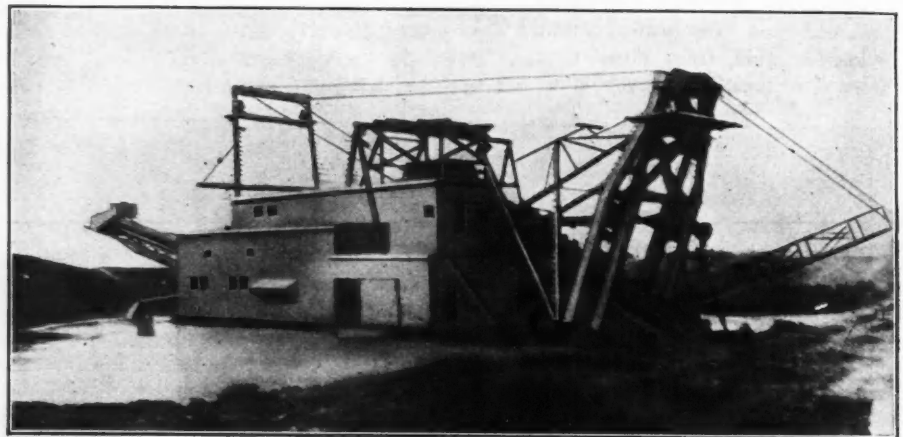
Another general tendency has been toward increasing the area of the gold-saving tables. Some of the earlier 7½-cu.ft. Yuba boats only have gold tables of an aggregate area of about 900 sq.ft., while on the later boats the tables range up to over 6000 sq.ft. in area. The Hungarian riffle is generally preferred to the expanded-metal-and-coccomatting type. Few if any gold-saving devices to supplement the tables have proved successful, the difficulty always being in their inability to handle the requisite amount of dirt.

DREDGE BUILDERS

Up to 1904, W. P. Hammon, who probably has the most extensive holdings in the dredging industry of California, contracted for the building of his dredges, but in 1907 organized the Yuba Construction Company, with shops at Marysville, Cal. This company has built 21 boats to date, all of which are operated by companies under the control of Mr. Hammon.

The Bucyrus, Risdon and Western Engineering and Construction companies have built most of the other dredges used in California. A considerable amount of machinery and parts manufactured by the Bucyrus Company is used in the Yuba and Western Engineering boats.

The Yuba company is now building three 13-cu.ft. dredges: the No. 8 Natoma for the Natomas Consolidated of California, which company will erect its own dredge; Yuba No. 13 for the



NATOMA NO. 1. THE LARGEST DREDGE OPERATING IN CALIFORNIA

tables on the old Natoma boats range between 2000 and 4000 sq. ft. The details to be embodied in the construction of these dredges illustrate the latest ideas in dredge building. Tables III and IV give interesting data as to the dimensions and equipment of a number of California dredges.

HULL—WEAK POINT OF DREDGE

The difficulty of designing a hull strong enough to stand up under the hard service to which it necessarily must be subjected has always been a serious obstacle in dredge building. This has practically meant that the life of the hull has determined the period of usefulness of the dredge. On one California boat after one and one-half years' operation the distortion of the hull measured six inches.

According to the latest and most improved California design (shown in the accompanying detail drawing furnished me by H. G. Peak, former superintendent for the Yuba Construction Company) two

buffer plates and nests of heavy steel car springs are used to assist in taking up shocks from the spuds. On each of the new boats being built by the Yuba Construction Company, a steel casting will distribute the load over the stern. This casting will weigh eight tons. Each boat will be provided with two 38x50-in. by 70-ft. steel spuds with 10-ft. steel points, and weighing 84,000 lb. each. The main cord of each spud will be lined on the edges with 1x8x8-in. angle irons. There will be a guide at the top but no spud casing will be required. The hull of the Natoma No. 8 will be 150x68 ft. (58 ft. + 5 ft. overhang) and 12 ft. 6 in. deep and will require 650,000 board feet of lumber for its construction.

PUMPING AND ELECTRICAL EQUIPMENTS

The pumping equipment of the new dredges will consist of two 14-in. centrifugal pumps, one high-pressure to supply water for the screen and for

TABLE III. DATA ON CALIFORNIA DREDGE EQUIPMENT.

| Dredge. | HULL DIMENSIONS. | | | DIGGING. | | Water Supply. | | Gold Tables. | | BUCKETS. | | | SCREENS. | | | PUMPS. ^a | | |
|----------------------|------------------|--------|---------|-----------------------------|-----------------------|---------------|-----------------|------------------------|-------------------|------------------|------------------|-----------------|--|---------------|---------------|---------------------|-------------------|----------|
| | Depth. | Width. | Length. | Length Ladders C. of Drums. | Dig below Water Line. | Carry Bank. | Miners' Inches. | Combined Area, Sq. Ft. | Capacity, Cu. Ft. | Number in Chain. | Travel. | | Size. | Perforations. | | Screen Supply. | Auxiliary Supply. | Monitor. |
| | | | | | | | | | | | Feet per Minute. | No. per Minute. | | Upper Section | Lower Section | | | |
| Natoma No. 1..... | 11' 6" | 50' | 112' | 104' | 35'-6" | 20' | 150 | 3840 | 13½ | 61 | 64 | 20 | Upper 10' 10" x 22' 6" x 35' 6" | ¾ to ½" | 14" V.-L. P. | 10" V.-L. P. | ..... |  |
| Natoma No. 2..... | 9' | 42' 8" | 105' | 92' | 31' | 25' | 150 | 2395 | 8½ | 66 | 50 | 20 | Lower 11' 8" x 22' 6" x 35' 6" | ¾ to ½" | 14" V.-L. P. | 10" V.-L. P. | ..... |  |
| Natoma No. 3..... | 9' | 42' 8" | 105' | 92' | 37' | 25' | 75 | 2395 | 8½ | 73 | 50 | 20 | 6' x 35' 6" | ¾ to ½" | 10" V.-L. P. | 8" V.-L. P. | ..... |  |
| Folsom No. 3..... | 10' | 42' 7" | 120' | 100' | 37'-6" | 20' | 200 | 2276 | 8½ | 79 | 50 | 18 | 7' x 36' | ¾ to ½" | 5" V.-2 S. | 8" V.-2 S. | ..... |  |
| Folsom No. 4..... | 10' 3" | 44' 7" | 102' | 90' | 24' | 20' | 175 | 3258 | 13½ | 59 | 50 | 18 | Upper 12' x 16' 5" Lower 12' 9" x 22' 6" | ¾ to ½" | 5" V.-2 S. | 5" V.-2 S. | ..... |  |
| Folsom No. 5..... | 10' 3" | 44' 7" | 110' | 142' | 49'-6" | 26' | 751 | 2163 | 8½ | 79 | 50 | 18 | 7' x 36' | ¾ to ½" | 4" V.-L. P. | 12" V.-L. P. | ..... |  |
| Folsom No. 6..... | 10' 3" | 46' 6" | 120' | 145' | 54' | 30' | 80 | 2534 | 8½ | 85 | 50 | 18 | 7' x 36' | ¾ to ½" | 5" V.-2 S. | 5" V.-2 S. | ..... |  |
| Yuba 9-10-11-12..... | 9' 4" | 44' | 133' | ..... | 60' | ..... | ..... | ..... | 7½ | 94 | .. | .. | 5' x 33' | ¾ to ½" | 10" V.-L. P. | 10" V.-L. P. | ..... |  |

^aWaste used for irrigation.
^bVariable; high pressure; low pressure; two step.
^cFlapper pump.

TABLE IV. ELECTRICAL EQUIPMENT AND POWER CONSUMPTION ON CALIFORNIA DREDGES.

| Dredge. | MAIN DRIVE MOTORS. | | | | | | SCREEN MOTORS. | | | | | | STACKER MOTORS. | | | | | | SIDE-LINE WINCH MOTORS. | | | | | | MOTORS ON PUMPS. | | | | | | MONITOR. | | | | | | TRANSFORMERS. ⁵ | | HORSEPOWER TOTALS. | |
|---------------------------|--------------------|-------|----------|--------|--------|-------|----------------|-------|----------|--------|--------|-------|-----------------|-------|----------|--------|--------|-------|-------------------------|-------|----------|--------|--------|-------|------------------|-------|----------|--------|--------|-------|-----------------|-------|----------|-----------|---------|----------------|----------------------------|--|--------------------|--|
| | H.P. | Make. | V. or C. | Volts. | R.P.M. | Type. | H.P. | Make. | V. or C. | Volts. | R.P.M. | Type. | H.P. | Make. | V. or C. | Volts. | R.P.M. | Type. | H.P. | Make. | V. or C. | Volts. | R.P.M. | Type. | H.P. | Make. | V. or C. | Volts. | R.P.M. | Type. | Number. | Kw. | Volts. | Capacity. | Output. | | | | | |
| | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | Screen Supply. | | | Auxiliary Supply. | |
| Natoma No. 1..... | 300 | G.E. | v. | 550 | 514 | ..... | 75 | G.E. | c. | 550 | 720 | ..... | 35 | G.E. | v. | 550 | 514 | ..... | 150 ³ | G.E. | c. | 550 | 600 | ..... | 35 ² | G.E. | c. | 440 | 600 | ..... | 3 | 175 | 4000-575 | 645 | 445 | | | | | |
| Natoma No. 2..... | 200 | G.E. | v. | 2000 | 600 | ..... | 50 | G.E. | c. | 440 | 850 | ..... | 35 | G.E. | v. | 440 | 600 | ..... | 10 ³ | G.E. | c. | 440 | 1200 | ..... | 10 ² | G.E. | c. | 440 | 1200 | ..... | 3 | 125 | 4000-460 | 490 | 322 | | | | | |
| Natoma No. 3..... | 200 | G.E. | v. | 2000 | 600 | ..... | 50 | G.E. | c. | 440 | 850 | ..... | 25 | G.E. | v. | 440 | 600 | ..... | 75 ³ | G.E. | c. | 440 | 720 | ..... | 35 ² | G.E. | c. | 440 | 600 | ..... | 3 | 125 | 4000-460 | 490 | 370 | | | | | |
| Folsom No. 3..... | 150 | West. | v. | 2000 | 345 | F | 30 | West. | c. | 400 | 850 | 40 | West. | v. | 400 | 850 | ..... | 50 | West. | c. | 2000 | 580 | C | ..... | 30 | West. | c. | 400 | 850 | ..... | 3 | 87.5 | 2300-460 | 580 | 401 | | | | | |
| Folsom No. 4..... | 200 | West. | v. | 2000 | 580 | H F | 30 | West. | c. | 400 | 850 | 40 | West. | v. | 400 | 850 | ..... | 15 | West. | c. | 2000 | 580 | C | ..... | 30 | West. | c. | 400 | 850 | ..... | 8 | 87.5 | 2300-460 | 415 | 260 | | | | | |
| Folsom No. 5..... | 200 | West. | v. | 2000 | 580 | H F | 30 | West. | c. | 400 | 850 | 40 | West. | v. | 400 | 850 | ..... | 30 | West. | c. | 2000 | 580 | C | ..... | 30 | West. | c. | 400 | 850 | ..... | 8 | 87.5 | 2300-460 | 490 | 484 | | | | | |
| Folsom No. 6..... | 200 | West. | v. | 2000 | 600 | H F | 30 | West. | c. | 400 | 850 | 50 | West. | v. | 400 | 850 | | 30 | West. | c. | 2000 | 580 | C | | 30 | West. | c. | 400 | 850 | | 50 ² | West. | v. | 2000 | 460 | 572 | | | | |
| Yuba Nos. 9-10-11-12..... | 200 | ..... | ..... | ..... | ..... | ..... | 35 | ..... | ..... | ..... | ..... | ..... | 25 | ..... | ..... | ..... | ..... | ..... | 75 | ..... | ..... | ..... | ..... | ..... | ..... | ..... | ..... | ..... | ..... | ..... | ..... | ..... | ..... | ..... | ..... |  |  |  |  |  |

¹Variable or constant speed. ²Two motors. ³Direct connected. ⁴Light circuit. ⁵Natoma division carries 4400 volts on boats and transforms to 440 volts; Folsom carries 2000 volts on boats and transforms to 440 volts for small motors.

washing the dirt and one low-pressure to supply water for use on the gold-saving tables; also two 2½-in. centrifugal priming pumps. The Natoma No. 8 will in addition have a two-stage, 12-in. monitor pump capable of producing a 200-ft. head of water.

The Natoma No. 8 boat will be fitted with Westinghouse electrical machinery; the Boston & Idaho and the No. 13 Yuba boats with General Electric motors. The main-drive motors will be 300 h.p., variable speed, carrying full load on any notch of the controller. The motor to drive the monitor pump on the Natoma boat will be 250 h.p. The high-pressure pumps will require 150 h.p.; low-pressure, 75 h.p.; the auxiliary or priming pumps, 30 h.p. each; screen drive, 75 h.p.; stackers, 60 h.p.; winch motors, 30 h.p.; auxiliaries for drills, etc., 5 h.p. On a number of the more modern dredges the transformers are sheltered outside of the main housing in asbestos- and tin-lined sheds.

MACHINERY

The machinery used in the new boats is of much the same design as that in the previous boats put out by the Yuba company, differing only in a few details. In the original 5-cu.ft. Oroville boats the upper tumbler shafts were 9½ in. in diameter and fitted with nickel-steel sleeves. On the Natoma No. 8 this shaft will be 25 in. in diameter and built of forged nickel steel.

For the swinging winch, gearing for speed reduction and speed change will be set on an auxiliary frame, to one side of the main winch, making it more accessible and thus providing for saving time on repairing and changing of lines. Speed-change clutches will be of the friction type instead of the jaw type commonly used. It will be possible to change from the low to the high speed without stopping the motor. Ladder-hoist winches and main drives will be similar to, but heavier than, those used in dredges heretofore built.

REVOLVING SCREEN IN FAVOR

The revolving-screen drives have given trouble on account of slight differences in the diameters of the two small drive rollers generally used. This method of driving has, therefore, been superseded, on the boats being built at the present time by the Yuba company, by driving from a single drive roller placed centrally under the lower end of the screen.

As stated, the shaking screen has only proved advantageous for treating light and loose gravelly soil. Where clayey material must be handled it has been demonstrated that the revolving trommel is necessary in order to break up the lumps and separate the material, so that the gold can be recovered. On the No. 1 Natoma and No. 4 Folsom dredges, shaking screens, placed one above the other, are used. The dimensions of these

screens are given in Table III. The screens are ordinarily run at about 120 shakes per minute.

Revolving screens are ordinarily sloped 1¼ in. to 1 ft. They are made in sections and range up to 9 ft. in diameter and to a length of 51 ft., which is the size of the screens for the Natoma No. 8. The introduction of wash water under pressure into revolving screens, from headers or nozzles situated at their lower end, is now strongly advocated. This scheme is being adopted on a number of the dredges.

TWO-EYE BUCKET MORE SERVICABLE

The close-connected, in preference to the open-link, bucket chain is in general favor in California dredge practice, although some of the latter type are still used. The buckets consist of three parts, i.e., bottom, hood and lip. In the most improved construction the bottoms are



BOW VIEW OF ONE OF THE OLDER YUBA DREDGES

made of chrome-nickel steel, high-carbon steel containing 3 per cent. nickel or of Bucyrus YZ steel. The lips are made of manganese steel and, for the 8-cu.ft. buckets, are 1 in. thick and about 9 in. long. The hoods are usually made of pressed flange steel ¾ in. thick; 1-in. rivets are used.

The three-eye bucket requires a smaller connecting pin than does the two-eye. For instance, 8-cu.ft., three-eye buckets require only 5½-in. pins, while two-eye buckets of the same capacity require 6-in. pins. However, the two-eye buckets have one-third more surface to take up the wear on the upper tumblers and as the bushings are in one piece wear is better distributed there also. The two-eye buckets are also much stronger, the bottoms being less cut up. The 8-cu.ft. buckets weigh 2800 lb. each; 13-cu.ft., from 3600 to 4000 lb. each.

DISPOSAL OF TAILINGS EXPENSIVE

Pan stackers for the disposal of tailings seem to have gone out of favor on California dredges, as practically all of the present boats use rubber conveying belts. On the Folsom No. 6 the belt is 32 in. wide and 317 ft. long, being run at 360 ft. per min. The conveyer elevates tailings at an angle of 22 deg. from the horizontal, which is about the maximum inclination permissible. The troughing idlers used with this belt are: an 8 x 10-in. central, horizontal idler with 1¼-in. bore and on each side an 8x11-in. idler set at 45 deg. to the horizontal. The return suspended idlers are 8x36 in. with 1½-in. bore. On the new boats 42-in. belts 136 ft. long and supplied with silent chain drives will be used. A 32-in. belt of seven-ply rubber costs from \$7 to \$8 per lineal ft. and only wears from 90 to 140 days, so it is evident that there is still room for improvement on this feature of the operation.

GASOLINE DREDGE FOR ALASKAN USE

The Yuba company is building a 3½-cu.ft. for the Wild Goose Mining and Trading Company, Charles Monroe, manager. It will be used at Nome. It will dig to a depth of 15 ft. and draw when equipped 3 ft. 4 in. of water. The revolving screen will be 4 ft. 6 in. in diameter and 23 ft. long. A belt conveyer 28 in. wide and 55 ft. long, between centers of pulleys, will be supplied. Water supply will be from one 10-in. centrifugal pump.

The digging ladder will be of the lattice-girder type and the main drive of the same general description as is used on larger dredges of recent design, driving from both ends of the upper tumbler shaft. This shaft will be a nickel-steel forging, 9½ inches in diameter. The buckets will be miniatures of those used on the largest dredges and will consist of high-carbon base casting, one-piece pressed-steel hood and a manganese lip 1 in. thick and 8 in. wide. The general constructional details will be carried out in the same style as in the other larger boats built by the same company.

STEEL-HULL DREDGE FOR COLOMBIA

A steel-hull dredge is being built by the Yuba company for use on the Magdalena river in the United States of Colombia. This boat will dig to a depth of 36 ft., and be operated by electric power generated in the hydroelectric plant that is now being constructed. The largest piece of wood on this dredge will be the friction block on the break band. Buckets will be of 8½ cu.ft. capacity. Steel-hull dredges have been built before, but in so far as I am able to learn have never been run long enough for a satisfactory trial.

Electrolytic Refining in Australia—II

The Electrolyte Cheaply and Efficiently Filtered. Impurities Removed in Separate Electrolytic Tanks. Doré Parted on the Moebius Principle

BY G. H. BLAKEMORE*

In the first part of this article some assays were given of the gold and silver content of the electrolyte before and after filtering. A great number of assays could be quoted to show the efficacy of filtering the solution. Circumstances constantly arise which help to stir up the settled slime, such as too rapid a feed of fresh electrolyte, too much air used in agitation, or the cleaning of a large number of tanks in the same day.

The system in use for cleaning the tanks was so defective that upon refilling the tanks, all the mud left behind was stirred up, and much of it flowed on through each tank in series before it escaped to the sump.

A number of assays of nodules of copper from the first cathode in the first tank of the series of eight, showed the loss of gold and silver caused by the slime adhering to the rough faces of the cathodes. The first cathode in the first tank was taken for the reason that the fresh feed of unfiltered electrolyte was delivered close to it.

The assays pointed to the usefulness of filtering the whole of the electrolyte, and a sand filter is efficient, cheap, and easily cleaned. The first sand filter after it had been in use only a few hours gave an assay of 0.652 oz. of gold and 3.918 oz. of silver per ton for the first few inches of the top layer of the sand. A second assay from a filter in use for some weeks gave, 4.952 oz. of gold and 23.243 oz. of silver per ton. The benefit of the sand filter was apparent in the reduction of the gold and silver content of the electrolytic copper.

IMPURITIES IN ELECTROLYTE REMOVED BY ELECTROLYSIS

The impurities in Great Cobar copper were so small in amount that the refinery was run for a period of four years without eliminating them from the electrolyte. They consisted chiefly of iron, aluminum, small amounts of arsenic and bismuth and a faint trace of nickel. One analysis was: 1.28 per cent. $\text{Fe}_2(\text{SO}_4)_3$; 1.26 $\text{Al}_2(\text{SO}_4)_3$; 0.025 Bi; 0.73 gram As_2O_3 per liter, with some gold and silver in suspension and a trace of nickel.

Cleaning of the electrolyte by electrolysis, using lead anodes and a non-circulating electrolyte, was tried, with the result that in three days' time the electro-

lyte was freed from bismuth, and the arsenic reduced to a low percentage within a week. During a temporary suspension of work a large portion of the electrolyte was purified, and it seems to me that this method might readily be used if a separate storage sump could be arranged to receive the purified solution. By using a separate feed, little extra stock of electrolyte would be required.

As the purified electrolyte was produced it could be run to the new storage, and as fast as enough gathered to supply one series of tanks, the latter could be filled, and by a little ingenuity, the overflow from these returned to the clean supply. If the tanks are arranged in sets of three, containing 1000 gal. in each set, the extra storage room for the new supply need only be about 1000 gallons.

The arsenic, bismuth, etc., are precipitated with the copper. From the analyses made, it appears that the copper does not readily deposit after the solution gets as low as 2.1 per cent. in copper. The last day the copper increased by 0.37 per cent. but this was most likely due to the resolution of some of the copper deposited. The copper assayed: 99.3 Cu, 0.022 Bi, and 0.168 per cent. As, with a conductivity by Matthiessen's standard of only 54.3 per cent.

Lawrence Addicks has pointed out the effect of small quantities of arsenic on the conductivity of copper, and these tests are an instance entirely supporting his conclusion. I do not know if this method of purifying an electrolyte of bismuth and arsenic has ever been used outside of Lithgow, but it seems to me to have possibilities. The tests were made on several thousand gallons of electrolyte.

CHLORINE IN ELECTROLYTE CAUSES A SLIGHT INCREASE IN CONDUCTIVITY

At one period the electrolyte was free from chlorine, and having seen it stated that the presence of chlorine was beneficial, a trial was made, with the result that the gold and silver content of electrolytic copper increased. Before its addition in 1907, the electrolytic copper carried 5 to 16 grains of gold and 5 to 6 dwt. of silver per ton.

The anodes from which this electrolytic copper were made assayed about 3 oz. of gold and 20 oz. of silver. The quantity of chlorine added was equal to 0.04 gram per liter of solution or electrolyte so that for a volume of 98,150 gal. of electrolyte 44 lb. of pure hydrochloric acid were added.

Hydrochloric acid had to be added at regular intervals, but the percentage of chlorine in the electrolyte was not kept constant. One month after the first addition of chlorine, the amount in the electrolyte was 0.395 gram per liter, a month later 0.028 gram, falling at times to 0.011 gram. It was found that the presence of this amount of chlorine had a good but slight effect on the conductivity of the copper. Usually the conductivity averaged 100 per cent., Matthiessen's standard; after the chlorine was added less than 100 per cent. conductivity was rarely noted and many times it ran close to 102 per cent.

GOLD AND SILVER CONTENT OF COPPER INCREASED WITH CHLORINE PRESENT

The gold and silver content rose steadily in the electrolytic copper, until it reached nearly 3 dwt. of gold and over 2 oz. of silver. Finally the use of hydrochloric acid was discontinued, when the gold and silver began to fall as the chlorine was slowly exhausted from the electrolyte. This matter of gold and silver increase is an important point, and it would be interesting to know if similar results are obtained in other refineries.

The cause of the increase was attributed by me to the supposition that the temperature of the electrolyte may have assisted the free sulphuric acid to attack some of the finely divided slime. The chlorine present would naturally react upon it and produce a flocculent precipitate of silver chloride. This would readily float, catching, possibly, particles of slime and then becoming entangled on the rough excrescences of the cathodes, be buried in the deposited copper.

HAULING THE SCRAP FROM THE ELECTROLYTIC TANKS

The mud is taken from the tanks at regular intervals. In large works it is found advantageous to run the contents of the tank to be cleaned straight to a sump where the slime or mud is filtered. At Lithgow the top layer of clear solution was siphoned off and the mud removed by bailing into a lead-lined box on wheels. This was taken to the mud refining room, hoisted off the wheels, and the contents poured into the storage tanks through a copper sieve to remove the coarse particles of copper.

This "mud scrap" is well washed to remove the mud and returned at intervals to a reverberatory furnace and melted in separate charges to mud-scrap anodes as

NOTE—Abstract of a paper in the February Bull. of the Australasian Institute of Mining Engineers.

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distinguished from scrap anodes or ordinary anodes. They are then returned to the electrolytic plant for separation. The percentage of scrap made in the depositing tanks runs from 8.5 to 9.5 per cent. of the weight of the anodes treated. In most American works the percentage runs from 10 to 15, because they remove all the anodes at one time.

TREATMENT OF THE ELECTROLYTIC MUD

The mud is washed fairly free from sulphate of copper, slowly dried in steel-plate trays, and then heated to a dull red both to get rid of the tallow and alter the mechanical conditions of the graphite, with which the starting sheets were originally coated. Before the practice of heating the mud was adopted, it was found impossible to get the copper out of the mud except after days of boiling with sulphuric acid, and even then, as much as 40 per cent. of it remained in the residue.

It might be added that this high percentage of copper existed some years ago, before it was decided to keep the free acid content of the electrolyte above 10 per cent. Since the temperature of the electrolyte has been raised and maintained at a definite point and as the acid content increased, the copper in the mud has fallen from above 55 to as low as 15.5 per cent. One analysis of the mud before raising the acid content was: 46.84 Cu, 2.21 S, 0.201 Al₂O₃, and Fe₂O₃, 0.654 Se and Te, 0.707 Bi, 9.58 insoluble residue, and 22.6 per cent. grease and graphite; 1.45 per cent. gold, 15.72 per cent. silver, and traces of As, Sb and Ni.

MUD FREED OF COPPER BY BOILING WITH H₂SO₄

The mud usually contains from 24 to 28 per cent. copper, not in the form of sulphate, which is dissolved with H₂SO₄. After heating, about 400 lb. of mud are boiled with 300 lb. of concentrated H₂SO₄, of 1.830 sp. gr. in a cast-iron pan covered with a hood to take away the sulphur trioxide fumes. In about four hours the copper is reduced to 0.3 per cent. The residue is then washed, dried, and melted with bicarbonate of soda in a small cupel furnace to doré bullion, which usually assays about 12 to 16 per cent. gold and 82 to 86 per cent. silver. Various fluxes were tried such as, carbonate of soda, sand and nitrate of potash, mixed in different proportions; soda and nitrate of potash together; sand and carbonate of soda; and, finally, carbonate of soda alone. The latter has the advantage of producing a clean doré bullion ready for the parting plant.

The method used at Lithgow was rapid and satisfactory. No attempt was made to save the selenium, although at one time a selenium matte was occasionally produced in smelting the slime in the cupel furnace. This matte ran about 50

per cent. in copper and 10 to 14 per cent. selenium. The total cost per ounce of doré produced, to treat the mud is about 2.21 pence.

DORÉ PARTED IN SMALL TANKS ON THE MOEBIUS PRINCIPLE

The doré bullion is parted in a small tank on the Moebius principle using a current of 150 to 200 amp. at two to three volts. Each tank contains eight doré anodes, 8x6x $\frac{1}{2}$ in., weighing 8 to 10 lb., and one cathode of silver plate of which 2 ft. 3 in. x 1 ft. 11 in. is actively immersed in the electrolyte. The electrolyte for this parting plant when freshly made contains 15 oz. silver to the gallon in the form of nitrate, but this proportion changes considerably in the course of the work. Each tank contains about 12 gal. of the solution.

The anodes, inclosed in calico bags so as to collect the gold as it separates, are hung by hooks to the positive lead. The silver collects on the cathode in crystalline form and as it grows rapidly in long crystals, it is likely to cause short circuits. To avoid this moving wooden arms pass backward and forward sweeping the silver from the cathode as fast as it forms, into a wooden tray below.

In large plants, like those in operation at Perth Amboy in America, 20,000 oz. of doré are treated per day, and in such plants it pays to extract gold if it is as low as one-five thousandth part of the total bullion. The crystalline deposit may be changed in character by the addition of a colloidal compound, such as gelatin, but there is little necessity for it in a plant treating small quantities. In larger plants various improvements have been made in the original Moebius design, such as substituting a traveling band of silver for the cathode instead of a stationary one. For small quantities of doré up to 3000 oz. per week or more, the small plant at Lithgow was entirely satisfactory.

The gold caught in the calico bags is in a finely divided condition and looks like black mud. It was heated in porcelain jars with pure nitric acid to cleanse it of any excess silver and then fused, giving a fineness of from 0.990 to 0.998.

The silver crystals after collecting and fusing had a fineness of not less than 996, while the gold content of the bar silver was insignificant. The average cost of parting 12,593 oz. of doré was about 0.441d. per oz. The composition of the cupel used in fusing the silver was; 140 parts marble, 57 cement, 57 lime and 28 fire clay. Later the constituents of the cupel were cement and sand alone.

ELECTROLYTE IN PARTING PLANT RE-NEWED WHEN COPPER CONTENT REACHES 4.5 PER CENT.

Before the copper in the electrolyte used in the parting plant exceeded 4.5 per cent. it was replaced by a fresh solution.

This was accomplished by pouring the foul electrolyte into a glazed pottery jar of 20 gal. capacity having a few thin cathodes of electrolytic copper. These rapidly precipitate the silver which is collected and melted in the cupel furnace and again parted in the Moebius plant. The copper in the solution is precipitated with a little scrap iron and returned to the reverberatory furnace.

No solutions are allowed to escape until they are tested and shown to be free from silver, copper and gold. In the mud treatment, after boiling with sulphuric acid, it may happen that a little of the silver goes into solution. Consequently all solutions and washings from the mud are passed through wooden tanks containing scrap copper which precipitates any silver in solution.

COSTS

The cost of an electrolytic tank of the new type of construction at Lithgow, including all material and copper conductors was £16 8s. 10d. Prior to the general installation of this design of tank, one dynamo had been fitted with 100 of the improved tanks, and tested for 14 weeks against the other four dynamos in circuit on tanks of the old design. The results were that with the improved design the output exceeded the tonnage of the best of the other four by over 31 tons, while the efficiency was 93.4 per cent. as against an average of 73.6 per cent. for the others.

The total cost of electrolytic copper per ton was £2 18s. 9.58d. This cost might be greatly reduced by the installation of casting machines at the melting furnace. The labor could be lowered at least 3s. per ton. The copper from each furnace refining from 10 to 16 tons per day, was all hand ladled by four men using 8-in. ladles, which cost £33 per ton in Sydney, 312 ladles weighing one ton.

No interest charge is included in the above cost. The amount of copper in leads, connections, electrolyte, and anodes in course of treatment was approximately 413 tons. This was for an output of from 90 to 100 tons of electrolytic copper per week.

Analysis by H. Schroeder, late chemist and works manager at Lithgow of Great Cobar electrolytic copper gave: 0.00012 Au, 0.00237 Ag, 0.0025 Pb, 0.00025 Bi, 0.0006 As, 0.00071 Sb, a trace of Zn, 0.017 Fe and 99.94732 per cent. Cu. No nickel was present.

The Western Pacific railroad between Salt Lake City and San Francisco was opened for passenger service Aug. 22, 1910. Freight has been handled since Dec. 1, 1909. The road is 927 miles long, and gives access to a new mineral section in both Utah and Nevada. The new Denver & Rio Grande station, which was opened at Salt Lake on Aug. 19 is used by this road.

Capitalization of Small Mines

BY A. W. WARWICK*

There is hardly any question that many enterprises are started in such a manner as to be foredoomed to failure. Mining, to be successful, must be conducted according to certain definite principles. If these principles are disregarded or violated and a failure occurs, the blame should not be laid at the door of mining, but should be assigned to some other cause.

MORTALITY AMONG COMPANIES INSUFFICIENTLY FINANCED DISCREDITS MINING

The mortality among mining companies is alarming and naturally reflects great discredit upon the business of mining. It is safe to say that a large percentage of failures in such cases is not due to the risky nature of the mining industry, but to the enterprises being started in such a way as to eliminate practically all the possibilities of success that the mine had. Larger companies with ample capital at their command can remedy many of the mistakes made. Moreover, the larger enterprises, having a higher order of technical ability at their command, not only in the field but in the directorate, make fewer mistakes. The smaller companies are usually financed in such an inadequate manner that any mistake may be fatal to the entire business.

COST OF A TEN STAMP MILL

A recent case in point will illustrate these remarks. A company operating in Nevada recently undertook to equip its mine with a 10-stamp mill. It was estimated that the mill would cost \$15,000. In order to take care of all contingencies, a capital of \$20,000 was raised. The directors, having a well-opened little mine showing 15,000 tons of good ore, had complete confidence that with this capital they could carry the enterprise through to a successful issue.

Even if the mine comes up to the expectations and even if the mill only costs \$15,000, there can be hardly any question that the company with only \$20,000 capital would be on financial rocks before the mill can possibly commence to earn a revenue. The minimum capital required is at least \$35,000. It appears obvious that if a capital of \$35,000 be required and only \$20,000 were provided, there is grave danger not only that the enterprise would become financially embarrassed but there is a real danger of an almost entire loss of the capital invested.

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METHODS OF FINANCING A SMALL COMPANY

The usual methods of financing a small company are ridiculous in the extreme. The usual method is to make a rough guess that the work is going to cost so much and then multiply by a factor in order to provide for contingencies. This is exceedingly unbusiness-like and engenders false hopes as to what can be done. These hopes not materializing, dissension ensues and it is difficult to straighten out the financial tangle at the most critical period of the company's life. The only satisfactory method is to calculate carefully the needs of the entire business, step by step, and then, after summing up the various items, make an allowance for unforeseen contingencies.

In case of the 10-stamp mill referred to, it seemed reasonable that the minimum capital required was \$35,000. It was agreed that under the conditions of the property \$15,000 was sufficient to erect the mill. The extra sum of \$5000 was entirely inadequate to carry the business through to a paying basis.

It is rarely the case that a mining company can cut off every expense except that of mill building during the period of construction. There are certain fixed charges that have to be met. Almost invariably some additional preparatory work must be done in the mine in order that the ore can be economically extracted and sent to the mill. During the development stage of the mine, the work of preparing stopes, etc., is not usually done, especially in small enterprises. In the case in question, it was obviously necessary to spend a little money in the mine every month during the period of mill building in order that the mine might be able to respond later to the demands of the mill. In the mine referred to an expenditure of \$800 per month during the period of mill building was obviously needed.

TIME REQUIRED FOR CONSTRUCTION

When the directorate decides on the erection of a mill, a month will usually elapse in preparing plans and specifications and in placing the order. The manufacturers will usually require from 60 to 90 days after receiving the order before loading the machinery on the cars. At least another month will pass before it can be assembled on the ground. Under ordinary circumstances five months will have elapsed before the work of erecting the mill will actually commence. Assuming that it will require three months to erect the mill, under normal condi-

tions about eight months will slip away between the time the directorate decides to erect the mill and the date of getting it into operation. The chances are all in favor of this time being extended.

However, taking eight months as a reasonable length of time, the company will have expended about \$6500 in addition to the \$15,000 which we have assumed as the cost of mill construction. Therefore, before the mill turns a wheel, the company will have expended every dollar it has raised and possibly be in debt from \$1000 to \$2000.

The directorate cheerfully assumes, in many cases, that the minute the stamps begin to drop profits will begin to roll in. Anyone who has had milling experience knows that the moment a mill starts up the troubles of the manager commence. Every error in planning, construction or manufacturing becomes apparent and there is usually a period of tuning up and reconstruction. It is safe to say that a new mill will cost 25 per cent. of the original cost in order to make changes and repairs to broken parts, etc. In the case under consideration this will amount to between \$3000 and \$4000.

FIRST MONTH'S CLEANUP

During the first month of operation, the mill does well if it runs half time. During the time that it is running its work will not be efficient and a poor saving will be made. Then on cleaning up at the end of the first month only a small percentage of the product actually saved can be obtained. It is within the bounds of probability that the cleanup of the first month will not amount to more than one-fourth of the normal output of the mill. In the case cited the normal output should be about \$10,000 a month and in this case an output of \$2500 is all that can be counted upon as a result of the first month's operation.

This state of affairs is not only understandable by the experienced mining man but is anticipated. To the director of the typical small company the result of the first cleanup is apt to be equivalent to a blow in the face and usually he is ready to close down, much less put in fresh capital. At the end of the month the expenses will amount to about \$5000 and all the company has on hand to meet these is a product worth only \$2500. It will take some time to market this products and it is fair to assume in this case that from 20 to 30 days would be required to realize on the mill products, but in the mean time the \$5000 expense account has to be met.

NO PROFITS TILL THIRD MONTH

During the second month the affairs of the mine and mill will be running more smoothly and the mill under ordinary circumstances will be making better time and closer savings. At the end of the month the mill in question might make a saving of \$7500, but meantime another \$5000 becomes due and all the company has on hand is the \$2500 received on account of the sales of the previous month's product. It is obvious that \$2500 must be provided from capital in order to meet the second month's obligations. Thereafter if there are no accidents, and if normal conditions prevail, the property will take care of itself.

SUMMATION OF NECESSARY FUNDS

We now see that ten months have elapsed since the time the directorate decided to build a mill and the time the property becomes self-sustaining, even if everything goes according to calculations. Under such conditions a summation of the costs will show that the capital that should have been provided will aggregate \$33,000 as a minimum.

| | |
|--------------------------------|----------|
| Fixed charges of mine..... | \$6,500 |
| Cost of mill construction..... | 15,000 |
| Alterations and repairs..... | 4,000 |
| First month's expenses..... | 5,000 |
| Second month's expenses..... | 2,500 |
| Total | \$33,000 |

It is to be noted that these estimates do not provide for any contingencies and any wise board of directors would take care to provide a contingent fund to meet underestimates and unexpected expenses. Calling this \$7000 we have as a reasonable minimum capitalization \$40,000 net cash required for the erection and operation of a 10-stamp mill until it comes to a paying basis. To attempt to carry on the enterprise for less simply invites failure.

A second point to be considered is that this money should be furnished promptly since the estimates do not contain any allowance for increased cost due to delays. In constructing a mill in an isolated spot it is impossible to do the work cheaply unless it goes along steadily. Men working in an isolated mining camp cannot be laid off at a moment's notice and kept on hand without pay. The result is that every delay is exceedingly expensive in most mining regions. This failure to supply the requisite amount of capital to the mine in its early stage of development is the most fruitful cause of mining wrecks. The western country is covered with mills that have barely started up and then closed down for just such reasons as those indicated.

The Calumet 60-ft. sand wheel of the Calumet & Hecla Mining Company is now being run by a rope drive from the motor to the gearing. This gives most satisfactory results and entirely eliminates the difficulties experienced with the direct drive.

Useful Clues for the Mining Geologist

By W. H. HENDRICKSON*

The solution of geological problems in mining may often be more profitably approached from the three points of view of the prospector, the miner and the engineer, than from the single view point of the geologist.

The geologist will naturally note the various prominent surface phenomena that are so important to the prospector. He will be on the lookout for the ragged skyline, fault scarps and gulches, discontinuous, brecciated or folded strata, dikes and their contacts, changes in vegetation and soil, significant variations in erosion, fossils, mineral outcrops, sunken areas or outcrops in gulch bottoms, evidences of weathering of outcrops, sunken areas indicating oxidized orebodies, and copper and iron stains, etc. The miner just as naturally notices the general signs of mineralization, movement and intrusion. It is just as characteristic of the engineer that he thirsts for accuracy and facts. The mining geologist will do well to combine these attributes.

INFORMATION FROM CHARACTER OF ORE-BODY

The ordinary water course, and that of sulphurous or silicious mineral solution leave different traces. In limestone, a "corroded" bedding plane often leads to ore. In corrosion caves gypsum crystals often underlie, and shrinkage caves often overlie oxidized orebodies. Harder rock, due to silicious replacement, or softer rock due to leaching, often indicate the vicinity of ore.

It has been stated that orebodies often seem to follow the lines of least resistance. With fissure veins in sedimentary rocks, the miner often looks for some particular formation to give the ore of best grade and the greatest vein widths. With contact veins, the intersection with a fissure or fault is often sought.

Changes in the mineral constituents often appear near the limits of an orebody, that is, as the appearance of a greater quantity of base minerals or of gangue, or of some particular mineral, or a larger crystallization, which changes are typical of the district or the mine or sometimes of the general class of orebody. In fissure veins, the changes from oxidized to enriched sulphide, or to lean sulphide, may often be foreseen from obscure mineralogic changes, as the appearance of arsenical pyrites, zinc blende, etc. The fact that mines can be prepared for a sale by a skilful foreman, and also that the mine foreman often proves the geologist wrong in locating ore makes the former's knowledge interesting.

*Mining engineer, White Plains, N. Y.

CLOSE OBSERVATION HELPS SOLUTION OF FAULTS

In the solution of fault problems the general rules that normal faults are commonest, and that most flat faults are reverse faults, of course, give no clue as to whether or not a particular case is an exception. Often closer observation of obscure conditions will show the truth. The miner, when a vein is faulted, follows the "trail" of small ground fragments in the fault gouge (panning the gouge, if necessary), and turns with the "drag" of the strike. Often there are subsidiary faultings of small movement, in the same direction, or veinlets of secondary quartz or mineral running into the hanging- or foot-wall on the side toward the continuation that affords clues for the true solution.

The width of gouge, the depth of the grooves on a slickenside surface, the extent of brecciation and number of movement planes also indicate the extent of movement that has taken place.

Veins with numerous faultings tend to assume an average position. The faults may be in pairs of opposite movement. They are, however, often members of a system of the same movement. It is sometimes possible to recognize a part of a vein as a fault block out of place, on account of its more greatly broken and leached nature.

For the technical work, a surface map with about 25-ft. contours, should be at hand, or be prepared, upon which all outcrops of veins, orebodies, fissures, important beddings, points on faults, dikes, etc., may be noted, with correct average strikes and dips, and elevations. The preliminary mapping and contouring can be done by plane table and Y-level; or more easily by a transit, using a sectional sheet on a tablet to keep track of the detailed information. The geological work can be platted with sufficient accuracy by using a Brunton or other compass, and a transit course as base line.

GEOLOGICAL PLANS AND SECTIONS INSTRUCTIVE

It is essential to have carefully surveyed plans of underground workings with elevations upon which the positions of hanging- and foot-wall, and fault lines, with strikes and dips, limits of ore, contacts and other necessary geological information can be mapped. A combined skeleton-horizontal projection of important surface and underground features is sometimes exceedingly useful. Vertical sections can then be made and observations correlated, between underground and between surface and underground points. After the solution of a problem has become apparent, it should be tested from the critic's point of view by further detailed observation. The time of the geologist is considerably less expensive than is useless development.

Facts Concerning Present Fuel Situation

A Coal Famine in Many States This Winter Appears Probable. An Indicated Shortage of 15,000,000 Tons. The Situation in Illinois

BY FLOYD W. PARSONS

In an editorial appearing in THE ENGINEERING AND MINING JOURNAL, under date of Sept. 10, the fuel situation was referred to as follows: "The general public have failed to appreciate the seriousness of the present coal strike in various fields. At no time in recent years have coal supplies been smaller than at present. In order to prevent a repetition of the coal famine that occurred in 1902-03, and again in 1906, the majority of our mines will have to work steadily this winter, and even then certain parts of the West may lack fuel."

Having concluded a hasty trip through certain Western States, I desire to emphasize, in a positive way, the forecast made one month ago, and referred to above. The great danger in the present situation lies in the fact that the general public are absolutely indifferent if not

other States, the total net shortage would still amount to 15,000,000 tons. Anthracite production has not shown any material increase so far this year, so that we are certain to enter the winter facing a fuel shortage of alarming proportions.

Looking at the other side of the question, there are some conditions that may act to modify and possibly relieve the situation. If there should occur a further important recession in general business throughout the country, the fuel demands will be less. Then, also, the certainty of a shortage in fuel is sure to have a retarding effect on business.

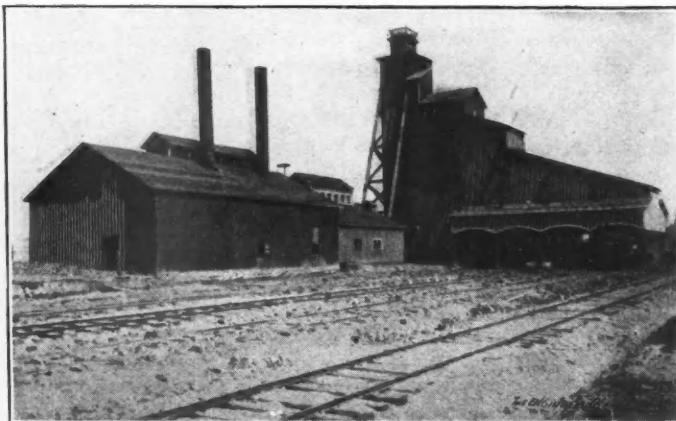
As is always the case, the problem of securing adequate railroad service will play an important part. A few weeks ago, it was believed that the annual car shortage would not be a considerable factor this year. However, conditions have

practically all of the mines that have been idle, it is safe to figure that 25 per cent. of the working places have caved. Several weeks have already passed, and the mines that have resumed are not producing a large tonnage, nor will they be able to show a large output for another month. Miners are returning to the Illinois field slowly, and it is doubtful if there will be a full complement of men before November 1. Since the labor troubles were settled in Indiana, that State has been showing a record output, but this higher rate of production has been accomplished largely with miners who have come over from the Illinois field. This is proved by the fact that the production at many mines in Indiana has fallen off 30 per cent. since the Illinois strike was settled.

Indiana mines are sold out 60 days



TYPICAL INDIANA MINE EMPLOYING 300 MEN AND PRODUCING ABOUT 1400 TONS DAILY



THE TIPPLE AND SURFACE BUILDINGS ARE GENERALLY CONSTRUCTED ENTIRELY OF WOOD

unconscious of the fuel situation, and that, furthermore, coal men themselves are not awake to actual conditions. The greatest and surest way to avoid any trouble is to advertise its approach. Unless the general press becomes active immediately in making public the probability of a fuel shortage, many parts of this country will suffer this winter.

GROSS SHORTAGE 33,000,000 TONS

The shortage of coal in Illinois this year will amount to about 21,000,000 tons. The shortage in States west of Illinois will be in the neighborhood of 12,000,000 tons, making a total shortage of about 33,000,000 tons. West Virginia will produce not less than 8,000,000 tons more than it did last year, and if we allow for a total increase in production of 10,000,000 tons in Pennsylvania and

changed rapidly, and the number of idle cars have decreased so quickly, that in many parts, a shortage is already here. It is reported from Columbus, Cincinnati and Cleveland that cars are not only hard to obtain for loading at the mines, but that the railroads actually lack the motive power with which to haul cars.

THE DEFICIT CANNOT BE MADE UP

It is relatively easy to sit down and figure that now, since the Illinois mines, and also the operations throughout the Southwest, have resumed work, the output will be so enlarged that consumers will be quickly supplied. This could not occur even if the railroads could supply a sufficient number of cars and haul the coal to market. In Illinois alone, there are any number of mines where 40 per cent. of the rooms have caved in. In

ahead and cannot relieve the situation this fall. In Ohio, the Sunday Creek Coal Company is also sold out more than 60 days ahead, and has notified its agents to take no orders for future delivery. The shortage of coal in Chicago is estimated at about 1,250,000 tons, and this caused the season to open three weeks ago with lump at \$2.50 and slack at \$1.50 at the mines. Lump ordinarily sells at from \$1.25 to \$1.50 at the mines, this season of the year. Present indications lead to the belief that coal will sell in Chicago for \$5 per ton early this fall.

THE SITUATION IN THE SOUTHWEST

The perspective of many coal men is often limited to local districts, and they fail to realize the far-reaching effect of a shortage in distant fields. Most eyes have been centered on Illinois, and but

little attention has been directed to the States further west. The strike has been more severe in Kansas, Missouri, Arkansas and Oklahoma than in Illinois. In Illinois, certain districts reached an early agreement, while in the Southwestern States, practically all of the mines were closed tight for the entire five months. The four Southwestern States mentioned, normally produce about 17,000,000 tons annually, and, considering the condition of the mines that have been idle, the slowness in laborers returning to work, and the certainty of a lack of cars this fall and winter, it is fair to estimate that their total output will be cut in half. Furthermore, Iowa produces about 7,000,000 tons of coal and suffered a shutdown for nearly two months. We must also remember that labor troubles have occurred in Colorado and that the Northwest now faces a similar crisis.

The mines in Indiana and other States adjacent to strike territory have been working night and day, with the result that demoralized conditions exist both

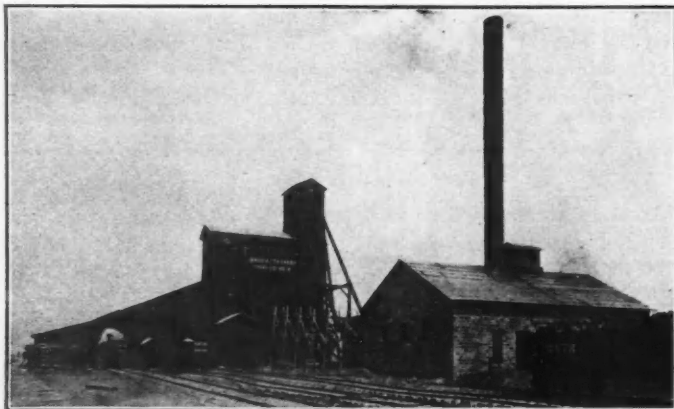
conditions exist. The Miners' Union is a national organization. A strike is called in one State, or one section of the country, while the miners in all other fields continue to work and contribute to the support of the strikers. On the other hand, the operators lack a national organization, and, consequently, have to defend themselves entirely from within the boundaries of their own territory. Not only is this the case, but operators in adjacent States and districts are frequently pleased to see labor disturbances in nearby competitive districts, and it is not unheard of for such operators to encourage a strike in a neighboring State.

MINERS SURE TO WIN

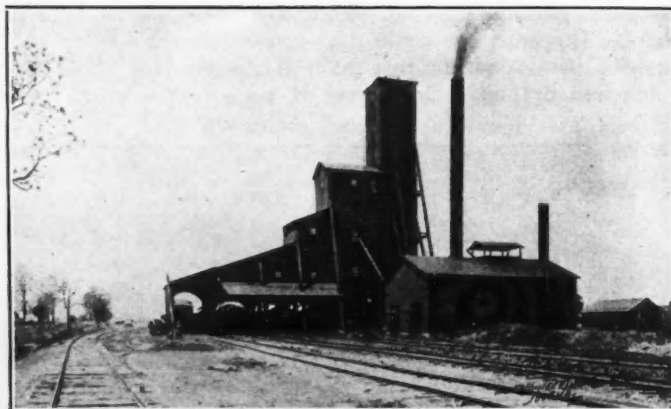
This is all very well, but it is short sighted on the part of the operators, and means the ultimate and certain victory of the Miners' Union throughout every coal-producing State in the Union. The general campaign will be as follows: The miners have established the highest and

can be done, it is possible for them to carry on a strike indefinitely. The only hope of such States as West Virginia and Kentucky, under present conditions, is due to the fact of the isolation of the mines and the lack of nearby and ready employment for the men in case of a strike.

In this connection it is well to remember some of the remarks made by the labor leaders in their recent discussion with the operators. Some of the operators complained that the terms demanded by the union in Pennsylvania and certain other States were impossible and unbearable. They further stated that they could not compete in the unionized States with the operators in nonunion districts. President Lewis replied that these same operators who were complaining, controlled mines in the nonunion States, and that they were competing with themselves. Furthermore, that so long as these same operators prevented the union entering these nonunion States, just so long would the miners refuse to equalize conditions.



CEMENT BLOCKS ARE BEING LARGELY USED AT PRESENT IN CONSTRUCTION OF POWER HOUSES



PRACTICALLY ALL THE MINES ARE EQUIPPED TO SHIP THREE OF FOUR SIZES OF COAL

underground and on the surface as regards cars and machinery; it is also true that the mines that have been idle so long, cannot properly resume normal work for weeks, and finally, we must add the fact that the railroads throughout the West and the East will have difficulty in moving a normal tonnage without considering an increased tonnage.

THE LABOR SITUATION

While considering the fuel situation throughout the country, a word with reference to the settlement of the prolonged strike may be interesting. A final analysis of the outcome of the Illinois strike shows that the operators in that State received the most severe beating that they have yet experienced. Those operators who held out to the last naturally lost most and had to accept the most unfavorable terms. The defeat of the operators in the Southwestern States was about as severe, and it must be conceded that the Miners' union throughout the Central West secured the greatest victory in years.

There never can be any other outcome to such a struggle so long as present con-

most favorable standard of conditions for themselves in the State of Illinois. The next struggle therefore, will not occur in Illinois but the union will concentrate on certain adjacent States, while continuing to operate the mines in Illinois and the Southwest, bringing the other States up to the Illinois standard step by step. After this has been done, the miners will again concentrate their attention to Illinois, and again better their conditions there.

West Virginia has so far succeeded in combating the organization of the miners in that State, but if the present attitude of the operators in various States with respect to each other is maintained, West Virginia, or no other State, can remain long outside the union fold. It was reported that the miners and their families in Illinois suffered extremely during the strike, but close investigation convinces me that this was not the case except on the part of the more shiftless. Practically all of the miners who desired employment found it readily in adjacent States and oftentimes in other occupations right at home. So long as this

ILLINOIS OPERATORS HELPLESS

When operators throughout the country come to a full realization of conditions as they exist in Illinois, and come to know of the absolute control the miners have obtained over the coal properties in that State, they will then begin to act more concertedly, and as a result will obtain more satisfactory working conditions for themselves.

I am heart and soul with the miners when they are unfairly treated and when the conditions of employment are unjust; however, we should be as strongly for the operators when conditions are as unequal and unfair as those forced on the mine owners in Illinois. If the present Illinois mining laws are further amended, the operators in that State will have more to fear from their legislature than from the Miners' Union. With the passage of other laws similar to some of those that have been enacted recently in Illinois, such as the one that compels the operator to place bells at the working faces so that a warning may be sounded in case of an accident, the lot of the Illinois operator will not be one to envy.

Notes on the Coal Industry in West Virginia

BY R. B. BRINSMADE *

John Laing, chief of the department of mines in West Virginia, has arranged for the holding of eight examinations for mine foremen and fire-bosses during the coming winter. The applicants for these positions will be required to pass upon the questions relative to coal dust, gases met with in the coal mines of West Virginia, electricity, mine ventilation, drainage, timbering, different methods of mapping and working different seams of coal in the State, and, the mining laws of West Virginia.

The places and dates for these examinations are: Welch, Oct. 19 and 20; Fairmont, Oct. 16 and 17; Clarksburg, Oct. 9 and 10; Bramwell, Oct. 26 and 27; Elkins, Oct. 23 and 24; Glen Jean, Dec. 7 and 8; Beckley, Dec. 14 and 15; Charleston, Jan. 6 and 7.

Under the present ruling and interpretation of the mining law, every person is required to pass an examination, conducted by the chief of the department of mines of the State, before he can hold the position of mine foreman or fire-boss. Since this requirement has been enforced, West Virginia has not had any disastrous mine accident. Although this absence of any great accidents may not be attributed to the above ruling entirely, all mining men admit that it has had much to do with the good showing made by the State. There has not been an explosion in the mines of this mining State for nearly a year and a half.

SHIPMENTS OVER THE VIRGINIAN RAILWAY

The coal shipments over the Virginian railway for the month of July are shown to have been 105,589 long tons and 3462 tons of coke. This is the banner shipment in the history of this new road traversing some of the very best coalfields in West Virginia. The reports show that there are now 13 shippers of coal along the new Virginian railroad, the largest being E. E. White Coal Company with 24,109 long tons. Loup Creek Colliery Company shipped 16,056; Gulf Smokeless Coal Company, 13,975; Slab Fork Coal Company, 13,942, while the others all had small shipments due to the fact that the mines are just being opened. Only one company is shipping coke but others are preparing to do so.

The taxable property in West Virginia for the year 1910 is shown to be a little over \$1,112,000,000 as against \$1,063,247,851 in 1909, or an increase of about \$50,000,000. The greatest increases are shown in the counties where oil and gas

is produced and where the pipe lines are located. More than one-third of the increase is attributed to the oil and gas companies. The State tax has been reduced to 4½ cents and one cent more for State road purposes, making the taxes for the purposes of the State 5½ cents on the hundred dollars valuation.

It is rumored that the railroads traversing West Virginia have formed a combination for the purpose of getting control of the larger operations in this State, especially along the Chesapeake & Ohio and Norfolk & Western roads. It is said that the railroads realize that the development of coal lands has been so rapid that the roads will not be able to carry the output, and according to decisions of the highest courts, the railroads being common carriers, failing to care for the output, can be sued by the big coal companies. By getting control of the more important coal companies, those who control the railroads believe they will be able to block such actions and thereby protect their investments in the railroads.

From an authoritative source, it is learned that options for control have been taken on nearly all of the big operations in the New River coalfield, and from the same source it is learned that either options have been taken or asked for on the larger operations in the Norfolk & Western field.

MINERS UNION BECOMING ACTIVE

There is talk of the spreading of the organization movement of the United Mine Workers of America among the non-union workers of the districts along the Kanawha river; an organization campaign that has been engineered and prosecuted from the local State headquarters is now being carried on.

That the native white and negro miners of the State are being replaced by miners of foreign birth or their sons, is indicated by a report issued recently by the Immigration Commission.

White Americans, instead of being driven out of the mines by the foreign help, are merely driven into the positions of greater responsibility, according to the report. Positions requiring executive ability, such as foremen, bosses, etc., are practically all filled by white Americans, while the foreign laborers do actual work of mining.

Of the foreigners, the general preference is given to the Italian, especially those from northern Italy. The Italians are said to be better miners, more generally sober than other foreigners, but less adaptable to conditions.

NEW COMPANIES INCORPORATED

The following new companies have been incorporated lately; Kanawha Valley Fuel Company, incorporated with \$25,000 capital by J. Vaughn, and others: The Sunshine Coal and Coke Company, chartered with an authorized capital of \$55,000 to mine coal, manufacture coke and build and operate a railroad in the State, and the Seng Creek Coal Company, incorporated with \$100,000 capital to operate at Jarrett's Ford.

The Cannelton Coal and Coke Company will develop 5200 acres of coal land. The present daily output is 1000 tons but the equipment to be installed will provide for an additional daily output of 2000 tons. The plans are not complete as yet.

The Kanawha Brick Company will install cable service to bring clay from across the river, enlarge the plant and install additional equipment.

Coal-acreage buying goes on apace, and stories come out almost every day of large acreages about to be taken over by somebody or a group of somebodies from outside the State. Many of these are tentative; but that there are negotiations in progress for important transfers is unquestioned. It is not too much to say that a large part of the State will be in the hands of men who do not live inside of State lines before long, which is not a pleasing thought to the officials of the State nor to the residents who have large interests here, and whose community pride is offended by the fact that these owners take so little interest in State welfare and so often are directly opposed to it.

It is reported that J. P. Morgan has laid aside a large sum to be invested in coal lands in this State and Pennsylvania, and that he is also supplying the funds for the construction of a Western Maryland link from Connellsville to Cumberland. The Morgan plan is said to be to develop the West Virginia coal, which will be taken to Baltimore, there to be shipped to Spain and Italy, and that in Spain big purchases of iron-ore property will be made to be in turn brought into this country. Under the scheme, he could deliver West Virginia coal in Naples for \$4.10 while the best price at present is \$4.90.

Coal production by counties in West Virginia in the fiscal year 1909, ended June 30, shows that McDowell county leads in output with 9,415,069 tons. The counties that exceeded one million tons were as follows, in round numbers: Fayette 7,600,000; Kanawha 4,140,000; Marion 3,730,000; Harrison 3,000,000; Mercer, 2,100,000; Logan, 1,910,000; Raleigh,

*Professor of mining engineering, University of West Virginia, Morgantown, W. Va.

1,800,000; Mingo, 1,620,000; Tucker, 1,000,000; Mineral came next with 745,000 tons and the smallest producer was Boone with only 3451 tons.

The selling agencies of the operators in the Pocahontas and New River districts of the State report being in possession of orders enough to keep them busy for the remainder of the lake-shipping season. Prices are reported as steady, with no change except in a few cases where higher prices than the prevailing ones are being secured. The price of lump advanced sharply Aug. 15. Demand for fancy sizes will not be large enough to equal the supply unless the slack market picks up by increased demand for coke.

FAYETTE COUNTY

The Ephriam Creek Coal and Coke Company has improvement under way at its mine near Thayer which will materially increase capacity. The tippie is being rebuilt, a new power house constructed and larger engines and boilers installed.

The contract has been awarded for a five-mile branch to extend from Caperton on the Chesapeake & Ohio Railway, to a point where the Kingston Collieries Company is preparing to commence development work. Five mines are to be opened, it is announced, and the work will be put under way at once.

W. W. Keefer, the president of the Pittsburg Terminal Railroad and Coal Company, Pittsburg, Penn., and associates purchased about 6500 acres of coal land at about \$250,000. The construction of a railway and the development of the property is planned.

MONONGALIA COUNTY

J. Eddy, of Wadestown, purchased 150 acres of coal land for the purpose of development.

The charter of the Righter Coal Company was filed at Morgantown lately. The chief works of the company will be located in Grant district. The company was formed for the purpose of mining for coal and other minerals, oil, gas, etc.

Several gentlemen of Morgantown are completing the optioning of a tract of coal underlying about 1000 acres, located on the west side of the Monongahela river, opposite Little Falls. The coal includes all seams under the Pittsburg seam. The property is being optioned at \$35 an acre.

PRESTON COUNTY

Spurred on by improvements made and continuing to be made on the Western Maryland Railway for a western outlet, the Baltimore & Ohio Railway Company is surveying a route for a new double-track tunnel for the more efficient carrying of freightage through the mountain at Tunnelton. The old Kingwood tunnel forbids the use of the large engines now in general use for it was put through when the locomotives were very much smaller than they are now.

J. M. Guffey, leader of the Democracy of Penn., and titular owner of about 137,700 acres of coal in Preston and nearby counties in W. Va., recently petitioned for a receiver for his estate. His liabilities were given at \$7,000,000 and his assets at \$17,000,000. Mr. Guffey says that on the coal territory owned by him in W. Va., can be realized 2,000,000,000 tons of coal, which at the low profit of one cent per ton would net \$20,000,000.

MARION COUNTY

The Virginia & Pittsburg Coal & Coke Company will develop 250 acres of coal land by pick mining. The daily capacity will be 300 tons of coal. R. M. Hite will be the manager.

S. C. Lowe and several others have recently incorporated the Monongah Fuel Company with a capital of \$50,000.

The property of the Federal Coal Company of Fairmont has been transferred to the Keystone Coal and Coke Company, of Greensburg, Penn. The property embraces 3040 acres of coal. The price realized was \$1,050,000 in cash.

The Fairmont Mining Machinery Company, of Fairmont has commenced improvements costing about \$100,000. To its present main building the company is adding side and front extensions and is also erecting a large supply house.

Statistical Results of Coal Mining in Russia in 1909

FOREIGN CORRESPONDENCE

The coal market in Russia during the year 1909 was not favorable. The output which had been 1,529,860,000 poods¹ in 1908, was only 1,493,150,000 poods in 1909, and notwithstanding this reduction, the stock is reported to have increased considerably. The market was very calm at the end of 1909 with but little demand.

The following table indicates the production of the various large coal districts of European Russia in 1909 compared with the year 1908 (in million poods):

| COAL PRODUCTION IN RUSSIA. | | | |
|----------------------------|----------|----------|----------------------|
| Districts. | 1908. | 1909. | Per Cent. of Output. |
| Donetz..... | 1,114.88 | 1,084.94 | 73 |
| Dombrowa..... | 344.41 | 347.53 | 23 |
| Oural..... | 47.83 | 42.73 | 2.9 |
| Moscov..... | 19.52 | 15.39 | 1 |
| Caucasus..... | 3.22 | 2.56 | 0.1 |
| Total..... | 1,529.86 | 1,493.15 | 100.0 |

The Donetz district suffered the most from this reduction which took place only in the second half of 1909. The rea-

¹ 1 pood = 16.3 kg. or 36 lb.

sons for this reduction are the uncommon mildness of the temperature during last winter, the increased competition of mineral oils, the crisis on metallurgy and the introduction in the conditions of railway orders of technical specifications that did not agree with the conditions of that district. The consumption of Donetz coal has decreased by about 30,000,000 poods and the number of workmen from 141,000 to 113,000.

THE DOMBROWA DISTRICT INCREASES OUTPUT

Contrary to the other districts, that of Dombrowa in Pologne has increased its output in 1909 by about 3,000,000 poods. Its stock, far from increasing as elsewhere, has been reduced by 50 per cent. The average number of workmen employed there in 1909 was 22,690 with an average daily production of 834 kg. per workman employed.

In Oural district the reduction is due to the mines of Abamelef-Lezereff, the most important of the region, failing to secure a considerable portion of railways' orders. Anthracite is produced only in Donetz. The stocks have also increased during the year by about 3,000,000 poods for the same reasons as explained above. The manufacture of coke has also suffered a reduction of about 2,000,000 poods.

INCREASE IN MANUFACTURE OF BRIQUETS

There is on the contrary an increase in the manufacture of briquets from 10,950,000 poods in 1908 to 11,210,000 poods in 1909. However shipments have diminished by 150,000 poods. The oil producers have increased their production by 5 per cent. as shown by documents issued by the Russian Chamber of Commerce of Paris, from 467,000,000 poods in 1908 to 490,500,000 poods in 1909. Furthermore, prices are lower than before, being about 18 kopeks per pood at the beginning of 1910, against 19 and 25 kopeks in 1908 and 1907. For export the reduction is 2 kopeks per pood. The following table shows a reduction in shipments to the Orient which more than counterbalance the increased sales to Europe:

SHIPMENTS TO THE ORIENT AND EUROPE.

| | 1908. | 1909. |
|----------------------|----------|--------|
| | thousand | pounds |
| Lighting oils: | | |
| to Europe..... | 16,710 | 20,762 |
| to Orient..... | 9,265 | 3,097 |
| Russia..... | 3,402 | 3,954 |
| Residues of naphtha: | | |
| to Europe..... | 2,093 | 4,796 |
| to Orient..... | | 8 |
| Other products: | | |
| to Europe..... | 9,338 | 10,048 |
| to Orient..... | 189 | 295 |
| Russia..... | 126 | 170 |

In view of increasing the shipments to the Orient, the Russian Railway Department has prepared a reduction to the tariff for the oils shipped from Baku to Batum.

Lehigh Valley Coal Company

This company owns and operates, either directly or through leases, a large estate in the anthracite region of Pennsylvania. The report for the year ended June 30, 1910, shows a capital account of \$1,965,000 stock, all owned by the Lehigh Valley Railroad Company; \$12,796,000 bonds; and \$10,537,000 certificates of indebtedness, which represent advances made by the Lehigh Valley Railroad Company.

OVER EIGHT MILLION TONS OF COAL MINED BY THE COMPANY

The coal mined from lands owned and controlled by the company was, in long tons:

| | 1908-9. | 1909-10. | Changes. |
|-----------------|-----------|-----------|------------|
| Anthracite..... | 7,734,078 | 8,092,940 | I. 358,862 |
| Bituminous..... | 288,457 | 234,978 | D. 53,479 |
| Total..... | 8,022,535 | 8,327,918 | I. 305,383 |

The bituminous coal is from the Snow Shoe field in the central part of Pennsylvania.

INCREASED EARNINGS

The report does not give total earnings or expenses, the brief income statement being as follows:

| | |
|--------------------------------------|-------------|
| Net Income for the Year..... | \$1,136,543 |
| Miscellaneous Adjustments..... | 15,998 |
| Balance..... | \$1,120,545 |
| Balance Forward from Previous Year.. | 2,272,897 |
| Total, June 30, 1910..... | \$3,393,442 |

The net earnings for the year showed an increase of \$761,091 over those for 1908-9. The report says: "The improved earnings of the company are, in the main, due to the increased sales of coal, the demand for which was greater than during the previous year; and to the fact that the mining has been so conducted as to counteract, wherever possible, the constantly increasing cost of operation naturally resulting from the greater depth and extension of the underground workings. . . ."

IMPROVEMENT IN DRESSING OPERATIONS

"The percentage of prepared sizes above pea coal was 64.5 per cent., an increase of 1.6 per cent. over the previous year. This marked increase, which was made in prepared sizes, notwithstanding the greater tonnage that is being mined from smaller and inferior veins, emphasizes the importance of continuing the policy of remodeling breakers so as to improve the preparation. This practice has been consistently followed in recent years and the results are further shown by the increased tonnage which it has been possible to secure from the raw product as delivered by the mines. Substantial progress has also been made in the concentration of operations, installation of electric or compressed-air haulage systems, erection of modern power plants and the improvement of machinery and

appliances generally. The property has been fully maintained and extensively developed to provide for an increased production of coal. The expenditures for additions and betterments during the year, and which were deducted from income or accounts other than cost of mining, amounted to \$369,788 in all. . . .

COMPANY RESUMES OPERATION OF LEASED MINES

"The Stevens Coal Company, which had been conducting operations on lands leased from your company many years ago, desired to surrender that lease. Accordingly the same was canceled during the year under an arrangement whereby your company purchased the breaker plant and other improvements on the property, paying therefor on a royalty basis as the coal is mined, and assuming \$61,000 bonds issued by the Stevens company. These bonds were taken up and are now in the treasury. To effect greater economies in operation, the breaker at William A. colliery has been remodeled and enlarged to permit of handling, in addition to its own tonnage, the coal heretofore prepared by the Stevens breaker. In view of the limited capacity of the latter, it will be converted into a washery, in connection with which a conveyer and the necessary machinery to reclaim the culm bank at the Stevens colliery are being installed.

"Your company further has taken over the operations of the Buck Mountain and Vulcan collieries heretofore conducted by the Mill Creek Coal Company. That company had been mining from lands owned by your company under a lease, which expired Jan. 1, 1910. Such of the machinery and plant as would meet the requirements of modern operation were purchased at an appraised value. The breakers, however, were not so acquired, although they are being operated by your company under a temporary lease. A new concrete and steel breaker is being constructed at Buck Mountain, together with the necessary boiler plants, shops, engine houses and other facilities, all of fireproof construction. When completed, it will prepare the coal now handled by the two old breakers, the lease of which will be surrendered."

THE LEHIGH VALLEY RAILROAD

The report of the Lehigh Valley Railroad Company for the year shows that its earnings from the transportation of coal were \$15,821,798, or 43.8 per cent. of the total revenue. The coal tonnage was: Anthracite, 11,513,475; bituminous and coke, 2,520,921; total, 14,034,396 tons, or 51.6 per cent. of the total freight moved. The coal ton-miles were 2,165,127,775, showing an average haul of 154.3 miles. The average earnings per ton of coal carried were \$1.13; per ton-mile, 0.73c., or about 0.09c. more than the general freight average.

The Fuel Situation in Texas

Since the year 1884, the production of coal and lignite in Texas has been 18,199,584 tons. The separation of these two items was begun in 1895. Since that time the production of coal has been 10,767,866 tons, valued at \$22,596,544, or an average of about \$2.10 a ton at the mines. During this same period the production of lignite has been 5,488,218 tons, valued at \$4,767,830, or an average of 82.8c. per ton at the mines. During these 15 years the production of coal has increased so that for each ton mined in 1895 there were 3.17 tons mined in 1909. In the year 1895 the average value of the coal mined was \$2.22 and in 1909 \$2.37.

The production of lignite increased much more rapidly than that of coal. For each ton of lignite mined in 1895 there were mined 5.75 tons in 1909, the value, per ton, for the respective years, being 90c. and 82.8 cents.

The latest estimates of the original supply of bituminous coal in Texas—those of M. R. Campbell, of the U. S. Geological Survey—show that we had 8,000,000,000 tons and of lignite 23,000,000,000 tons, or a total fuel supply of 31,000,000,000 tons. If we allow that each ton of fuel mined represents a loss of 1½ tons, the loss of coal and lignite is 27,299,376 tons, an insignificant proportion of the original supply. During the last 26 years the loss of fuel has been so small, compared with the original supply, as to be quite negligible in any estimates affecting the situation. The workable coal area may be taken as 8200 square miles, with an additional area of 5300 square miles that may contain workable seams.

There is much more uncertainty in regard to the workable lignite area, Mr. Campbell's estimates show 2000 square miles, but it is highly probable that it is nearer 20,000 than 2000. For the additional lignite area he gives 53,000 square miles, or a total of 55,000 square miles. The total workable area of coal and lignite has been taken as 10,200 square miles, with an additional area of 58,300 square miles that may prove to be workable. The coal and lignite area in Texas, proved and probable, is almost as large as the entire State of Missouri.

The outlook for a continued increase in the production of domestic fuel is most encouraging. Detailed investigations of the quality of our coals and lignites are now being carried on in the fuel-testing laboratory of the Bureau of Economic Geology, at the university.

An analysis of coal from the Tlaxiaco district in Oaxaca shows moisture, 2.20 per cent.; volatile material, 9.44 per cent.; fixed carbon 55.68 per cent.; ash, 32.68 per cent.; calories, 4605.

NEW PUBLICATIONS

- COAL FIELDS OF NORTHWESTERN COLORADO AND NORTHEASTERN UTAH**, by Hoyt S. Gale. U. S. Geological Survey, Bull. 415, 1910.
- IRON ORE DEPOSITS OF THE BRISTOL MINE, PONTIAC COUNTY, QUEBEC**, by E. Lindeman, Canadian Department of Mines, Ottawa, 1910.
- DIE THEORIE DER FAERBUNG DER NAUTERLICHEN ERDOELE UND DEREN NOTWENDIGE KONSEQUENZEN**. By M. A. Rakusin. Fachliteratur G.m.b.H., Berlin.
- MANGANESE ORE DEPOSITS OF THE SANDUR STATE**. By A. Ghose. Excerpt from Transactions of the Mining and Geological Institute of India, Calcutta, India.
- QUALITY OF THE SURFACE WATERS OF CALIFORNIA**. By Walton Van Winkle and Frederick M. Eaton. Water-supply Paper 237. U. S. Geological Survey, Washington.
- MANGANESE DEPOSITS OF THE UNITED STATES, WITH SECTIONS ON FOREIGN DEPOSITS, CHEMISTRY AND USES**. By Edmund C. Harder. Bull. No. 427. U. S. Geological Survey, Washington.
- ESTABLISHMENT, PURPOSE, SCOPE AND METHODS OF THE STATE GEOLOGICAL SURVEY**. By George H. Ashley. Extract A from Bull. No. 1, Geological Work in Tennessee. State Geological Survey, Nashville, Tenn.
- UEBER DIE ZUSAMMENSETZUNG DER FINNISCHEN EISENERZE, KALKSTEINE, EISENHUETTENPRODUKTE UND IHRER NEBENPRODUKTE**. By Gust A. Aartovaara. Suomalaisen Tiedeakatemia Kustantama, Helsinki, Russia.
- ANNUAL REPORT OF THE MINISTER OF MINES FOR THE YEAR ENDING DEC. 31, 1909; Being an Account of Mining Operations for Gold, Coal, etc., in the Province of British Columbia**. Minister of Mines Office, Victoria, B. C.
- SURFACE WATER SUPPLY OF THE UNITED STATES, 1907-08: PART XI, CALIFORNIA**. Prepared under the direction of M. O. Leighton by W. B. Clapp and W. F. Martin. Water-supply Paper 251, U. S. Geological Survey, Washington.
- LES ACCIDENTES DU GRISOU (Y COMPRIS LES EXPLOSIONS DE POUSSIÈRES) SURVENUS DANS LES MINES DE HOUILLE DE BELGIQUE DE 1891 A 1909**, by V. Watteyne and Ad. Breyre. Extrait des *Annales des Mines de Belgique*, Tome XV, 1910.
- THE COUNTRY LYING BETWEEN 21° 30' S. LAT. AND 113° 30' AND 118° 30' E. LONG.; Embracing Parts of the Gascoyne, Ashburton and West Pilbara Goldfields**. By A. Gibb Maitland. With Petrological Notes by J. Allen Thomson. Bull. No. 33, Geological Survey of Western Australia, Perth.
- INVESTIGATIONS OF COALFIELDS IN WYOMING BY THE UNITED STATES GEOLOGICAL SURVEY IN 1908**. By R. W. Stone, C. T. Lupton, H. S. Gale, C. H. Wegemann, E. G. Woodruff, M. W. Ball, Eugene Stebinger and A. R. Schultz. Advance chapter from Bull. No. 381, Contributions to Economic Geology, 1909, Part II. U. S. Geological Survey, Washington.
- DRAINAGE RECLAMATION IN TENNESSEE. (First Papers)**. Bull. 3, 1910. Containing: Drainage Problems in Tennessee, by George H. Ashley; Preliminary Report upon the Lands Overflowed by the North and Middle Forks of Forked Deer River and Rutherford Fork of the Obion River in Gibson County, Tenn., by A. E. Morgan and S. H. McCoy. State Geological Survey, Nashville, Tenn.
- COLORADO STATE GEOLOGICAL SURVEY, BULLETINS 1 AND 2, 1909**. Bulletin 1 comprises "A Preliminary report on the Geology of the Monarch Mining District, Chaffee County, Colorado," by R. D. Crawford. Bulletin 2 covers the "Geology of the Grayback Mining District, Costilla County, Colorado," by Horace B. Patton, Charles E. Smith, G. M. Butler and Arthur J. Hoskin. Office of R. D. George, State Geologist, Boulder, Colo.
- THE CANADA YEAR-BOOK, 1909. Second Series**. Census and Statistics Office, Ottawa.
- This statistical volume contains a full summary of the census and customs reports of Canada for the year; together with reports of mineral production and a variety of other statistics.
- TRANSVAAL CHAMBER OF MINES; ANNUAL REPORT FOR 1909**. Johannesburg, Transvaal.
- This volume contains full reports of the proceedings of the Chamber of Mines during its twentieth year of existence. It has also elaborate statistical tables giving analyses of the mineral production, statements of labor supply and other matters relating to mines and mining. A supplement gives a list of all companies registered in the Transvaal up to the end of 1909, with particulars as to their capital, officers and ownership.
- THE UNDEVELOPED AREAS OF THE GREAT CENTRAL AND NORTHERN INTERIOR OF BRITISH COLUMBIA**. Bulletin No. 22, 1910. Bureau of Provincial Information, Victoria, British Columbia.
- This is a description of the extensive areas in the central and northern sections of British Columbia which will be opened to settlement and exploitation by the construction of the Pacific sections of the Grand Trunk Pacific and the Great Northern railroads. The agricultural possibilities are good, but the greatest value is in the mineral resources which are as yet mainly undeveloped because of the lack of transportation. Preliminary explorations indicate that these resources may be important, and that great developments may be expected when the railroads are completed.
- GEOLOGIC RECONNAISSANCE OF SOUTHWESTERN LUZON**. By George I. Adams. *Philippine Journal of Science*, Vol. V, No. 2.
- This is, we believe, the first connected and fairly complete account in the English language of the large region directly tributary to Manila in the Philippines. Such literature as exists in relation to the district is rather fragmentary and is chiefly in Spanish or German. Mr. Adams has endeavored to correlate various previous publications, chiefly Spanish, and has added the notes of extensive recent field work. The result is an interesting study. The region presents no mining possibilities, except in the development of the Bulacan coal deposits; but it has valuable resources in building stone, clays, other structural and cement-making materials. It is the section of the island which is best known and on which money has been expended in roadbuilding and other improvements. A large part of the region is volcanic, and the geology is of much interest. The report includes one large map and a number of smaller ones, besides some excellent photographic reproductions.
- THE ENGINEERING INDEX ANNUAL FOR 1909**. *Engineering Magazine*, New York and London.
- This is the twenty-sixth year of this publication, the usefulness of which is now well established. In this, as in the volumes issued for the last four years, the classified system of arranging the items is followed in place of the strict alphabetic order of the earlier volumes. In other words, the articles indexed are first grouped under the great divisions of engineering practice to which they belong—civil, mechanical, electrical, mining, etc.—and under these again they are sub-grouped according to the recognized special divisions of each field. After these two steps have been taken in sorting the miscellaneous literature of the day into closely related sections, the final arrangement under each section becomes strictly alphabetical. In the present volume the classifications have been amplified and made more distinct, and cross references have been freely used. The list of periodicals included comprises about 250 publications, representing 17 nations and colonies and six languages. About three-fourths of these journals are printed in English, the others being in German, French, Spanish, Italian and Dutch. With every entry a brief descriptive note is given defining the scope and purport of the article.

i PERSONAL i

Mining and metallurgical engineers are invited to keep THE ENGINEERING AND MINING JOURNAL informed of their movements and appointments.

Claude T. Rice paid a brief visit to Victoria, B. C., late in September.

Dr. Frank D. Adams, of McGill University, Montreal, has returned from Europe.

R. E. Palmer, chief engineer of the Rio Tinto copper mine, Spain, is in Vancouver.

George H. Schickler, of Pittsburg, has been elected president of the McKean Coal Company.

Otto Sussman, of New York, was married, Oct. 5, to Miss Edna Bailey, of Salt Lake City, Utah.

Sir Alfred M. Mond, of the Mond Nickel Company is inspecting the company's property at Sudbury, Ontario.

Arthur Lakes and Arthur Lakes, Jr., have removed their offices to 701, Gas and Electric Building, Denver, Colorado.

Diack & Smith, chemical engineers, have removed their office and laboratories to No. 49 West Larned street, Detroit, Michigan.

Leighton Stewart, with the Mina Santa Francisco Asientos, Aguascalientes, Mexico, is dangerously ill of typhoid fever at Aguascalientes.

F. Augustus Heinze has been chosen president of the Stewart Mining Company in the Cœur d'Alene district, Idaho, in place of G. B. Leonard.

Fritz Cirkel, of Montreal, is making a tour of the Graphite mines in the Buckingham district, Quebec, and in the Ticonderoga district in New York.

William B. Anthony, formerly of Michoacan, and at one time connected with the U. S. Geological Survey, has opened an office at Guanajuato, Mexico.

E. Harms, superintendent of Torreón smelter, Torreón, Mexico, is away on a month's trip visiting metallurgical works and mines in Colorado, Utah and Montana.

Victor B. Hjortsberg, former metal clerk of the Grasselli plant, United States Metals Refining Company, has been appointed chief clerk and cashier at that plant.

W. F. Evans, of Hartshorne, Okla., chief engineer, Rock Island Coal Mining Company, has been appointed general superintendent to succeed H. C. Booth, who has returned to Illinois.

Major S. K. Hooper, well known to all Colorado mining men as general passenger agent of the Denver & Rio Grande, has been made assistant to the general traffic manager of the road.

Henry M. Payne, general field manager of the Hydraulic Mining Cartridge

Company, of New York, sailed from New York on Oct. 6 for a business trip through the coalfields of Mexico.

C. E. Stuart, who left the employ of the Montana-Tonopah Company in March last, is employed as mining engineer by the American Smelting and Refining Company, at Angangueo, Michoacan, Mexico.

E. Stütz, vice-president and general manager of the Goldschmidt Thermit Company, New York, retired Oct. 1, from the direction of the company, which passes under the management of William C. Cuntz.

Joseph T. Singlewald, of Johns Hopkins University, Baltimore, has returned from Europe, where he spent a year studying mine operations in France and Germany. He is now engaged in research work in economic geology.

J. B. Fleming, having completed the rebuilding of the Goldfield Consolidated mill at Goldfield, is now engaged in the construction of a stamp mill and cyanide plant for the Nevada Hills Mining Company at Fairview, Nevada.

John Cooper has resigned as mine superintendent of the Mexico Mines of El Oro, in order to further his railroad interests in the State of Zacatecas, Mexico. As a token of esteem his underground employees presented him with a gold watch.

Eli T. Conner announces that to properly care for important professional engagements in the Lackawanna and Wyoming regions of Pennsylvania, he has opened a temporary office in the Traders' National Bank building, Scranton, Penn. His Philadelphia office in the Real Estate Trust building will be open as usual.

A banquet was given by 200 engineering graduates of the University of Toronto, on Oct. 5, to R. W. Leonard, who succeeds Prof. Goldwin Smith on the board of governors. W. E. H. Carter presided. H. Fairlie in introducing the guest of the evening dwelt on the importance of having on the board one who is in close practical touch with engineering work.

Dr. Herbert Gray Torrey has tendered his resignation as chief assayer of the New York assay office. He entered the office first 49 years ago as assistant to his father, the late Dr. Torrey, who was appointed when the office was first established. He became chief assayer when his father died, and has held that important position for 37 years, conducting the work without a break and with entire satisfaction for all that time; for years past in the face of many difficulties arising from the limited space and the insufficient equipment of the office. The handling and testing of \$75,000,000 or \$80,000,000 of the precious metals, which has been required in recent years, is no mean task. Dr. Torrey has introduced

many improvements, and has been largely responsible for the plans of the new office building, now nearly ready for use. He will hereafter devote his time to consulting metallurgical work.

+ OBITUARY +

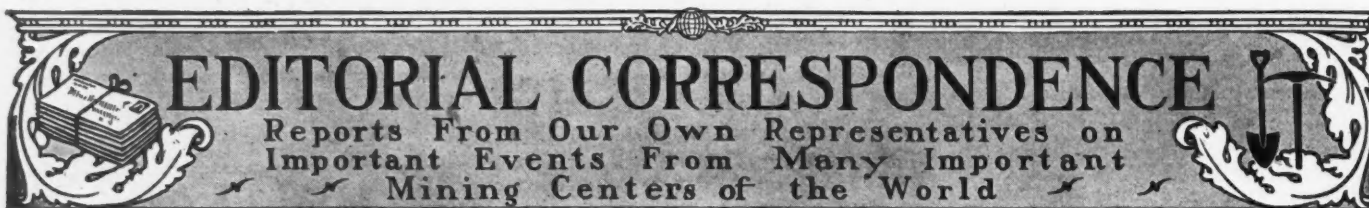
Richard Wood died in Philadelphia, Sept. 29, aged 76 years. He was born in Philadelphia and when a young man entered business with his father, later becoming a member of the firm and then an officer in the corporation of R. D. Wood & Co. Outside of the company he was interested in iron mining in Virginia, and was also part owner of some copper mines in Mexico.

William Whitwell, of William Whitwell & Co., owners of the Thornaby Iron Works, Thornaby-on-Tees, died at Scarborough, England, Sept. 19, aged 75 years. He was one of the prominent figures of the past half century in the iron trade of the Cleveland district and was known best for his efforts over a long period of years to further the adjustment of industrial difficulties by arbitration and conciliation. He was one of the founders in 1869 of the Board of Conciliation and Arbitration for the Manufactured Iron and Steel Trade of the North of England and was president of the board from 1875 to 1907. He was one of the first among English iron manufacturers to recognize the value of the iron ores of Bilbao. He was president of the Iron and Steel Institute in 1901-1903 and accompanied the Institute on its American tour six years ago.

SOCIETIES and TECHNICAL SCHOOLS

Mining and Metallurgical Society—The following have been elected to membership: Robert Gilman Brown, Benedict Crowell, James S. Douglas, Ernst F. Eulich, B. Britton Gottsberger, Robert Peele, Dennis M. Riordan and Bradley Stough-ton.

Los Angeles Chamber of Mines—It is intended to establish at Los Angeles, Cal., an important collection of rocks and ores, illustrating the economic geology and mining industry of the tributary region. The matter has been undertaken by the Chamber of Mines and placed in the hands of a committee, of which J. Nelson Nevius is chairman. Space in the German building has been secured and a part of the material is already on exhibition. It is proposed that the collection shall be systematic. Earnest effort is being directed toward making it also truthful and representative. Donations are requested and will be installed and exhibited free of expense, provided that they conform in character to the very reasonable regulations adopted by the committee.



EDITORIAL CORRESPONDENCE

Reports From Our Own Representatives on
Important Events From Many Important
Mining Centers of the World

San Francisco

Oct. 10—There is unusual activity in both quartz and placer mining in the southern section of Plumas county, near the northern Sierra county line. A new and promising strike has been made in the Little Grass Valley, or Quigley mine, three miles north of La Porte, where extensive drifts have been run through the gravel deposit. A mill is being put up to crush the cemented gravel. In the Bellevue, gravel running as high as \$35 a cu.yd. has been found. There are large areas of undeveloped gravel on the Gibsonville and Mooreville ridges, which unite at a point between La Porte and Little Grass Valley. The same conditions exist in the vicinity of Saw Pit, Onion Valley and Blue Nose. Greater activity is also being shown along the gravel channel near Howland flat, Poker flat and Bunker hill, in Sierra county, as well as in the drift mines around Table Rock, Sugar Loaf and along the ridge where the Port Wine lead exists.

At Sierra City, Sierra county, there is also notable activity, particularly in quartz. This is an old camp both for quartz and hydraulic mining. At the head of Ladies cañon, in the Lee Brothers claim, under bond to Charles R. Thompson, there has been found one of the richest oreshoots ever discovered in the county. In the claim of Lewis Brothers, of Sierra City, on the Keystone ridge, very high-grade ore has been discovered, and fine specimens are being taken out. The old Sierra Buttes mine is running 20 stamps and doing well again, though it lay virtually abandoned for some years. The Keystone, also given up for a period of years, is again working 10 stamps. The Phoenix is being rehabilitated and the mill is soon to be in readiness. The Hayes mine, two miles from Sierra City, is also being reopened and other old properties are being developed. All this is making Sierra City one of the liveliest of the mountain towns. The place is at a high elevation and supplies and stores for the winter have to be hauled in during the summer months. There are still numbers of known quartz mines in that vicinity in which little is being done, but capital has come into that section so that many will be put in shape for working before long.

Denver

Oct. 10—Recently local papers have published reports that the Idaho mine, in the La Plata mountains, 10 miles west of Durango, near Hesperus mountain,

had been for 90 days shipping six and seven cars of ore a week which averaged \$7000 per car, including two cars which were settled for by the smeltery for \$14,000 and \$25,000 respectively, and that one car reached the smeltery under guard of ten armed men. It was stated that the ore was sent to the Durango smeltery. It was also stated that the mine was collecting a carload of ore which would be worth \$100,000. Now, no such shipments as \$14,000 and \$25,000 per car have ever been made from the above property. It is a fact, however, that quite a number of carloads have been shipped that ran from \$8000 to \$12,000, but these were exceptional. The mine is a great producer, and puts out much rich ore.

The Pelican and Dives, at Silver Plume, above Georgetown, is certainly "coming back." It has a grand early record, and appears likely now to nearly repeat itself. This mine is on Republican mountain, and was discovered in 1868, but produced but little until 1871, when, in a few months, the owners took out ore of a bullion value of about \$122,000. Then litigation began, and the Pelican and Dives were separated. In six years, up to 1878, the Pelican paid \$652,000 profit on ore mined. Its total silver product to that date was about \$1,500,000. In 1880, Gen. Francis Marshall organized the Pelican and Dives Mining Company, in New York, the two mines being again consolidated. The capital stock was \$5,000,000, held mainly among the leading officials of the telegraph, telephone and express companies, with Norvin Green as president. So much for the early history. A lease is now being operated on the Pelican by the Burleigh Mining and Milling Company, and it is just reported that an orebody 6 to 7 ft. in width has been exposed in the winze sunk below the Pelican tunnel, the whole of which, it is stated, is smelting grade.

Butte

Oct. 10—At the Commercial Club in Helena, there was held last week a meeting called by H. S. Taylor, of Seattle, for the purpose of organizing a chapter of the American Mining Congress. Edward Horsky was elected chairman, and L. S. Ropes, secretary. No steps were taken at the meeting other than to outline the procedure necessary to found a local chapter and the appointment of a committee to solicit members. J. A. Walsh, R. A. Bell, H. Topel and J. J. Fisher.

There is a persistent rumor that the North Butte company is endeavoring

to settle its suit against the Tuolumne out of court. It is stated that North Butte has offered President Hickey, of the Tuolumne company, a fair price for control of the stock, but that Hickey refuses to compromise unless the minority stockholders be taken care of on the same basis. It is also said that North Butte has offered to trade its stock for Tuolumne on the basis of 1:6 and that the Tuolumne people are holding out for a 1:4 basis but, from the very nature of the matter, definite information is practically impossible to obtain.

Salt Lake City

Oct. 10—On account of the decreased production of some of the Park City mines the supply of lead ores coming to the Valley smelteries is below the normal. For several months the Silver King-Coalition has been shipping only about one-third of its usual output, and recently the Daly-West has cut shipments to the same amount or less. These two mines were the principal shippers to the American Smelting and Refining Company plant at Murray. It is reported that the plant is not operating at much more than 60 per cent. of its normal capacity, and has four blast furnaces in operation on lead ores, the furnace on matte concentration having been cut out. At Midvale the United States company is running five furnaces on custom ores and on ores from its mines in Bingham and Tintic. The Centennial-Eureka, now that the new pumps are in working order is increasing production somewhat, though the average is still 300 to 350 tons daily. At Garfield three blast furnaces out of four, and five reverberatories are operating. About 250 tons of copper is produced daily at very low actual smelting and converting cost. The capacity of the plant is being increased. An additional reverberatory furnace is being built, and one more basic lined converter of the Peirce & Smith type is to be added. There are now five of these converters, of which three are in use. They are giving good results and turn out from 1000 up to 3000 tons of blister copper without relining. From 70 to 90 tons of matte are converted in a blow and the converters have turned out as high as 62 tons of blister copper at one charge. The usual amount is from 25 to 40 tons of blister copper. Several tons of Utah Copper concentrates carrying from 25 to 30 per cent. silica are added at intervals to furnish silica for the flux. From two to five tons is the usual amount, but up

to seven tons can be added without chilling. The converters do not require frequent relining, and last a month or longer in some cases without repairs. The greatest wear is at the tuyeres, on account of the breaking of pieces of magnesia brick, when the tuyeres are rodded to keep them clear. The lining here is from 24 to 30 in. thick.

Duluth

Oct. 6—Mine inspector W. H. Harvey has filed his annual report. The report states that the total number of men employed in mines of St. Louis county, was 17,613, of which 7813 were employed underground and 867 on the surface of the underground mines. In the open pit mining 4054 men were employed in mining, and 4879 in stripping. The daily wage for the underground employees is \$2.50 per day, and for open pit and skilled workers the average is \$2.80 per day. The ratio of fatal accidents decreased from 4.59 to 3.95 per 1000. During the year ended July 1, 1910, the report says that the underground mines produced 10,577,624 tons, while the open pits yielded 20,667,751 tons.

The cubic yards of stripping amounted to 45,902,178; railroad ties used in mining work, 353,679; lumber 28,258,934 ft. and lagging 53,872 cords.

Birmingham, Ala.

Oct. 10—The Alaga Mining Company, which has several thousand acres of brown-ore land under development in Cherokee county, near the Georgia line, is making further developments that will cost \$150,000. The company has made arrangements to increase its output and has found customers for its product.

The Bessemer rolling mills, belonging to the Tennessee Coal, Iron and Railroad Company, near Birmingham, have had a new plate mill installed and the largest plates ever manufactured in this section of the country are now being produced.

Much progress is reported in the developments being made by the Tennessee company and the American Steel and Wire Company, in the vicinity of Birmingham, and by the middle of next year the new plants will have been completed and ready for operation.

Authoritative figures recently issued show Alabama's pig-iron production for September to have been 149,829 tons against 141,097 tons in August and 151,803 in September of last year. For the first nine months of this year, Alabama produced 1,435,198 tons of pig iron against 1,174,499 tons during the same period last year.

Cobalt

Oct. 11—The buildings of the Mines Power Company substation in South Lorrain are completed and most of the machinery is on the ground. It is also stated that the company will install a

1500-cu.ft. electric-driven air compressor, with which it will supply compressed air to some of the smaller mines. The electric energy will be ready for distribution in about a month, and will give a considerable impetus to mining operations in that district.

The extremely heavy rains during the last two weeks have greatly hampered the freight and passenger service into Porcupine. The roads are in bad shape, and teams can haul only a very small load. In the meantime the freight is piling up and operators are anxiously waiting for the freezeup. It is estimated that this winter there will be from 300 to 400 teams on the Kelso route. Shippers are complaining greatly about the loss of goods on the trail by thieving.

Toronto

Oct. 9—Charles Russell and H. E. Tiebur, representing American oil-refining interests, have made an inspection of the oil shales in Albert county, New Brunswick, and have made an offer to the General Oil Shales Company, of Canada, which holds large areas in that locality to purchase the entire output of the property for a term of 25 years at a fixed price for refining purposes. They propose to build a refinery either at Hillsboro or St. John, to connect with the mines by a pipe.

A meeting of a number of representatives of companies manufacturing explosives and others interested in the proposed legislation affecting their manufacture and use, was held at Ottawa, on Sept. 23. Dr. Eugene Haanel, director of mines, presided. Capt. A. P. Desborough, the British explosives expert, who is in Canada for the purpose of making preparatory investigations, was in attendance and gave an outline of the recommendations to be made in his official report. These include the establishment of a testing station at Ottawa, at which samples of all explosives manufactured or sold in Canada must be tested, and the passing of legislation to prevent the establishment of an explosive-making industry until a federal license had been obtained. He pointed out that the present regulations were exceedingly loose, there being a division of authority between the federal government, the provincial government and the municipal bodies. A system of regular inspection of factories by government officials was also recommended.

Victoria, B.C.

Oct. 7—R. G. McConnell, of the Geological Survey branch of the Department of Mines, who spent the field-work season of 1910 in making investigations in the Portland Canal district of British Columbia, with an assistant geologist and a topographer, says: "There is not a large area of mineralization in the Portland Canal district, but it is yet a little pre-

mature to pass any final opinion respecting the possibilities of mining there. With only two noteworthy exceptions, most of the work done has been superficial. Owners of claims have been chiefly occupied during the past season in cutting out roads and trails, prospecting the surface and getting in supplies. I visited various camps and saw some promising prospects. Conditions in the Salmon River district, farther inland, are much the same as in the Portland Canal country. At Salmon River I also saw a number of good showings, but no orebody has yet been outlined or proved up. The ore yields principally in gold, silver, and lead. I was shown fine specimens of gold ore, which, according to report, had been found this season across the divide, in the Nass River district. It was unfortunate that sensational and untruthful reports about the discovery of rich free-milling gold ores on Bitter creek, were sent broadcast last June. As a matter of fact, the existence of free-milling ore on Bitter creek has not yet been established. It is true that specimens of free gold in small quantities were found. Similar exaggeration took place concerning the so called gold placers on Bitter creek, which has been staked from end to end. If the gold is there, nobody has yet tried to get it out."

Mexico City

Oct. 6—It is announced that a company has been formed in Denver to finance an extensive plan of hydroelectric development for the west coast of Mexico, utilizing the Mayo, Humaya and Santiago rivers. Among the Denver people mentioned as being identified with the project are Thomas Keeley, J. B. Andrews, F. F. Struby, Dr. L. T. Durbin, Dr. John T. Foster, Dr. I. B. Perkins and W. O. Temple.

The transmission lines will extend from Guaymas to Santiago, 1200 miles. Twenty cities along the west coast of Mexico, eight of which have electric street-car systems, will be supplied with power as well as the railroads and mines. The entire cost of the system when finished will be \$5,682,000 and it will generate over 300,000 h.p. The power project on Rio Mayo, in Sonora, Mexico, includes a dam 170 ft. high, 260 ft. long at the top and a reservoir capacity of 10,280,000,000 cu.ft. The Rio Humaya project includes a dam 223 ft. high, 708 ft. at the top and a reservoir capacity of 11,384,500,000 cu.ft. The Rio Santiago project includes a dam 215 ft. high, 145 ft. long and 9,360,000,000 cu.ft. capacity. The cost of the three plants will be \$3,609,000. The cost of the transmission lines will be \$2,000,000.

It is also reported that the Southern Pacific railroad in Mexico will use the power for part of its Mexican system.

Work is to be begun at once under charge of R. M. Jones, of Denver.



THE MINING NEWS

Reports of New Enterprises, New Machinery,
Installations, Development Work and Property
Transfers The Current History of Mining

Alaska

John B. Denney, of Seattle, who owns property in the basin back of Juneau, has secured the stamp mill used several years ago at Snettisham, and will use it.

Fairhaven Ditch Company—As a result of the operation of a hydraulic elevator \$50,000 in gold was cleaned up this season from a property a short distance from Candle.

Alaska Gold Exploration and Development—This company has secured control of eight claims near Seward, and will develop. Headquarters are at North Yakima, Wash. Phil. A. Ditter president.

Otterson—This property, about 50 miles from Juneau, is being steadily worked. C. S. Otterson, of Seattle, is president.

Arizona

COCHISE COUNTY

Calumet & Arizona—The company is taking advantage of the curtailment by both itself and the Superior & Pittsburg to increase the size of its smeltery by enlarging its blast furnaces to permit of the treatment of 600 tons additional ore per day, bringing the total capacity to 3000 tons per day. The dust chamber is also being enlarged.

GILA COUNTY

Arizona Commercial—Ore is reported in the drill holes on the 700-ft. level. The company is at work on the fourth hole on the eastern side of the 700 level toward the Superior & Boston line. A fifth hole will soon be sunk 200 ft. west of the Eureka shaft. An official of the company made the statement that in all probability the Copper Hill smeltery would be in commission by Jan. 1.

Superior & Globe—The drill on the 660-ft. level is 300 ft. below that level, one-half of the ultimate depth.

California

CALAVERAS COUNTY

At Skull Flat near West Point, the Star of the West, an old mine, is being sunk upon and new hoisting and pumping machinery is being put in. The Morning Star, owned by C. Gilbertson, is taking out shipping ore from the tunnel. The new shaft in the Smith & Thompson is showing quartz in the bottom. High-grade ore is being sacked at the M. R. G. mine.

ELDORADO COUNTY

Rising Hope—In this gravel mine near Placerville, being reopened under bond

by J. R. Partridge and George W. Engelhardt, of New York, while extending an old tunnel, a fine body of gold-bearing gravel has been struck, extending 75 ft. across the channel. The Try-Again claim adjoining has also been secured by the same parties.

HUMBOLDT COUNTY

Klamath River—This company has a lease of the Miller Brothers group of hydraulic mines near Weitchpec, covering a stretch of gravel about a mile long, 400 yd. wide and 30 ft. deep. The plant has been put in order ready for the water brought by the winter rains. C. A. Sample is manager.

California—This mining and dredging syndicate of Orleans has concluded a successful hydraulicking season and is putting the ditches and flumes in order for an early start in the coming season, when the heavy rains come. The company expects to install a dredge shortly to work a large acreage of shallow gravel which can be better worked by this method than by the hydraulic system. The dredge will also be used to work river bars.

KERN COUNTY

Kern-Piute—This company at Piute has just put new boilers in the mill and the concentrating plant will shortly be completed. The mine, at an elevation of 8000 ft., will be operated all winter.

MARIPOSA COUNTY

Bullion Hill—This Los Angeles company has started work on the American Eagle group of mines near Hornitos, which has been bonded by it from L. Valverde and John Morrison. The property will be developed on a large scale. J. E. Meyer is president.

MONO COUNTY

Casa Diablo—The last fortnightly clean up was 216 oz. of gold. The tunnel is now in 1100 ft. and is expected shortly to cut the Granite Mountain vein.

Midas Gold Gravel Mines Company—This company has been organized to work placer claims near Midas. George W. Langford and W. H. Clary are among the incorporators.

NEVADA COUNTY

Andy Fitz—The work of installing the new machinery at this mine near Moores Flat has been completed and operations will now be resumed on the property.

PLACER COUNTY

Red Bird—George A. Tubb is about to commence active operations on this mine

near Colfax, and has also purchased the Wollaster claim adjoining.

PLUMAS COUNTY

Golden Horse Shoe—This new company has been organized by R. M. Peabody, W. T. Stone and others to cut a tunnel through Horse Shoe bend, south of Quincy, and drain a long stretch of the Middle Fork of the Feather river for mining purposes.

SACRAMENTO COUNTY

Eckhardt—This mine near Folsom will shortly be reopened.

Union Dredging Company—This company, organized by Philadelphia capitalists, has bought 200 acres near Folsom, from Mrs. Louise Fassler, of the Willow Springs ranch, and will build several dredges. The land has been under bond to the company for some time and has been thoroughly prospected by drills. More or less drift mining has been done in that vicinity.

SAN LUIS OBISPO COUNTY

W. J. McCarthy is developing the McCarthy and Dorsey quartz claims in the La Panza district, by tunnels. In the wet season a hundred or more men work the placers in this district but no quartz-mining has been done.

SHASTA COUNTY

The Consolidated Gold Dredging Company's dredge, costing over \$100,000, sank in the Sacramento river opposite the mouth of Middle creek, three miles above Redding. W. D. Egilbert, the superintendent, estimates the damage at less than \$1000. The dredge will be raised.

Monarch—The road from Kennett to this newly discovered mine has been completed and shipping of ore has commenced.

SIERRA COUNTY

Sierra Buttes—Recent developments in this property at Sierra City have led the Hayes Brothers, owners, to install a compressor.

Gibraltar—The drift from the bottom of the 310-ft. shaft has run into high-grade gravel. The Kieffer Brothers are the owners.

Hayes—This mine at Loganville has been bonded to S. W. Van Sycklen, who will develop it.

TUOLUMNE COUNTY

Greenhorn and One Chance—These claims near Rawhide have been bonded to W. T. Watson, who has started work.

Duffield—A 10-stamp mill has been taken to this mine near Arastraville and a hoist and compressor installed.

Black Oak—This mine at Soulsbyville has been unwatered and in a few days the winze below the 1500 level will be cleaned out and the work of sinking the shaft commenced.

OIL

At Bakersfield, the bringing in of oil on the Kern-Maverick, in the northeast corner of the northwest quarter of section 12, T. 29, R. 27 is important in proving the still larger territory of the Kern River field, and that the oil-belt extends a half mile further in the northwest section than previously known. The Kern Oil Fields, Ltd., of California, one of the large English companies, has signed a contract with the San Joaquin Light and Power Company, whereby that company will furnish in the neighborhood of 2500 h.p., which is proposed to use. This is the first oil company to install electric power in the Kern River field.

At Maricopa the Consolidated Midway has reduced the 10-in. casing through which the oil was gushing by stages to 1½ in. Well No. 1 of the Midway Northern, in section 32 T. 12-R., 23, is producing about 2500 bbl. daily, part of this production is being placed in storage.

At Coalinga, the Southeast Oil Company, Well No. 1 in the northwest corner of section 18 T. 20-R. 16 has struck the oil sand at 3540 ft., this is stated to be just east of the apex of the anticline and is in an unproven territory. The Lacey Oil Company in section 34, T 25-R. 18 has a showing of high-gravity oil, testing from 32 to 34 gravity; the well is down approximately 1000 ft.

Admiral R. D. Evans has purchased the Yellowstone Oil Company property of 20 acres, in the Kern River district, 45 acres in the McKitterick field and 160 acres in the Sunset field. The Mascot property in the Midway field, and the Premier property of 160 acres at Coalinga.

Colorado BOULDER COUNTY

Two cars of tungsten ore from the Frigid mines are ready for shipment to the Eureka mill, at Boulder. A. R. Krum is manager. The new mill of the Tungsten Mining and Milling Company, on Beaver creek, is in full operation.

CLEAR CREEK AND GILPIN COUNTIES

The shipments of ore and concentrates to the valley smelteries from Idaho Springs during September were 129 carloads, being a considerable increase over any month in the last year and a half. The average for this year has been 109 carloads per month.

Seven-Thirty—The lessees on this Georgetown mine have been shipping silver-lead ore worth \$150 per ton for some time, and now have a streak 3 in. wide which runs many hundreds of ounces

silver, and an ounce of gold per ton. They are installing machine drills, and will develop extensively.

Pioneer—This mine, on Cordove mountain, is sending regular shipments of \$50 ore to Golden.

Waldorf Consolidated—One carload per day of concentrates is going to Golden. Edward J. Wilcox is manager.

Dives-Pelican—The Burleigh lease bonanza is holding out well, and there is a great demand for leases on blocks of Pelican ground. George Tarkington is the manager.

Old Town—It is reported that Newton J. Pike & Co., leasees, crosscut from the fourth level of the Old Town to the Wautanga vein, and opened up an orebody, four carloads of which have returned 2½ oz. gold, 5 oz. silver and 3 per cent. copper, netting the lessees \$50 per ton. The principal owner is George K. Kimball.

Mattie—William Jones, lessee on this mine, on Chicago creek, has shipped eight tons which netted him \$200 per ton. Smith & Griffith, leasees on the same mine, have shipped 17 tons of second-class ore which yielded \$40 per ton. The first-class ore runs 8 oz. gold per ton, the streak being about 6 in. in width.

Lamartine—R. R. Graham, lessee on this mine, is reported to have opened a 6-in. vein of ore carrying values of \$100 per ton. John Carlson, another leaser, has shipped a carload running \$50 per ton.

GUNNISON COUNTY

It is reported that a 12-mile tunnel is to be driven by New York capital from Crystal to Irwin. It will cut a large series of veins that have been heavy producers on the surface, and will develop the Galena and Treasury mountains at depths of upward of 2000 feet.

LAKE COUNTY—LEADVILLE

Humboldt—From this mine, in Adelaide park, 300 tons of lead ore is being shipped monthly.

Colonel Sellers—The new shaft of this mine will be sunk to 800 ft., and when the orebody is reached at this point, it is stated that the output will be 350 tons daily.

LAS ANIMAS COUNTY

Starkville—At this coal mine an explosion occurred, Oct. 8, entombing 50 or more miners. Rescuing parties hope to save some of the men.

SAN JUAN DISTRICT

Tomboy—In September the mill crushed 9900 tons, yielding bullion, 47,500; concentrates shipped, \$21,500; expenses, \$44,000; profit, \$25,000.

SUMMIT COUNTY

The Silver King mill has been equipped with new machinery, and is treating a heavy tonnage of ores from the silver Cave, Silver King and Princess mines, on

Collier and Glacier mountains, above Montezuma. The product is silver-lead, and the concentrates are hauled to the railway at Keystone, eight miles.

Kokomo Consolidated—The 20 claims belonging to this company are being operated by P. W. Brown, manager, and are developed by a tunnel now 2300 ft. in length, and still being driven ahead. Two weeks ago a 6-ft. vein of sulphide ore was cut, and shipments are being made regularly. The ore carries copper, silver and gold.

TELLER COUNTY—CRIPPLE CREEK

Leasers on what were originally called "waste dumps," in the Cripple Creek district, are making better profits than ever, and the demand for these piles is increasing.

Trilby—In this Bull Hill mine, the discovery is announced, at a depth of 1100 ft., of a 3-in. streak of very high-grade sylvanite and free gold ore. It occurs on the west wall of the vein, which is 4 ft. wide, and has been yielding about 1 oz. gold to the ton.

Ajax—This mine, on Battle mountain, is being operated by 25 sets of leasers. Fogleman & Vaughn, leasing on the 500 level, are reported to be working on a vein which gives returns of as high as 4 oz. gold to the ton.

Jo Dandy—The leases having expired, this mine will be worked on company account, and the shaft sunk to 1000 ft. Fifteen cars per month of 1-oz. gold ore is the present output.

Dante—Shaft No. 2 of the Dante, M. B. Rapp, lessee, is producing some very high-grade ore from the 500 level, a 2½-in. seam in the middle of the vein giving returns as high as 30 oz. gold to the ton. The average of the ore, however, is about 1 oz. gold to the ton. Joseph Hass, lessee, operating through No. 1 shaft, is getting returns of from \$25 to \$40 per ton from a vein 3 ft. wide, and is shipping regularly.

Granite—From the Christenson lease five to six cars of high-grade ore is being shipped per month, the last car yielding on settlement 8 oz. gold per ton.

Victor—This mine, owned by D. H. Moffat, of Denver, is under lease to the Western Investment Company, and sub-leased to the Roscoe Leasing Company, which is shipping from three to five cars per week of ore from the old stopes and drifts. It is said to average about 1 oz. gold per ton.

Idaho

COEUR D'ALENE DISTRICT

Stewart—At the annual meeting F. Augustus Heinze was elected a director, and president succeeding C. R. Leonard, of Butte. M. W. Bacon, of Butte, was re-elected as secretary-treasurer, the other directors being B. F. O'Neil, of Wallace,

Idaho; E. J. Carter, of Spokane, and Stanley Gifford, of New York. No financial statement was made but it is known that the indebtedness incurred by the company in development has almost been wiped out.

Indiana

CLAY COUNTY

Brazil Block Coal Company—A strike by 300 men in mine No. 3 at Diamond, occasioned by the mule driving question has been settled by a compromise. The company waived the \$1 a day fine on all the miners who left the mine in violation of the working agreement and the miners conceded that the management has a right to change drivers for particular mules. The rule that a driver is entitled to drive one certain mule at all times will no longer be contended for. It took two days for the district officials of the miners and operators to settle the strike because the company, after a mule had recovered from an injury, gave it to another driver on the ground that the original driver had been careless.

Kokomo Mine Company—This company has been compelled to close its mine northwest of Brazil and is clearing the mine of water. A creek broke into the mine. The company has sustained the loss of two boilers by explosion due to the use of water from the mine which contained sulphur.

GIBSON COUNTY

Rain of 24 hours duration has caused a flood in all the lowlands of the Oakland City oilfield; two-thirds of the oil wells are shut down and many pumping stations submerged in 3 to 6 ft. of water. A marked drop in new production is the result. The Pike county field, a little south, but adjacent, made a good showing in development previous to the heavy rains.

GREENE COUNTY

A peculiar damage suit for \$10,000 has been filed against the Alliance Coal Company at Linton by Thomas Williams, who alleges that the company had a balky mule, which caused him to fall under a mine car, resulting in his permanent injury.

SULLIVAN COUNTY

Glendora—This mine, closed for two years and owned by the Consolidated Indiana Coal Company, resumed Oct. 4, with 150 men. The mine is located three miles north of Sullivan.

VANDERBURG COUNTY

A mine rescue station car on exhibition in Evansville is attracting attention. The car carries mine rescue equipment, which is being demonstrated by R. Y. Williams and James Webb, of the Urbana, Ill., station; first aid to the injured equipment, which is in charge of a government expert, and conveniences for use as a

hospital. There is an audience apartment in the car and lectures, illustrated by means of a stereopticon machine, are being given to instruct miners and officials in the use of the equipment. Six men from the Indiana mines are at the Urbana station preparing to take charge of the Evansville station when completed and equipped.

Michigan

COPPER

Ojibway—The north drift at the 800-ft. level of No. 1 shaft has come to exceptional rich copper ground, the lode in the face of the drift is 15 ft. wide and uniformly mineralized. The south drift from the 500-ft. level of the same shaft is improving.

Lake—The shaft at this property is sinking about 75 ft. below the seventh level at 30 deg. At the seventh level a crosscut that is being driven to the lode is in 250 ft. Drifts from the levels above are exposing good copper throughout, with an occasional lean streak, a characteristic of the amygdaloid.

Algomah—This company's shaft is down about 67 ft. and is bottomed in the same grade of ore that has been exposed throughout the sinking. A recent sampling of the stock pile, which contains about 65 tons of ore, showed an average of 24.1 per cent. copper. No. 2 drill hole sinking to determine the pitch of the formation is established in bedrock. Trenching is also under way near the Lake boundary.

Seneca—This company has discontinued sinking at 920 ft., where a crosscut is being driven to the lode. This shaft is sinking in the footwall of the Kearsarge lode, but development in the level above has not exposed any consistent copper ground.

South Lake—No. 5 drill hole has penetrated the second of the series of three amygdaloid lodes that were exposed in holes 3 and 4, and the core showed it to be 22 ft. well mineralized.

Ahmeek—The two new shafts of this company have penetrated the west branch of the Kearsarge lode and are now sinking in the trap which separates it from the main lode. A little copper was in evidence in the west branch at the point of intersection, in the form of small fissures.

Mohawk—No. 6 shaft is sinking below the third level with drifts extending in both directions from the first and second levels, and northward from the third, with about the same class of ground being broken as at other parts of the mine. This shaft is sending about 150 tons of rock daily to the mill.

IRON

In the territory to the east of Republic and to the south of Michigamme, within the limits of the Marquette region, the

Cleveland Cliffs company is preparing to explore the Fence Lake district. The Cyr property is being provided with railroad facilities. The Cyr is the latest Swanzy district mine, the development of which has been started by the Cleveland Cliffs company. The Traders property of the Antoine Ore Company, at Iron Mountain, Menominee range property in the Lake Fume district, between Iron Mountain and Norway, is being explored by the Independent Iron Company, of Detroit.

North Range—This iron-mining company has been organized to operate the new Maas mine developed adjoining the American mine on the Marquette range. It is claimed that one forty contains 15,000,000 tons of hematite and more than 200,000,000 tons of mixed ore which can be concentrated. A steel-lined shaft will be sunk to 700 ft. this winter. George J. Maas, of Negaunee, is in charge.

Minnesota

On the Mesabi range the Roberts-Kingston Contracting Company is stripping the Union mine, originally an underground operation. The Bray mine, having filled the season's contracts, has closed for the winter. The Republic Iron and Steel Company is installing water works and sewers at Gilbert.

Interest in the Vermilion iron range is increasing as the result of the season's explorations. Section "30" mine is stockpiling ore. The Duluth-Vermilion Iron Company will drill at Robinson lake.

Woodbridge—The concrete shaft is 50 ft. west of the orebody. The Foundation Company, bottomed the new concrete shaft (97 ft. deep) on taconite. The mining company has commenced sinking the shaft through rock. Shaft will be sunk 225 or 230 ft. Approximately 100 ft. of earth is over the ore.

Duluth—This Oliver mine, at Biwabik, is practically worked out. It will be abandoned this season. The orebody continues beyond the side line into the Canton property.

Biwabik—A 325-kw. generator is being installed to operate the new gyratory-crusher plant, now under construction. John S. Lutes, Biwabik, is superintendent.

Gilbert—Shaft No. 2 was closed recently. Steam-shovel work has been discontinued. The only work being done is at No. 1 shaft.

Commodore—A new spiral track is being laid out to take place of a number of switchbacks. The pit is about 110 ft. deep and confined to less than 40 acres.

North American—The Foundation Company has completed the 95-ft. concrete shaft, which extends 7 ft. into bed rock. The mining company will continue the shaft 100 ft. more to strike the orebody. P. F. Chamberlain, Tower, is general manager.

Leonidas—A steel-timbered five-compartment shaft is being sunk. An entire new equipment, including steel head-frame, hoist, powerhouse and shops, is being installed. Stripping will be continued on a portion of this property during the winter. R. J. Mitchell, Eveleth, is general superintendent.

Adams—Extensive stripping operations are in progress, extending well into a large part of the old workings, which were formerly mined by the square-set system. Steam-shovel work will take place of the milling, for which a portion of this mine was famous.

Montana

The United States Assay Office reports that \$158,388 was received from Montana in precious metals during September. Madison county was first in production with \$58,817 and Fergus county second with \$40,928.

Federal Judge Rasch has issued a temporary restraining order on behalf of the Montana, Wyoming & Southern railway, restraining the State commissioners from enforcing the rates and regulations recently promulgated. The petition upon which the restraining order was based recites that the rates prescribed by the commission are so low as to be confiscatory and will bankrupt the road.

BUTTE DISTRICT

Anaconda—The four-compartment shaft at the Belmont mine is down 1800 ft. and sinking continues. At the West Gray Rock mine the pump compartment of the shaft is being extended from the 700-ft. level to the surface, making the shaft three-compartment throughout. Work is progressing steadily on the new compressor plant near the High Ore mine, and it is expected that it will be in operation by the first of the year. This plant will be electrically driven by power furnished by the Great Falls company. The plant comprises three 1200-h.p. compressors, giving a total of 3600 h.p. When completed the air will first be used to operate the hoists at the Bell, Diamond, Mountain View and High Ore mines, in place of the steam now being used. This will necessitate some changes in the hoists themselves. The use of air for hoisting purposes is in the nature of an experiment, and if it proves satisfactory will undoubtedly be extended. The compressor plant is so built that additions can be made to it from time to time and it is planned eventually to put in six other compressors of like horsepower. Air receivers adjoin the building, having sufficient storage capacity to keep the air supply effective for eight hours in case of accident. The hoists at present are operated at an expense of \$12 per h.p., whereas the installation of air will reduce this to \$4. E. S. Woodward, superintendent of the Washoe Sampling Works, which burned in July, is authority for the

statement that the plant will be rebuilt at once. The plant will be built of reinforced concrete, will have a capacity of 1500 tons daily. The new shaft at the Gagnon mine is now down 900 ft. A six-post raise is being run from the 1500-ft. level of the mine to connect with the shaft.

Tuolumne—Ore is being hauled from the mine to the railway, about a quarter of a mile distant.

GRANITE COUNTY

Mt. Royal—A 35-h.p. gas-engine compressor and drills are being installed at the Shakespeare mine.

MADISON COUNTY

Ball & Tullock are shipping two four-horse loads of ore from their Winnetka property daily at Highland. Two six-horse loads of ore are being shipped daily from the Boss Tweed mine and two four-horse loads daily from the Strawberry mine, both of which are situated near Pony.

Nevada

CHURCHILL COUNTY

Nevada Hills—Work on the new mill at Fairview has been commenced. Twenty stamps, amalgamating plates, concentrators and a cyanide plant will be installed. Buildings will be of steel. Shipments of high-grade are being made regularly.

ESMERALDA COUNTY

Florence Extension—Ore from the 500-ft. level is being sacked for shipment, but the operators think that they will have to sink to 700 ft. for the best results.

Spearhead—Since the recent discoveries on the Wheeler-Knickerbocker lease, two other leasers have started active operations within a few hundred feet of the former's workings. There are several shafts on the property.

Alamo—Operations on the property at Lucky Boy have been suspended pending the completion of the power line of the hydroelectric company from Bodie, Cal. It is expected that work under more economical conditions will be resumed by Jan. 1.

Victor—The shaft is to be sunk to 400 ft. The mine at Rawhide has already produced 5000 tons of ore from workings above the 200-ft. level.

HUMBOLDT COUNTY

Humboldt county has taken second place as a gold producer during the past six months. The output for the third quarter is expected to approach nearly \$1,000,000, being second only to Esmeralda.

LINCOLN COUNTY

Consolidated Pioche—Operations are centered on the Black Ledge in the old Raymond & Ely workings. The ore, besides carrying silver, lead and gold, contains 20 per cent. zinc.

LYON COUNTY

Mason Valley—The orebody has been cut on 470-ft. level, 70 ft. below previous workings in ore.

NYE COUNTY

A gold-silver discovery has been made 13 miles east of Tonopah. While practically no work has been done, the showing is so good that George Wingfield has taken an option on the ground.

Tonopah Extension—Foot-wall cross-cuts on the 500- and 600-ft. levels are being driven to get under the ore on the upper levels in the westerly workings of the mine. Good results have been obtained.

Montgomery Shoshone—The stockholders have been informed that the ore supply in the mine will not last more than three months. General Manager Kirchen says that he felt sufficient exploration work had been done to demonstrate that further expenditure of money in that direction would not help the situation. The company will continue as long as operations will pay expenses. Charles M. Schwab is one of the largest stockholders and is a creditor to the amount of \$200,000. The property is in the Bull-district at Rhyolite. A cave recently dropped 5000 tons of rock into the big "glory hole." A face of milling ore was exposed on the southwest side of the pit.

Oregon

JOSEPHINE COUNTY

Yellow Horn—This mine has been sold to Reese & Rogers, of Shasta, Cal., who will operate it on a much larger scale. A larger mill and reduction plant will be installed, and other improvements made.

Golden Drift—It is stated that the affairs of this company are now in such shape that operations will be resumed. The affairs are in the hands of George Sanders.

Gold Note—The new cyanide plant recently installed is in operation with satisfactory results. This property is in the Mount Baldy district.

South Dakota

Homestake—The back of Independence stope No. 2 caved to the surface, Sept. 25, forming a hole about 50 ft. square and 50 ft. deep, near the former bed of Gold Run creek. This vein is east of the main orebodies of the Homestake, and the stope was an old timbered one, only partially filled, which had been carried to within 120 ft. of the surface. During September the mine commenced sending gold bars to the U. S. Assay Office in Deadwood, instead of expressing them to New York.

Wasp No. 2—The new mill is approaching completion. It is near site of the old mill burned last winter, but is

more favorably located for the disposition of tailings.

Tennessee

Tennessee Copper—The acid plant is producing over 300 tons of acid daily and by Jan. 1 will be producing 600 tons daily.

Washington

FERRY COUNTY

Mogul—Work will be started on this mine controlled by the Kettle River Mining Company. E. W. Scothorn has charge.

STEVENS COUNTY

E. C. Regnier, of Boulder, Colo., has announced that he will erect a \$10,000 tungsten sampling plant at Loon lake.

West Virginia

In Mingo county the Crystal Block Coal and Coke Company will construct a tippie and make other improvements at its coal mines and the Borderland Coal and Coke Company of Roanoke, Va., will open a new mine on its 6000-acre tract of coal land.

The Davy-Pocahontas Coal Company, which was recently organized by Baltimore capitalists, has completed grading a railroad siding on Spice creek (a mile and a half from Roderfield) and has started work on the opening of a 6-ft. seam, so as to ship coal within three months.

At Gary, the Central Pocahontas Coal Company will open bids in November for the erection of a tippie, boiler and power house, and 10 tenement houses. The daily capacity is to be 1000 tons.

The Majestic Collieries Company, in McDowell county, has contracted for a new steel tippie at its mine near Eckman. The United States Coal and Coke Company will erect three tipples at its mines at Gary. These will replace wooden structures now in use. All the other mines of the company already have steel tipples.

Utah

The Salt Lake Stock and Mining Exchange at the end of the third quarter of the year shows a marked decrease in business as compared to that of 1909. Up to Oct. 1, the total number of shares traded in was 13,063,012, valued at \$3,895,432, as compared to 27,938,567 shares of a value of \$15,434,122 for the same period of 1909.

The Utah Ore Sampling Company, which is a consolidation of the various ore-sampling companies of the State has passed into the control of the Knights.

JUAB COUNTY

Emerald—This company, which adjoins the Centennial-Eureka, Grand Central, Mammoth, Lower Mammoth and Opex, has been held under lease and

bond. At a meeting of the directors it was voted to make the final payment of \$25,000, due Dec. 4. Work has been carried on from the 1100-ft. level near the center of the property. A mineralized zone 42 ft. wide has been cut, which in places carries gold, copper and lead. Prospecting will be carried on in search of a continuation of the Centennial-Eureka orebodies. W. E. Earles is president.

Union Chief—This company in the Santaquin district has completed about a mile of wagon road from the mine. There still remains about a quarter of a mile to be built, after which shipments of lead-silver ores will be started.

Black Jack—Drifting is being done on the 1400-ft. level to catch the OpoHongong vein.

Beck Tunnel—Surveyors for the Knights have been at work on that part of the Uncle Sam ground adjoining this property. Surveys of both the surface and underground workings have been made for use in the suit which this company has filed against the Uncle Sam. It is understood that the Uncle Sam claims the ore extracted from Beck Tunnel ground on account of an apex.

Bradley—This company is considering the installation of a small compressor. The shaft is down 280 ft., and but slow progress can be made by hand in the hard ground.

Yankee Consolidated—The shaft is down about 1100 ft. and good progress is being made. It will be continued to the 1300-ft. level under the present contract. Some prospecting will probably be done on the 1300 or 1400, when these points are reached.

SALT LAKE COUNTY

Ohio Copper—According to F. A. Heinze, who has recently been in Salt Lake City, the work of installing the machinery in the second half of the mill will be begun soon. On Sept. 27 the mill handled 2096 tons in 24 hours, which is the largest tonnage up to date.

South Hecla—This company is now the owner of claims formerly held by the South Columbus Consolidated and the Alta-Hecla mining companies. Work will be started shortly.

Utah Consolidated—Shipments over the new tramway are being made at the rate of 800 to 1000 tons a day to the International smeltery. Sampling and examination of the property are now being carried on to get as accurate information as possible in regard to the ore reserves. This work is being done under the direction of R. H. Channing, who recently became general manager.

Utah Copper—The company is considering the purchase of Mallet articulated compound locomotives for use on the Bingham & Garfield railway. These have four cylinders and 12 driving wheels, and

are the type used at Bingham by the Denver & Rio Grande.

SUMMIT COUNTY

Daly-West—A 250-ton trial shipment has been made to Midvale to be tested for the separation of zinc by the Huff electrostatic process. It is proposed to grant leases at this property, and a large number of applications have been received. It is probable that leasing will be adopted. The leases will be verbal only, the company reserving the right to terminate the same, or to raise the royalty.

Silver King Consolidated—This company has recently purchased the Duffy and Mara groups, in Thaynes cañon.

California-Comstock—Four men are working at this property in Thaynes cañon. It is expected that a shipment will be made to the Graselli zinc plant.

Little Bell—A quarterly report was mailed with checks for dividend No. 4, Sept. 22. This report states that during the quarter work was directed mainly toward the further development of ore, and to the erection of a concentrating plant. Shipping ores extracted in the course of development were marketed. Milling ore has been blocked out, awaiting the completion of a new mill. This mill is designed for a capacity of 100 tons a day, and it is expected to begin milling during October. During the quarter, 365 tons of ore averaging 13.96 per cent. lead, 51.8 oz. silver, 0.04 oz. gold, 1.59 per cent. copper were shipped, and brought \$9935. The total receipts, including cash on hand, May 31, of \$37,213 amounted to \$47,309. The total disbursements, including mill expenses and dividend were \$31,031, leaving a balance Sept. 1 of \$16,277.

TOOELE COUNTY

Consolidated Mercur—The annual report was sent to stockholders Oct. 3. The net earnings for the year were \$16,537, and only by careful work was it possible to make any profit. This was largely on account of the ore becoming of lower grade. Prospecting was kept up during the year, but with little encouraging results. Over \$17,000 was expended for work of this character. Conditions are not promising for improved results during the coming year. The gross value of gold produced was \$613,148. Other receipts brought the total to \$625,890. Operating expenses were \$609,352, leaving the net earnings of \$16,537. There was a balance of \$75,029 from the last report which, taking into account extra expenditures for repairs, left \$84,445, June 30, 1910. During the year 99,441 tons of base and 132,190 tons of oxidized ore were mined and milled, making a total of 231,631 tons treated. The ore came from the Mercur, Golden Gate and Brickyard mine. The average number of tons per month handled was 19,303, or 638 tons per day. The heads averaged \$3.59 per ton, while the

tails ran 94c. The production was 29,900 fine ounces gold.

Ophir Hill—Beginning Sept. 23, one shift daily is being worked in the mill. About 50 tons of ore a day are mined. Concentrates are being stored, awaiting a suitable smelting contract.

Cliff—The daily output is 70 tons, which is hauled to St. John in four 15-ton wagons by means of 110-h.p. traction engine. The distance is nine miles. Ore is delivered from the mine to the bins in Ophir cañon by a Bleichert tram.

Lion Hill Consolidated—This company is installing a 5000-ft. air line from the Ophir Hill compressor to the Buffalo tunnel. A car of pipe has arrived, and is being placed on the ground.

Canada

BRITISH COLUMBIA

Slocan Star—Shipment has been resumed. For two years the development of oreshoots on the adjoining Richmond-Eureka group extending into Slocan Star ground, has been in progress, but no stoping has been done. The oreshoots have been found on three levels.

Rambler-Cariboo—Wagon-road communication has been opened between this Slocan mine and the railway at Three Forks, so shipment, suspended last July after burning of trestles and bridges on the Kaslo & Slocan Railway, is once more practicable.

Rawhide—The shipment from this, one of the New Dominion Copper Company Boundary district mines, has been recommenced, after two years, the ore going to Greenwood.

Britannia—Ore and concentrates from this mine, on Howe sound, near Vancouver, is now being sent to Tacoma, Washington.

Cornell—This Texada island mine shipped during seven months, to Aug. 31, 4501 tons of an average content gold, 0.407 oz. and silver, 1.73 oz. per ton, and copper, 4.47 per cent. This compares with 10,178 tons in 1909.

Daisy Snowflake—This property, near Ymir, has been bonded by a Spokane syndicate, which will start development this fall.

ONTARIO

Shipments of ore from Cobalt for the week ended Oct. 1 were: Beaver, 45,600 lb.; Buffalo, 60,990; City of Cobalt, 66,000; Crown Reserve, 65,000; Kerr Lake, 420,999; La Rose, 172,620; McKinley-Darragh, 50,000; Nipissing, 187,270; Right-of-Way, 82,330; Standard Cobalt, 64,049; Temiskaming, 122,400; total, 1,387,258 pounds.

Ophir—The shaft on this mine at Cobalt is down 300 ft. with a 10-ft. sump and active work to crosscut the veins encountered on the 200-ft. level has been started.

Provincial—On this Cobalt property

shaft No. 2 now down 200 ft. is being sunk farther and will be put down to 275 ft. during the winter.

Bartlett—At Gowganda, surface trenching is being actively carried on with good results. Several veins have recently been found, the latest discovery being one from 2 to 4 in. in width carrying 3000 oz. ore, which has been traced for 100 feet.

Vipond—A plant comprising two 1500-lb. Nissen stamps, hoist, boiler and tables and is on the way to Porcupine. The ore will be treated by straight amalgamation and concentration.

QUEBEC

Dominion Goldfields of Canada—This Montreal company is pushing exploration work in the Seigneurie Rigaud de Vaudreuil, Beauce county. On the Des Plantes river, about one mile from its confluence with the Chaudiere river, gold has been found in the river bank alluvions in paying quantities. A canal is being constructed now for the purpose of draining the works, which will consist of a system of adits and crosscuts through the gold bearing ground. Enough water for washing and hydraulicking can be obtained from falls 1000 ft. up the river. On the Ruisseau des Meules river a ditch is being constructed now to bring 1000 miner's inches of water from Lake Fortin down to the gold alluvions on the lower part of the river, a distance of 7 miles. It is reported that pay dirt has been located for several thousand feet along the river. A mechanical elevator will be installed during the winter and operations commenced early in the spring. Good pay ground has been located through extensive drilling operations on the Gilbert river on lots 9 and 10 St. Charles and lots 13 and 15 De Lery. This testing work will be continued during the winter months.

Calway—Operations at this copper mine in Beauce were resumed 3 months ago and are now directed toward exploring the main vein to the north. The shaft is 56 ft. deep and the main drift along the vein is 80 ft. The ore is a copper glance, associated with malachite and azurite in a matrix of quartz, calcite, epidote and silicate minerals, the country rock being a diabase porphyry.

Mexico

CHIHUAHUA

A party of American engineers, in the employ of the Mexico Northwestern Railway, recently left Miñaca in quest of a feasible route for a railroad, presumably from that place, to the Pacific port of Agiabampo, Sinaloa.

Hidalgo Mining Company—It is reported that the company has disposed of all its interests, including the railroad, to a Pittsburg syndicate for \$1,500,000. The property has been developed and managed by James I. Long.

DURANGO

Avino—At the annual meeting in London R. H. Jeffrey, general manager, stated that the results of exploration indicated the extension of the present orebodies to the lower levels and that the new water concentration process in use was satisfactory. The measured reserves were given as 107,505 tons. Development and metallurgical testing will be continued. The mines are near Gabriel.

JALISCO

Cinco Minas—Recently Henry E. Crawford made the transfer of the Cinco Minas to the Cinco Minas Company, a close corporation owned by Mrs. Marcus Daly, Marcus Daly, Jr., and Justice James W. Gerard, Mrs. Daly's son-in-law. The new company is capitalized for \$500,000 and is a Delaware company proticolized in Mexico. In Mexico City an arrangement was made with the Chapala Electric Company to furnish power on a basis of 100 pesos per h.p. per year. The mine is yielding high-grade ore in the 200-ft. level, the lowest at present, and a vertical winze being sunk to the 500-ft. level is now down 200 ft. The ore shoot is stronger on the 200-ft. level. The company will probably put up a 250-ton plant.

OAXACA

The National Railways has let a contract for the extension of the line from Oaxaca to Tlacolula, a distance of 30 km. This line will serve the Magdalena district, which yields fluxing ores needed at Oaxaca and will shorten the route to the Totolapam district.

SINALOA

Choix Consolidated—This company, of Los Angeles, Cal., is erecting a copper smeltery of 100 tons daily capacity at its mines on the Fuerte river in northeastern Sonora. R. A. Thomas is president.

SONORA

Greene-Cananea—This company has seven of its battery of eight furnaces in operation and its production for October will be above that of August and September.

Sierra Pinta—This company, operating near San Joge's bay, has exported gold bullion to the value of \$15,900 from September mill run. The capacity is 25 tons daily and the normal yield approximately \$30,000 per month.

Transvaal—Two 80-h.p. boilers, a compressor and dynamo have recently been installed.

Roy—After over a year's work, this mine has temporarily closed.

Santa Rosalia—One hundred and fifty men are employed in development at this property, south of Cananea.

Rosario—This silver-copper property in the Pilares district has been acquired by a San Diego, Cal., syndicate, represented by E. G. Brassington.

THE MARKETS

Current Prices of Metal, Minerals, Coal and
Stocks, Conditions and Commercial Statistics

Coal Trade Review

New York, Oct. 12—The coal trade in the West is making some progress toward normal conditions, though some time will be needed yet to make up existing shortages and restore the balance. It will also take some time to determine whether there will be any permanent diversion of trade from the districts which have been out of the market for several months. Indiana and West Virginia operators are watching trade movements closely. Car supply is improving a little.

In the East trade continues to show the improving conditions recently reported. Both the anthracite and the seaboard bituminous trades are in good condition.

The Mine Mule—The mine mule has been always an important element in coal-mine operations, but usually unobtrusive, though inclined to be individually troublesome. Recently, however, the mule has been making itself felt in Indiana, and our local correspondents report this week two damage suits caused by it, and one strike which required the efforts of a committee of the mine workers to settle. Evidently the mule is preparing to demand recognition.

COAL TRAFFIC NOTES

Anthracite shipments by Lake from Buffalo for the season to Oct. 1 were 2,724,030 long tons, an increase of 638,215 tons over last year.

Coal tonnage originating on the lines of the Southern railway, seven months ended July 31, was: Tennessee district, 699,393; Alabama district, 1,750,921; total, 2,450,314 short tons, an increase of 399,780 tons over last year.

Shipments of anthracite in September were 4,967,516 long tons; a decrease of 28,528 tons from August, but an increase of 551,396 tons over September, 1909. For the nine months ended Sept. 30 the shipments were, in long tons:

| | 1909. | 1910. | Changes. |
|---------------------|------------|------------|--------------|
| Reading..... | 8,406,477 | 8,842,972 | I. 436,495 |
| Lehigh Valley.... | 7,317,277 | 8,116,029 | I. 798,752 |
| N. J. Central..... | 5,666,239 | 6,138,321 | I. 472,082 |
| Lackawanna..... | 6,907,679 | 7,079,171 | I. 171,492 |
| Del. & Hudson.... | 4,540,278 | 4,810,695 | I. 270,417 |
| Pennsylvania.... | 4,174,584 | 4,324,508 | I. 149,924 |
| Erie..... | 5,542,291 | 5,596,295 | I. 54,004 |
| N. Y., Ont. & West. | 2,032,063 | 2,072,376 | I. 40,313 |
| Total..... | 44,586,888 | 46,980,367 | I. 2,393,479 |

The total increase this year was 5.4 per cent. All the companies showed gains, the larger ones being made by the Lehigh Valley, the Central Railroad of New Jersey and the Philadelphia & Reading.

Shipments of Broad Top coal over the

Huntingdon & Broad Top railroad, nine months ended Sept. 30 were 322,227 tons in 1909, and 496,732 in 1910; increase, 174,505 tons.

Coal receipts at Boston nine months ended Sept. 30, reported by Chamber of Commerce:

| | 1909. | 1910. | Changes. |
|--------------------|-----------|-----------|------------|
| Anthracite..... | 1,233,882 | 1,283,304 | I. 49,422 |
| Bituminous..... | 2,582,820 | 2,972,785 | I. 389,965 |
| Total domestic.... | 3,816,702 | 4,256,089 | I. 439,387 |
| Foreign..... | 177,903 | 211,764 | I. 33,861 |
| Total..... | 3,994,605 | 4,467,853 | I. 473,248 |

The foreign coal is nearly all from Nova Scotia mines.

New York

ANTHRACITE

Oct. 12—Trade has been steady with no marked change from last week. Steam sizes are in good demand.

Schedule prices for large sizes are \$4.75 for broken and \$5 for egg, stove and chestnut, f.o.b. New York harbor. For steam sizes, current quotations are: Pea, \$2.95@3.25; buckwheat, \$1.15@2.50; No. 2 buckwheat, or rice, \$1.65@2; barley, \$1.35@1.50; all according to quality, f.o.b. New York harbor.

BITUMINOUS

The better condition of trade continues in evidence. Sales locally are fair, and the demand from the West remains good enough to help this market. All-rail trade is in good condition.

Prices continue to hold the recent improvement both for gas coals and low-volatile steam coals.

Transportation is not quite so good, some delays being reported in getting coal to tidewater. Few complaints are heard about car supply.

In the coastwise market vessels are still in demand, and rates hold up well, with a tendency to advance. Large vessels from Philadelphia are still on a basis of 70@75c. to Boston, Salem and Portland; small boats from New York, 60@65c. to points around Cape Cod.

Birmingham

Oct. 10—The coal mines in Alabama are turning out a large quantity of coal and there is apparently a demand for every ton of it. The coal operators are getting more for the coal than for two or three years. The business started in when labor troubles in the West brought about the placing of some healthy contracts in the Birmingham district for coal. Then the Pratt Consolidated Coal Company, one of the larger commercial

coal companies in this section, worked up a big trade at New Orleans and at other Southern ports, building a coal-loading plant at New Orleans and putting in docks so that some large vessels can take on coal. The home consumption is heavy also.

There is a good demand for coke, and the production is at highwater mark.

Chicago

Oct. 10—Mild weather and large supplies of the coals most popular in this market have caused dealers to complain of slack business in the last week, though the demand for domestic supplies and the steam trade are large. Fine coals are weakening notably under the large production of the Illinois mines and apparently resuming the place they held six months to a year ago. Illinois and Indiana coals are in general about on a normal basis for this time of the year. Eastern coals are selling steadily, but the supply has been larger than needed and the market in consequence has become a trifle weak.

Quotations on Illinois and Indiana are: Lump and egg, \$2.10@3.50; run-of-mine, \$1.90@2.10; screenings, \$1.40@1.65. Eastern coals bring \$3.95 for smokeless lump, \$3.30 for smokeless run-of-mine, and \$3.40 for Hocking, the last named being firm and not in too great demand.

Until the coming of decidedly cooler weather, practically all coals will be in large supply and indifferent demand, to judge from the present outlook. Shippers will do well to bear in mind that the Illinois production is now abundant and its sale concentrates in Chicago. Domestic coals especially show sluggishness, and anthracite is moving slowly from wholesalers or retailers and to consumers.

Cleveland

Oct. 10—Lake shipments are being rushed, as it is believed that the season will end early. At present vessels are plenty, but the dropping of ore boats out of commission will cut down the supply. Domestic trade is active. Car supply is improving, and the railroads are getting into better shape.

Prices are firm. Middle district coal, f.o.b. Cleveland, is \$2.15 for 1¼-in., \$1.90 for ¾-in., \$1.80 for run-of-mine, \$1.55@1.70 for slack. No. 8 and Cambridge districts 5 or 10c. higher. Pocahontas is quoted \$3.35 for lump and \$2.60 for run-of-mine, and is in better supply than it has been.

Indianapolis

Oct. 8—The tone of the coal market is growing stronger. The demand for coal at the mines for both industrial and domestic use took a sudden spurt during the week. The operators reported that in cities outside the Indiana coalfield the jobbers are boosting the price of coal and this caused a sudden jump in the demand at the mines which already have large orders to fill. The high water during the week interfered with mining in some localities and the hill or wagon mines are doing a big business in supplying local trade. The wagon mines are delivering coal to local consumers at the same price that Chicago dealers are paying on board the cars at the mines.

Pittsburg

Oct. 11—There is no material change in the market. Shipments continue heavy and mines are running to good advantage. Prices are not firming up to any extent, as was expected, and there is possibly a trifle more cutting than a fortnight ago. The regular quotable market remains: Mine-run and nut, \$1.20@1.22½; ¾-in., \$1.30@1.32½; domestic, 1¼-in., \$1.45@1.47½; slack, 75@82½c. per ton.

Connellsville Coke—The market continues very quiet, there being absolutely no demand for next year, and practically none for prompt delivery, as the furnaces are working the same as formerly and are already covered. An exception has been Corrigan, McKinney & Co., who have been buying from month to month this half year. Last week they closed for the remainder of their November and December requirements, having bought a portion of their fourth-quarter requirements when buying September coke. The price is understood to have been \$1.65 or a trifle higher, there being a slight premium over the prompt market on account of the uncertainties of delivery in winter months. We continue to quote standard grades as follows, per ton at ovens: Prompt furnace, \$1.60@1.65; contract furnace (nominal), \$1.75@1.85; prompt foundry, \$2.10@2.25; contract foundry, \$2.25@2.50.

The *Courier* reports the production in the Connellsville and lower Connellsville region in the week ending Oct. 1 at 345,390 tons, an increase of 1000 tons, and shipments at 4362 cars to Pittsburg, 5779 cars to points west and 846 cars to points east, a total of 10,987 cars.

St. Louis

Oct. 10—Demand for domestic coal has been good; steam coal is more quiet. The supplies coming in are good, in spite of the troubles about cars. In fact this really holds more coal for the local market. The restrictions on car movement continue and most of the roads will not let their cars go off their own tracks.

Prices are irregular and nominally unchanged.

Current prices on the St. Louis market are as follows:

| | Mine. | St. Louis. |
|----------------------------------|--------|------------|
| Illinois, Standard: | | |
| 6-in. lump and egg..... | \$2.00 | \$2.52 |
| 2-in. lump..... | 1.85 | 2.37 |
| Mine-run..... | 1.60 | 2.12 |
| Screenings..... | 1.20 | 1.72 |
| Trenton: | | |
| 6-in. lump and egg..... | 2.50 | 3.02 |
| 3-in. nut..... | 2.00 | 2.52 |
| Staunton or Mt. Olive: | | |
| 6-in. lump..... | 2.00 | 2.52 |
| 2-in. nut..... | 1.60 | 2.12 |
| Mine-run..... | 1.65 | 2.17 |
| Screenings..... | 1.50 | 2.02 |
| Carterville: | | |
| 6-in. lump or egg..... | 2.00 | 2.67 |
| 3-in. nut..... | 2.00 | 2.67 |
| Mine-run..... | 1.60 | 2.07 |
| Screenings..... | 1.25 | 1.92 |
| Pocahontas and New River: | | |
| Lump or egg..... | 1.90 | 4.40 |
| Mine-run..... | 1.55 | 4.00 |
| Pennsylvania Anthracite: | | |
| Nut, stove or egg..... | ..... | 6.95 |
| Grate..... | ..... | 6.70 |
| Arkansas Anthracite: | | |
| Egg or Grate..... | 2.35 | 5.35 |
| Coke: | | |
| Connellsville foundry..... | ..... | 5.40 |
| Gas house..... | ..... | 4.90 |
| Smithing..... | ..... | 4.15 |

East St. Louis prices on soft coal are 20c. less than the St. Louis quotations.

Anthracite—The market remains active. Demand is good, especially for chestnut coal.

FOREIGN COAL TRADE

French Coal Trade—Imports and exports of fuel in France, half year ended June 30, metric tons:

| | Imports. | Exports. | Excess. |
|------------------|-----------|----------|----------------|
| Coal..... | 7,255,277 | 656,326 | Imp. 6,598,951 |
| Coke..... | 1,078,064 | 57,613 | Imp. 1,020,451 |
| Briquets..... | 460,498 | 64,162 | Imp. 396,336 |
| Total..... | 8,793,839 | 778,101 | Imp. 8,015,738 |
| Total, 1909..... | 9,151,508 | 660,975 | Imp. 8,490,533 |

The exports this year included 62,794 tons coal and 30,337 tons briquets furnished to steamships in foreign trade.

German Coal Trade—Exports and imports of coal in the German Empire, seven months ended July 31, metric tons:

| | Exports. | Imports. | Excess. |
|------------------|------------|------------|----------------|
| Coal..... | 12,797,277 | 6,021,808 | Exp. 6,775,469 |
| Brown coal..... | 35,961 | 4,226,355 | Imp. 4,190,394 |
| Coke..... | 2,332,938 | 360,117 | Exp. 1,972,821 |
| Briquets..... | 1,055,140 | 128,485 | Exp. 926,655 |
| Total..... | 16,221,316 | 10,736,765 | Exp. 5,484,551 |
| Total, 1909..... | 14,920,240 | 11,739,588 | Exp. 3,180,652 |

Coke exports this year included 41,805 tons to the United States.

German Coal Production—Coal production of German Empire, seven months ended July 31, metric tons:

| | 1909. | 1910. | Changes. |
|--------------------|-------------|-------------|--------------|
| Coal..... | 85,181,831 | 86,360,970 | I. 1,179,139 |
| Brown coal..... | 38,222,137 | 38,027,891 | D. 194,246 |
| Total mined..... | 123,403,968 | 124,388,861 | I. 984,893 |
| Coke made..... | 12,164,578 | 13,388,070 | I. 1,223,492 |
| Briquets made..... | 10,600,094 | 10,826,772 | I. 226,678 |

Of the briquets reported this year 8,355,414 tons were made from brown coal, or lignite.

IRON TRADE REVIEW

New York, Oct. 12—The iron and steel markets are still rather inclined to hold a waiting position so far as future business is concerned. The main topic of discussion has been the readjustments in the pipe and sheet schedules; and general opinion seems to be that they point to an effort to keep prices up. The sheet schedule simply recognized the cutting in prices, which had been going on for some time; the pipe schedule can hardly be called either an advance or a reduction, as it involves a general reorganization, increasing some prices and lowering others. It will probably be generally recognized, but continued shading in sheets is probable, owing to the sharp competition for business resulting from the great enlargement of capacity in the sheet mills during the past two years.

There is little new in pig iron, business continuing about the same; but there seems to be more disposition to come together on 1911 business on the part of both buyers and sellers. The Southern furnaces are evidently giving way and concessions of 25c. and even more have been made from the \$11.50, Birmingham, which has heretofore been insisted on as the minimum for next year.

In finished material, structural steel continues to show a good business in orders of moderate size. Contracts for wire and wire products are reported to be coming in freely and in large quantity. Plates are quiet, chiefly owing to the lighter demand from the car works. Some small orders for cars are reported, but no large contracts.

The bids for the steel for the Quebec bridge will not be opened for about 10 days yet, it is understood. The contract involves between 80,000 and 85,000 tons of high-grade steel, and is the most important offered for some time. Bids were received from British, German and American companies, the latter including the Pennsylvania Steel and the American Bridge companies.

Steel Corporation Orders—The monthly statement of the United States Steel Corporation shows that on Sept. 30 the unfilled orders on the books were 3,158,105 tons. The decrease during September was 379,022 tons. This causes no surprise in the steel trade, as the movement reflects conditions as they have been understood. It is to be presumed that the decrease was chiefly in rails, line pipe, plates, structural shapes, and finished structural work, with a minor decrease in tinplates. In sheets, wire and merchant pipe, business has been good and in merchant bars moderately good. In the heavy lines there has been scarcely any new business, while shipments against old contracts have continued heavy, hence the large loss. The total capacity of the Steel Corporation is about 1,200,000 tons

monthly. It has been understood that it was operating about 70 per cent. of capacity, which would make its shipments about 840,000 tons, and to lose 380,000 tons in unfilled tonnage would require it to book 460,000 tons during the month. The bulk of this tonnage was probably in sheets, bars, merchant pipe and wire.

Pig Iron Production—The reports of the blast furnaces, as collected and published by the *Iron Age*, show that on Oct. 1 there were 238 coke and anthracite furnaces in blast, having a total daily capacity of 67,300 tons, an increase of 550 tons over the September report. Making allowance for the charcoal furnaces, the estimated production of pig iron in the United States in September was 2,085,000 tons; for the nine months ended Sept. 30 it was 21,412,000 tons.

Baltimore

Oct. 10—Imports for the week included 400 tons ferromanganese and 30 tons silicospiegel from Liverpool; 5800 tons manganese from Vizigapatam, India; 3500 tons cupreous pyrites from Huelva, Spain; 37,850 tons iron ore from Cuba.

Birmingham

Oct. 10—Southern pig-iron manufacturers are selling their product right along, but are forced to accept a low price. Some selling has been on for delivery during the first quarter of the coming year, but the up-price so far heard of is \$11.50 per ton, No. 2 foundry. For the balance of this year iron at \$11.25 is to be heard of and reports have been current that some iron has been sold as low as \$11. Consumers are said to be in need of iron and as a consequence some rush orders have been put in. The stocks of iron on the yards have been reduced. There are two more furnaces in blast at present than were going a month ago. It is announced that two others will go in blast by the end of this month. A number of inquiries are coming in for iron during the first and second quarters of the coming year, but the manufacturers are not anxious to quote beyond the first quarter.

The steel situation shows improvement. There have been some orders placed with the Tennessee company recently for steel rails that will give steady operation of the plant at Ensley for a while.

There is a strong demand for cast-iron pipe again and some heavy orders were recently booked.

Chicago

Oct. 10—Buying of pig iron continues to be small but steady, and the market does not lose anything of its firmness, supply seeming fairly well adjusted to demand. There is a tendency on the part of the average melter to look ahead farther than he has been doing for sev-

eral months, but the selling agencies are not giving low enough quotations to induce large business on first-half contracts. On first-quarter contracts iron in small lots is being steadily placed, the demand being better for Northern than for Southern. The large number of inquiries causes general predictions by the selling interests that the market is bound to strengthen as soon as consumers have used, in part at least, the iron they have stacked for use in the next 30 to 90 days. Two or three large corporations are in the market for lots of about 5000 tons and these sales may strengthen the buying movement. The largest sale in the last week was 1000 tons.

In the field of iron and steel products, the tone is decidedly better, structural contracts especially showing improvement. Coke remains firm at \$4.90 for the best Connellsville.

Cleveland

Oct. 10—September ore shipments showed a drop of 700,000 tons from August, but were still larger than had been expected.

Pig Iron—A large contract for foundry for the first half of 1911 is reported, and another one for basic. These are the first of any importance closed here for next year. The foundry included some Northern on a basis of about \$14, Cleveland and some Southern on a basis of \$11.15 Birmingham. The basic was taken at about \$14.25 at furnace. Some small business has been done locally at unchanged prices.

Finished Material—Some fair contracts for structural steel have been closed, and some sales of track material are reported. Otherwise the market is quiet. Specifications on contracts are good, especially from the agricultural implement makers.

Philadelphia

Oct. 12—Transactions actually closed have been mainly in foundry iron. Little basic has been sold, and forge is quiet. Plenty of inquiries for 1911 delivery are coming, but they are mostly to test the market, and sellers of Northern are holding back, though Southern makers are more inclined to close. No. 2X foundry may be quoted about \$16; No. 2 plain around \$15.50; with forge nominal at \$14.50 for Northern.

Steel Billets—Billets are quiet, only a hand-to-mouth business being done.

Bars—Business has been mainly in small lots, and concessions are in order. Steel bars are pretty well held at 1.55c., seaboard delivery; but common iron has sold at 1.40c. Store trade is fair.

Sheets—New orders come in by fits and starts, but the total is fair, and mills are not complaining.

Plates—A little more business is reported, mostly in the line of small orders.

Some large contracts for ship work are said to be coming.

Pipes and Tubes—The consumption of tubes continues good. Dealers here are still figuring over the new pipe discounts put out at Pittsburg last week.

Structural Material—Small orders continue to come, and some larger contracts have been closed, working a fair total for the week.

Scraps—The abandonment of the buying arrangement of the associated steel mills is generally accepted, and dealers are beginning to wake up. There is more demand for heavy melting steel scrap, but other kinds are not active. A sale of old rails is reported at a low price.

Pittsburg

Oct. 11—Reports of the trend of the industry since the first of the month are divergent, some steel interests reporting an improvement, with better bookings than for several months, others reporting that business is gradually decreasing. The difference is probably due to difference in viewpoint, with really little change in the flow of business. The salient feature of the situation is that the accumulation of business in the heavy lines is beginning to play out, while business in the light lines is close to normal. Without any material change, this will mean a considerable decrease in production before the end of the year. Since July 1 there has been practically no change. Pig-iron production has averaged about 25,000,000 tons a year in the past three months, decreasing very slightly, but there has been a considerable decrease in merchant production and practically no change in steel-works production.

The new prices put out by the American Sheet and Tin Plate Company, as noted in last report, have not been adopted in full by the independents. The prices were about \$1 a ton above the going market, but the company had adopted a less aggressive policy in making sales, having a fair amount of tonnage on its books. The great majority of the independents are adhering to the company's prices on flat sheets, 2.20c. on black and 3.20c. on galvanized, 28 gage, there being shading of \$1 a ton from these prices only in extreme cases, and then only by a very few sellers. In corrugated sheets, on the other hand, there are free sellers among the independents at 5c. per square under the company's prices, or at \$1.55 for painted and \$2.75 for galvanized, 28 gage, 2½-in. corrugations.

Pig Iron—There have been moderate sales of bessemer iron in lots of a few hundred to a thousand tons, one selling agency reporting sales of over 5000 tons in the past 10 days, all at \$15, Valley, the recognized market since August. Basic iron is quotable 25c. lower than at last report, as it appears that the low-priced sale made week before was not

abnormal. We quote for this year's delivery, at Valley furnaces, 90c. higher delivered Pittsburgh: Bessemer, \$15; basic, \$13.25; No. 2 foundry and malleable, \$14; gray forge, \$13.25. For first quarter bessemer is available at \$15, having already sold at this price; basic has shown no indication except that there are no open quotations as low as \$14; foundry and malleable have sold for first half at 50c. advance over the prompt market.

Ferromanganese—The market continues quiet, with prices rather soft, and cannot be quoted at over \$39.25, Baltimore, freight to Pittsburgh being \$1.95, while \$39 can probably be done without much difficulty and it is even reported that \$39 has been shaded.

Steel—New business is light, although shipments on old contracts are fairly heavy. Quotations as revised last week stand: Bessemer billets, \$24; sheet bars, \$25; open-hearth billets, \$25@25.50; sheet bars, \$25.50@26; rods, \$28.50, all f.o.b. Pittsburgh.

St. Louis

Oct. 10—A little more spot iron is moving. Consumers are still buying closely, to meet requirements in sight. Plenty of inquiries on first-quarter business are in, but few or no contracts have been closed. Current prices remain unchanged at \$11.00@11.50, Birmingham, or \$14.75@15.25, f.o.b. St. Louis, for No. 2 foundry. The inclination is toward the lower level, most business being at about \$11.15, Birmingham.

Foreign Trade United States

Iron and Steel—Exports and imports of iron and steel in the United States for the eight months ended Aug. 31 are valued as below by the Bureau of Statistics of the Department of Commerce and Labor:

| | 1909. | 1910. | Changes. |
|--------------|---------------|---------------|-----------------|
| Exports..... | \$100,953,952 | \$130,148,125 | I. \$29,194,173 |
| Imports..... | 18,175,130 | 27,759,534 | I. 9,584,404 |

Excess, exp. \$82,778,822 \$102,388,591 I. \$19,609,769

The leading items of imports and exports were, in long tons:

| | Exports | | Imports | |
|-----------------------|---------|---------|---------|---------|
| | 1909. | 1910. | 1909. | 1910. |
| Pig iron..... | 37,975 | 70,865 | 87,222 | 159,947 |
| Scrap..... | 22,050 | 14,952 | 4,377 | 62,271 |
| Billets, blooms, etc. | 84,119 | 9,682 | 10,149 | 32,108 |
| Bars..... | 53,659 | 81,844 | 9,944 | 28,703 |
| Rails..... | 166,306 | 243,244 | ..... | ..... |
| Sheets and plates.. | 107,735 | 179,563 | 2,225 | 4,761 |
| Structural steel.... | 60,960 | 104,219 | ..... | ..... |
| Wire-rods..... | 9,699 | 15,853 | 7,606 | 14,523 |
| Wire..... | 101,217 | 109,630 | ..... | ..... |
| Nails and spikes.. | 30,346 | 40,668 | ..... | ..... |
| Tinplates..... | 6,215 | 7,587 | 40,042 | 51,082 |
| Pipe and fittings.. | 99,124 | 105,141 | ..... | ..... |

Imports of wire not reported in quantities; values were \$665,556 in 1909, and \$1,052,878 this year. Imports of rails and structural steel not reported this year.

Iron and Manganese Ore—Imports and exports of iron ore in the United States eight months ended Aug. 31, long tons:

| | 1909. | 1910. | Changes. |
|--------------|---------|-----------|------------|
| Imports..... | 954,718 | 1,791,025 | I. 836,307 |
| Exports..... | 302,766 | 430,689 | I. 127,923 |

Of the imports this year 996,060 tons

were from Cuba, 362,863 from Spain, 160,927 from Sweden and 108,619 tons from Canada.

Imports of manganese ore for the eight months were 135,603 tons in 1909, and 157,629 in 1910; increase, 22,026 tons.

FOREIGN IRON TRADE

British Foreign Trade—Exports and imports of iron and steel and of machinery in Great Britain, eight months ended Aug. 31, are valued by the Board of Trade returns as follows:

| | Exports. | Imports. | Excess. |
|------------------------|-------------|-------------|-----------------|
| Iron and steel | £28,297,096 | £ 5,200,805 | Ex. £23,096,291 |
| Cutlery and hardware.. | 4,101,353 | 2,832,784 | Ex. 1,268,569 |
| Machinery... | 19,065,238 | 2,998,654 | Ex. 16,066,584 |
| New ships.... | 7,052,980 | ..... | Ex. 7,052,980 |

| | | | |
|---------------|-------------|-------------|-----------------|
| Total..... | £58,516,667 | £11,032,243 | Ex. £47,484,424 |
| Total, 1909.. | 50,953,533 | 10,607,191 | Ex. 40,346,342 |

Increase in exports this year, £7,563,134, or 14.8 per cent.; increase in imports, £425,052, or 4 per cent. Quantities of iron and steel were, in long tons:

| | 1909. | 1910. | Changes. |
|--------------|-----------|-----------|------------|
| Exports..... | 2,725,060 | 3,053,652 | I. 328,592 |
| Imports..... | 776,710 | 859,793 | I. 83,083 |

Exports of scrap iron and steel, not included above, 105,244 tons in 1909, and 109,535 in 1910; imports, 15,767 tons in 1909, and 42,984 this year.

METAL MARKETS

New York, Oct. 12—The metal markets have been rather irregular, but on the whole show some tendency to improvement.

Our index number for the metals, calculated on the approximate production and sales of pig iron, copper, tin, lead, zinc and aluminum, was 127 for the month of January; 124 for February; 118 for March; 118 for April; 113 for May; 107 for June; 112 for July; 113 for August; 114 for September.

Gold, Silver and Platinum

UNITED STATES GOLD AND SILVER MOVEMENT

| Metal. | Exports. | Imports. | Excess. |
|----------------|-------------|--------------|-------------------|
| Gold: | | | |
| Aug. 1910.. | \$3,150,423 | \$12,818,606 | Imp. \$ 9,668,183 |
| " 1909.. | 9,230,273 | 5,348,757 | Exp. 3,881,516 |
| Year 1910.. | 53,495,605 | 42,489,786 | " 11,005,819 |
| " 1909.. | 89,726,392 | 28,764,235 | " 60,972,157 |
| Silver: | | | |
| Aug. 1910.. | 4,755,708 | 4,119,362 | Exp. 636,346 |
| " 1909.. | 4,494,552 | 3,190,988 | " 1,303,564 |
| Year 1910.. | 36,934,397 | 29,815,770 | " 7,118,627 |
| " 1909.. | 38,903,584 | 29,979,133 | " 8,924,451 |

Exports from the port of New York, week ended Oct. 8: Gold, \$400; silver, \$1,082,530, to London, Paris and Hamburg. Imports: Gold, \$221,998, from the West Indies, South America and Australia; silver, \$58,586, from Central and South America.

Gold—Demand for new supplies has not been quite as active as last week, and prices on the open market in London were unchanged at 77s. 9d. per oz. for bars and 76s. 5d. per oz. for American coin.

Platinum—The market is strong on the recent advance. Dealers ask \$36@36.50 per oz. for refined platinum, and \$42@42.50 per oz. for hard metal.

Our Russian correspondent reports, under date of Sept. 29, that the market is quiet and the prices remain unchanged. From Ekaterinburg reports come of great activity on the mines and that the production of this year will considerably surpass that of the previous year. The crude metal is quoted: At Ekaterinburg 7.50 rubles per zolotnik; in St. Petersburg, 28,500 rubles per pood—equal to \$28.20 and \$27.93 per oz. respectively.

SILVER AND STERLING EXCHANGE

| Oct. | 6 | 7 | 8 | 10 | 11 | 12 |
|---------------|--------|--------|--------|--------|--------|-------|
| New York.... | 54½ | 54½ | 54½ | 54½ | 54½ | ..... |
| London..... | 24½ | 25½ | 25½ | 25½ | 25½ | ..... |
| Sterling Ex.. | 4.8640 | 4.8625 | 4.8620 | 4.8610 | 4.8600 | ..... |

New York quotations, cents per ounce troy, fine silver; London, pence per ounce, sterling silver, 0.925 fine.

Silver—The tendency of silver is toward improvement in price. This feeling is founded on the fact that the condition of the crops in India is considered very satisfactory. As an indication of the great recuperative power of India it is worthy of note that the exports of 1909-10 were the highest on record, and showed an increase of 23 per cent. over the previous year.

Copper, Tin, Lead and Zinc

NEW YORK

| Oct. | Copper. | | Tin. | Lead. | | Zinc. | |
|------|--------------------|----------------------------|--------------|------------------------|-------------------------|------------------------|-------------------------|
| | Lake, Cts. per lb. | Electrolytic, Cts. per lb. | Cts. per lb. | New York, Cts. per lb. | St. Louis, Cts. per lb. | New York, Cts. per lb. | St. Louis, Cts. per lb. |
| 6 | 12½ @12½ | 12.45 @12.50 | 35½ | 4.40 @4.27½ | 4.25 @5.52½ | 5.37½ @5.40 | 5.37½ @5.40 |
| 7 | 12½ @12½ | 12.45 @12.55 | 35½ | 4.40 @4.27½ | 4.25 @5.52½ | 5.37½ @5.40 | 5.37½ @5.40 |
| 8 | 12½ @12½ | 12.50 @12.55 | 36 | 4.40 @4.27½ | 4.25 @5.52½ | 5.37½ @5.40 | 5.37½ @5.40 |
| 10 | 12½ @12½ | 12.50 @12.55 | 36½ | 4.40 @4.27½ | 4.25 @5.52½ | 5.37½ @5.40 | 5.37½ @5.40 |
| 11 | 12½ @12½ | 12.50 @12.55 | 36½ | 4.40 @4.27½ | 4.25 @5.52½ | 5.37½ @5.40 | 5.37½ @5.40 |
| 12 | ..... | ..... | ..... | ..... | ..... | ..... | ..... |

The New York quotations for electrolytic copper are for cakes, ingots and wirebars, and represent the bulk of the transactions made with consumers, basis New York, cast. The prices of casting copper and of electrolytic cathodes are usually 0.125c. below that of electrolytic. The quotations for lead represent wholesale transactions in the open market. The quotations on spelter are for ordinary Western brands; special brands command a premium.

Copper—The publication of the figures of the Producers' Association last Friday, showing a decrease in the domestic stock of 20,087,531 lb., had a decided effect upon sentiment abroad. Consumers and speculators took liberal hold of the market and a fairly large business resulted at somewhat better prices. Strange to say domestic consumers have so far been quite indifferent in spite of the fact that the deliveries, as per the statistics of the Producers' Association, show that the recent rate of copper consumption in this country is well maintained. The volume of business transacted with Europe

| LONDON | | | | | | | |
|--------|---------|--------|-------------|-------|--------|------------------|---------------------|
| Oct. | Copper. | | | Tin. | | Lead, Span- ish. | Zinc, Ord- inaries. |
| | Spot. | 3 Mos. | Best Sel'td | Spot. | 3 Mos. | | |
| 6 | 55½ | 56¾ | 60 | 160¾ | 158¾ | 12¾ | 23¾ |
| 7 | 56½ | 57 | 60¾ | 161¾ | 159 | 12¾ | 23¾ |
| 8 | ..... | ..... | ..... | ..... | ..... | ..... | ..... |
| 10 | 56¾ | 57 | 60¾ | 164¾ | 160 | 12½ | 23¾ |
| 11 | 56¾ | 57¾ | 60¾ | 163¾ | 159¾ | 13 | 23¾ |
| 12 | ..... | ..... | ..... | ..... | ..... | ..... | ..... |

The above table gives the closing quotations on London Metal Exchange. All prices are in pounds sterling per ton of 2240 lb. Copper quotations are for standard copper, spot and three months, and for best selected, price for the latter being subject to 3 per cent. discount. For convenience in comparison of London prices in pounds sterling per 2240 lb., with American prices in cents per pound the following approximate ratios are given: £10 = 2.17½c.; £12 = 2.61c.; £23 = 5c.; £60 = 13.04c. ± £1 = ± 0.21¾c.

is estimated at 25,000,000 to 30,000,000 lb., at prices ranging from 12.65@12.70, c.i.f., corresponding to 12.50@12.55, New York. Almost all the agencies participated in this business. Calumet & Hecla is reported to have raised its price to 13c. for copper delivered in Europe. Domestic manufacturers have not figured prominently in the market. Some trifling sales of electrolytic have been made at 12.70c. delivered, 30 days, equivalent to about 12.55c. cash, New York, while some small sales of Lake copper have been made at 12¾@12¾. Sales of electrolytic copper have been made for delivery as far ahead as January, such late deliveries fetching slightly higher prices than the early. The close is steady at 12¾@12¾c. for Lake copper, and 12.50@12.55c. for electrolytic copper in cakes, wirebars and ingots. Casting copper is quoted nominally at 12¼@12½ cents.

Copper sheets are 18@19c. base for large lots. Full extras are charged, and higher prices for small quantities. Copper wire is 14c. base, carload lots at mill.

Covering on the part of bears and speculation for higher prices have been manifest in the standard market throughout the week, and there has been a steady improvement, the close being firm at £56 12s. 6d. for spot, and £57 10s. for three months.

Exports of copper from New York for the week were 5537 long tons. Our special correspondent gives the exports from Baltimore for the week at 1102 tons.

Imports of copper into Germany, eight months ended Aug. 31 were 114,916 metric tons; exports, 6074; net imports, 108,842 tons, an increase of 4796 tons.

Tin—The spot markets, both in London and here, are cornered. It was easy, therefore, to advance prices still further, and this without manipulating large quantities. Transactions on the London Metal Exchange were small. Futures naturally did not share the full advance of spot tin, and are selling today at a discount of £4. The close is cabled at

£163 15s. for spot, and £159 15s. for three months.

Premiums for spot tin in this market advanced to 1c. per lb. over import basis. Some of the consumers who had to have material were helped out by the largest holders, who did not ask the advance that was demanded by dealers. Under the circumstances, consumptive buying is at a standstill and business is taking place among dealers and speculators only. At the close, October tin can be bought at about 36½ cents.

Lead—The market is steady at 4.40c., New York. Offerings from the West are on a somewhat larger scale and prices there have eased off, being quoted at 4.25@4.27½c., St. Louis.

The improvement in the London market has made further progress, the close being cabled at £13 for Spanish lead, and £13 2s. 6d. for English.

Spelter—A fair business has been done during the last week, but demand has by no means been so strong as a little while ago and stocks in the hands of smelters are believed to be accumulating somewhat. The business transacted has been at 5.37½@5.40c., St. Louis, the preponderance being on the lower side of the mean rather than on the higher. However, the conditions in the spelter business are believed to be tending toward a higher level of price, and in the expectation of better trade in the near future smelters are not pressing their product for sale. The market closes at 5.52½@5.55c., New York, and 5.37½@5.40c., St. Louis.

The advance abroad has been well maintained, the close being cabled as unchanged at £23 15s. for good ordinaries, and £24 for specials.

Base price of zinc sheets is \$7.50 per 100 lb., f.o.b. La Salle-Peru, Ill., less 8 per cent. discount.

The Granby Milling and Smelting Company has purchased a smeltery site at East St. Louis, Ill., and a tract of coal land on the Vandalia railway, about 30 miles east.

Other Metals

Aluminum—Sales have been very light. Plenty of metal is offered at 22c., and business can be done at a lower price. In the absence of sales the quotations remain nominally at 21½@22c. for No. 1 ingots, New York.

Antimony—There is no change in the market, and business remains on a retail basis. Prices are nominally unchanged at 8¼@8¾c. per lb. for Cookson's; 7¾@8c. for U. S., and 7¼@7¾c. for outside brands.

Quicksilver—Business is fair. The New York quotations are unchanged at \$46 per flask of 75 lb. for large lots; \$47@48 for jobbing orders. San Francisco, \$45.50 for domestic orders and \$2

less for export. The London price has been reduced 5s. and is now £8 7s. 6d. per flask, with £8 5s. named by second hands.

Imports and Exports of Metals

Exports and imports of metals in the United States, eight months ended Aug. 31, are reported as follows, in the measures usual in the trade:

| Metals: | Exports. | Imports. | Excess. |
|---------------------|------------|------------|-----------------|
| Copper, long tons | 184,952 | 98,213 | Exp. 86,739 |
| Copper, 1909.... | 211,047 | 91,521 | Exp. 119,526 |
| Tin, long tons.... | 414 | 32,603 | Imp. 32,189 |
| Tin, 1909..... | 293 | 28,454 | Imp. 28,161 |
| Lead, short tons. | 40,163 | 71,118 | Imp. 30,955 |
| Lead, 1909..... | 64,943 | 76,189 | Imp. 11,246 |
| Spelter, sh. tons. | 1,066 | 2,549 | Imp. 1,483 |
| Spelter, 1909.... | 2,258 | 5,177 | Imp. 2,919 |
| Nickel, lb..... | 8,905,516 | 21,373,709 | Imp. 12,468,193 |
| Nickel, 1909.... | 7,421,687 | 13,258,622 | Imp. 5,836,935 |
| Antimony, lb.... | 2,726 | 6,576,328 | Imp. 6,573,602 |
| Antimony, 1909. | 6,648 | 6,561,290 | Imp. 6,554,642 |
| Platinum, oz.... | ..... | 77,637 | Imp. 77,637 |
| Platinum, 1909. | ..... | 70,916 | Imp. 70,916 |
| Aluminum, value | \$524,382 | ..... | Exp. \$524,382 |
| Aluminum, 1909 | 288,290 | ..... | Exp. 288,290 |
| Ores, etc.: | | | |
| Zinc oxide, lb.... | 17,280,303 | ..... | Exp. 17,280,303 |
| Zinc oxide, '09.. | 18,682,683 | ..... | Exp. 18,682,683 |
| Zinc dross, lb.... | 6,703,070 | ..... | Exp. 6,703,070 |
| Zinc dross, '09.. | 12,277,995 | ..... | Exp. 12,277,995 |
| Zinc ores, lg. tons | 12,606 | 42,430 | Imp. 29,824 |
| Zinc ores, 1909. | 9,092 | 80,972 | Imp. 71,880 |
| Antim'y ores, lb. | ..... | ..... | ..... |
| Ant. ores, 1909. | 504 | 3,386,798 | Imp. 3,386,294 |
| Chrome ore, tons | 30 | 27,850 | Imp. 27,820 |
| Chrome ore, '09 | ..... | 24,891 | Imp. 24,891 |

Copper, lead and nickel (and antimony from Aug. 5, 1909) include the metal contents of ores, matte, bullion, etc. The exports given include reexports of foreign material. Zinc contents of ore imported in 1910 were 32,883,952 lb.; not reported prior to date of new tariff. Quantity of antimony ore is not reported from Aug. 5, 1909, only metal contents being given. Imports of aluminum are not reported.

Zinc and Lead Ore Markets

Platteville, Wis., Oct. 8—The base price paid this week for 60 per cent. zinc ore was \$43. The base price paid for 80 per cent. lead ore was \$52 per ton.

SHIPMENTS, WEEK ENDED OCT. 8.

| Camps. | Zinc ore, lb. | Lead ore, lb. | Sulphur ore, lb. |
|--------------------|---------------|---------------|------------------|
| Mineral Point..... | 830,500 | ..... | ..... |
| Galena..... | 685,490 | ..... | ..... |
| Platteville..... | 646,510 | 55,000 | 421,700 |
| Benton..... | 584,549 | 53,000 | ..... |
| Highland..... | 376,100 | ..... | ..... |
| Cuba City..... | 154,780 | ..... | 253,310 |
| Harker..... | 67,040 | ..... | ..... |
| Livingston..... | ..... | 80,000 | ..... |
| Total..... | 3,344,969 | 188,000 | 675,010 |
| Year to date..... | 78,807,774 | 7,671,644 | 21,144,530 |

Shipped during the week to separating plants, 2,711,218 lb. zinc ore.

Joplin, Mo., Oct. 8—The highest price paid for zinc sulphide ore was \$47 per ton, the base ranging from \$41 to \$44.50 per ton of 60 per cent. zinc. Zinc silicate ore sold on a base of \$22@25 per ton of 40 per cent. zinc. The average price, all grades of zinc ore was \$39.94. The highest price paid for lead ore was \$55, and the average price all grades was \$54.54 per ton.

The zinc ore market opened weaker the early part of the week, and considerable ore sold on a base ranging from \$41 to \$43, but by Thursday noon, when

the market is really made for the week, there were several lots sold at a \$44 base and by Friday \$44.50 was paid for a few carloads. The zinc shipment was a decrease of 37 tons over last week. The lead-ore market was weaker, some selling as low as \$53, but the general market was on a \$54 base. The lead shipment was an increase of 276 tons over the previous week.

SHIPMENTS, WEEK ENDED OCT. 8.

| | Zinc, lb. | Lead lb. | Value. |
|-----------------------|------------|-----------|-----------|
| Webb City-Carterville | 3,666,260 | 1,086,660 | \$106,874 |
| Joplin | 1,737,550 | 209,380 | 42,141 |
| Alba-Neck | 1,277,110 | ..... | 29,373 |
| Spurgeon | 381,960 | 389,660 | 14,916 |
| Galena | 545,750 | 55,790 | 12,866 |
| Granby | 680,960 | 10,510 | 11,785 |
| Oronogo | 267,710 | 223,080 | 11,762 |
| Miami | 520,250 | 66,160 | 9,069 |
| Duenweg | 400,640 | 20,980 | 8,287 |
| Aurora | 306,690 | ..... | 5,086 |
| Carl Junction | 200,780 | ..... | 4,417 |
| Carthage | 191,620 | ..... | 4,215 |
| Sarcoxi | 194,700 | ..... | 2,859 |
| Qucpaw | 149,590 | ..... | 2,766 |
| Badger | 129,010 | ..... | 2,580 |
| Cave Springs | 59,800 | ..... | 1,225 |
| Totals | 10,710,320 | 2,064,220 | \$270,221 |

41 weeks.....458,343,370 67,258,880 \$10,756,244
 Zinc value, the week, \$213,919; 41 weeks, \$9,016,017
 Lead value, the week, 56,302; 41 weeks, 1,740,227

MONTHLY AVERAGE PRICES.

| Month. | ZINC ORE. | | | | LEAD ORE. | |
|-----------|-------------|---------|-----------|---------|-----------|---------|
| | Base Price. | | All Ores. | | All Ores. | |
| | 1909. | 1910. | 1909. | 1910. | 1909. | 1910. |
| January | \$41.25 | \$47.31 | \$38.46 | \$45.16 | \$52.17 | \$56.99 |
| February | 36.94 | 40.69 | 34.37 | 39.47 | 50.50 | 53.64 |
| March | 37.40 | 43.60 | 34.71 | 39.71 | 50.82 | 51.26 |
| April | 38.63 | 41.00 | 37.01 | 39.33 | 55.63 | 49.72 |
| May | 40.06 | 40.19 | 37.42 | 37.51 | 56.59 | 48.16 |
| June | 44.15 | 40.20 | 40.35 | 37.83 | 57.52 | 48.80 |
| July | 43.06 | 39.63 | 41.11 | 36.80 | 53.74 | 48.59 |
| August | 48.25 | 40.13 | 44.54 | 37.32 | 57.60 | 49.75 |
| September | 47.70 | 43.45 | 44.87 | 39.96 | 56.11 | 54.73 |
| October | 49.50 | ..... | 45.75 | ..... | 55.02 | ..... |
| November | 51.31 | ..... | 48.29 | ..... | 53.94 | ..... |
| December | 49.45 | ..... | 47.57 | ..... | 55.26 | ..... |
| Year | \$43.98 | ..... | \$41.20 | ..... | \$54.60 | ..... |

NOTE—Under zinc ore the first two columns give base prices for 60 per cent. zinc ore; the second two the average for all ores sold. Lead ore prices are the average for all ores sold.

CHEMICALS

New York, Oct. 12—The general markets continue rather quiet, as they have been for some time, with no material changes in quotations.

Copper Sulphate—A fair business is forward, with no change in quotations, which remain at \$4 per 100 lb. for carload lots and \$4.25 per 100 lb. for smaller parcels.

Arsenic—The market for this article has been extremely dull. In the absence of sales quotations are nominally unchanged, at \$2.25@2.37½ per 100 lb. for white arsenic.

Nitrate of Soda—Quotations for spot are 2.10@2.12½ c. per lb.; while 2.12½@2.15c. is asked for futures.

Messrs. Mortimer & Wisner, New York, report the position of nitrate in the

United States on Oct. 1 as follows, in long tons:

| | 1909. | 1910. | Changes. |
|------------------------|---------|---------|-----------|
| Stocks, Jan. 1..... | 9,140 | 14,000 | I. 4,860 |
| Imports, 9 mos..... | 243,350 | 335,285 | I. 91,935 |
| Total supplies..... | 252,490 | 349,285 | I. 96,795 |
| Deliveries, 9 mos..... | 243,010 | 338,335 | I. 95,325 |
| Stocks, Oct. 1..... | 9,480 | 10,950 | I. 1,470 |
| Afloat for U. S. | 90,000 | 70,000 | D. 20,000 |

Quantities afloat include all cargoes due to arrive at United States ports before Jan. 15 next.

Imports and Exports—Imports and exports of chemicals and raw materials in the United States, eight months ended Aug. 31:

| | Imports. | Exports. | Excess. |
|--------------------|-------------|---------------|-------------|
| Bleach, lb..... | 62,258,164 | 496 I. | 62,257,668 |
| Bleach, 1909.... | 56,833,701 | 13,964 I. | 56,819,737 |
| Potash salts, lb. | 366,828,562 | 2,002,668 I. | 364,825,894 |
| Potash salts, '09 | 246,349,166 | 1,867,824 I. | 244,481,342 |
| Soda salts, lb.... | 21,050,087 | 326,073 I. | 20,724,014 |
| Soda salts, 1909 | 10,241,570 | 445,205 I. | 9,796,365 |
| Acetate lime, lb. | 44,391,403 | 44,391,403 E. | ..... |
| Acetate, 1909.... | 60,358,623 | 50,358,623 E. | ..... |
| Nit. of soda, tons | 373,112 | 4,323 I. | 368,789 |
| Nitrate, 1909.... | 253,542 | 6,240 I. | 247,302 |
| Phosphates, tons | 10,277 | 697,565 E. | 687,288 |
| Phosphates, '09 | 6,077 | 713,758 E. | 707,681 |
| Sulphur, tons.... | 21,868 | 22,981 E. | 1,113 |
| Sulphur, 1909.... | 20,086 | 13,686 I. | 6,400 |
| Pyrites, tons.... | 545,038 | ..... | 545,038 |
| Pyrites, 1909.... | 449,387 | ..... | 449,387 |
| Magnesite, lb.... | 190,656,768 | 3,180,632 I. | 187,476,106 |
| Magnesite, 1909 | 27,536,255 | 208,835 I. | 27,327,420 |

Exports include reexports of foreign material. Figures for magnesite not reported prior to July 1, 1909; imports above for 1909 are for two months only. Estimating sulphur contents of pyrites, the total imports of sulphur in 1910 were 239,883 tons.

Petroleum

It is to be noted that while exports of the various forms of refined petroleum showed a decrease in the eight months ended Aug. 31, there was an increase of 5,052,568 gal., or 4.7 per cent., in exports of crude oil, and a gain of 1,505,778 gal., or 2 per cent., in those of residuum.

MINING STOCKS

New York, Oct. 12—The general stock market has been quiet. The outside public continues conspicuously absent, and trading has been of little interest, with only fractional changes in quotations.

A sale of 110 shares of Homestake, of South Dakota, is noted at \$86 per share.

The Gurb market, like the Exchange, inclined to quiet and fractional changes, showing no marked tendency in either direction. The copper shares were the most active and strongest during the week.

At auction, in New York, Oct. 6, a lot of \$8000 La France Copper Company 6 per cent. first-mortgage bonds, January, 1910, coupons attached, sold at 10 per cent.; 1600 shares United Copper common, \$100 par, brought \$4.37½@4.50 per share.

Boston, Oct. 11—The Boston market during the past week has been quiet and bare of any sensational news, but the

general sentiment is more cheerful and reports from all sides indicate optimism. The decrease in stocks of copper is encouraging. It is also believed by well posted local people that the low price of copper has increased consumption.

Butte shares seem to have benefited mostly by the better feeling which has developed. Of the Butte issues North

COPPER PRODUCTION REPORTS.

Copper contents of blister copper, in pounds.

| Company. | July. | August. | Septem-ber. |
|---------------------|-------------|-------------|-------------|
| Anaconda | ..... | ..... | 22,200,000 |
| Arizona, Ltd. | 2,910,000 | 2,620,000 | 2,672,000 |
| Balaklala | 1,100,000 | ..... | ..... |
| Boleo (Mexico) | 2,272,600 | 2,039,520 | ..... |
| Copper Queen | 8,771,735 | 7,796,559 | 6,903,759 |
| Calumet & Ariz. | 2,705,000 | 2,660,000 | ..... |
| Cananea (Mexico) | 4,500,000 | 3,626,000 | 3,565,000 |
| Detroit | 1,800,000 | 2,100,000 | 2,128,000 |
| East Butte | ..... | ..... | 790,000 |
| Imperial | 800,000 | 400,000 | ..... |
| Mammoth | ..... | ..... | ..... |
| Moctezuma (Mex.) | 1,958,637 | 1,630,204 | 2,211,435 |
| Nevada Con. | 6,896,429 | 5,800,000 | 5,270,000 |
| Old Dominion | 2,000,000 | 2,693,000 | ..... |
| Shannon | 2,207,000 | 1,546,000 | 1,418,000 |
| Superior & Pitts. | 2,224,000 | 2,520,000 | ..... |
| Utah Copper Co. | 8,677,000 | 7,440,035 | 7,100,000 |
| Butte District | 23,750,000 | 23,750,000 | ..... |
| Lake Superior | 19,000,000 | 18,800,000 | ..... |
| Total production. | 90,804,411 | 85,221,318 | ..... |
| Imports, bars, etc. | 17,714,034 | 13,324,788 | ..... |
| Total blister | 108,518,445 | 98,546,106 | ..... |
| Deduct Can. & Moc. | 6,458,637 | 5,156,204 | ..... |
| Net blister rep. | 102,059,808 | 93,389,902 | ..... |
| Imp. in ore & matte | 6,637,836 | 13,031,254 | ..... |
| Total | 108,697,644 | 106,421,156 | ..... |

Butte district and Lake Superior figures are estimated; others are reports received from companies. Imports duplicate production of Cananea, and that part of Copper Queen production which comes from Nacoziari. Boleo copper does not come to American refiners. Utah Copper report includes the output of the Boston mill. Butte district production for September is given under Anaconda and East Butte.

STATISTICS OF COPPER.

| Month. | United States Product'n. | Deliveries, Domestic. | Deliveries for Export. |
|--------------|--------------------------|-----------------------|------------------------|
| X, 1909..... | 124,657,709 | 66,359,617 | 56,261,238 |
| XI..... | 121,618,369 | 66,857,873 | 55,266,595 |
| XII..... | 117,828,655 | 69,519,501 | 59,546,570 |
| Year..... | 1,405,403,066 | 705,051,591 | 680,942,620 |
| I, 1910..... | 116,547,287 | 78,158,387 | 81,691,672 |
| II..... | 112,712,493 | 66,618,322 | 37,369,518 |
| III..... | 120,067,467 | 62,944,818 | 40,585,767 |
| IV..... | 117,477,639 | 67,985,951 | 31,332,434 |
| V..... | 123,242,476 | 59,305,222 | 45,495,400 |
| VI..... | 127,219,188 | 53,363,196 | 65,895,948 |
| VII..... | 118,370,003 | 56,708,175 | 59,407,167 |
| VIII..... | 127,803,618 | 67,731,271 | 61,831,780 |
| IX..... | 119,519,983 | 64,501,018 | 75,106,496 |

VISIBLE STOCKS.

| | United States. | Europe. | Total. |
|--------------|----------------|-------------|-------------|
| X, 1909..... | 151,472,772 | 210,224,000 | 361,696,772 |
| XI..... | 153,509,626 | 222,566,400 | 376,076,026 |
| XII..... | 153,003,527 | 236,857,600 | 389,861,127 |
| I, 1910..... | 141,766,111 | 244,204,800 | 385,970,911 |
| II..... | 98,463,339 | 248,236,800 | 346,700,139 |
| III..... | 107,187,992 | 254,150,400 | 361,338,392 |
| IV..... | 123,824,874 | 249,625,600 | 373,450,474 |
| V..... | 141,984,159 | 246,870,400 | 388,854,559 |
| VI..... | 160,425,973 | 239,142,400 | 399,568,373 |
| VII..... | 168,386,017 | 232,892,800 | 401,278,817 |
| VIII..... | 170,640,678 | 222,320,000 | 392,960,678 |
| IX..... | 168,881,245 | 218,444,800 | 387,326,045 |
| X..... | 148,793,714 | 211,276,300 | 360,070,514 |

Figures are in pounds of fine copper. U. S. production includes all copper refined in this country, both from domestic and imported material. Visible stocks are those reported on the first day of each month, as brought over from the preceding month.

Butte continues the feature and this specialty seems now to be leading the copper-share market up as well as it did down. Recent reports say that the buying is of the best kind and that directors who sold out some time ago are now taking back their original holdings—and some over. East Butte has also shown strength. Calumet & Arizona is taking advantage of curtailment by both itself and its sister property, Superior & Pittsburg, to increase the size of its smelter.

Among the newer issues, Chino, Inspiration and Mason Valley have been the leaders in the recent movement, all making new high records. Among the issues to show weakness Cactus was the only one worthy of note. It broke to 70, on a discouraging report by the consulting engineer of the company.

Assessments

Table with columns: Company, Delinq., Sale, Amt. Lists assessments for various companies like American, Ida., Big Cottonwood, etc.

*One-half mill.

Monthly Average Prices of Metals SILVER

Table with columns: Month, New York, London. Shows monthly average prices for silver.

New York, cents per fine ounce; London, pence per standard ounce.

COPPER.

Table with columns: NEW YORK, London. Shows monthly average prices for copper in electrolytic and lake forms.

New York, cents per pound. Electrolytic is for cakes, ingots or wirebars. London, pounds sterling, per long ton, standard copper.

TIN AT NEW YORK

Table with columns: Month, 1909, 1910. Shows tin prices for months from January to December.

Prices are in cents per pound.

LEAD

Table with columns: Month, New York, St. Louis, London. Shows lead prices for months from January to December.

New York and St. Louis, cents per pound. London, pounds sterling per long ton.

SPELTER

Table with columns: Month, New York, St. Louis, London. Shows spelter prices for months from January to December.

New York and St. Louis, cents per pound. London, pounds sterling per long ton.

PRICES OF PIG IRON AT PITTSBURG.

Table with columns: Bessemer, Basic, No. 2 Foundry. Shows prices for pig iron in different grades.

STOCK QUOTATIONS

Table with columns: Name of Comp., Bid. Shows stock quotations for Colorado Springs and Salt Lake.

SAN FRANCISCO. Oct. 10.

Table with columns: Name of Comp., Clg., Bid. Shows stock quotations for various companies in San Francisco.

N. Y. EXCH. Oct. 10

Table with columns: Name of Comp., Clg., Bid. Shows stock quotations for various companies on the New York Exchange.

N. Y. CURB Oct. 10

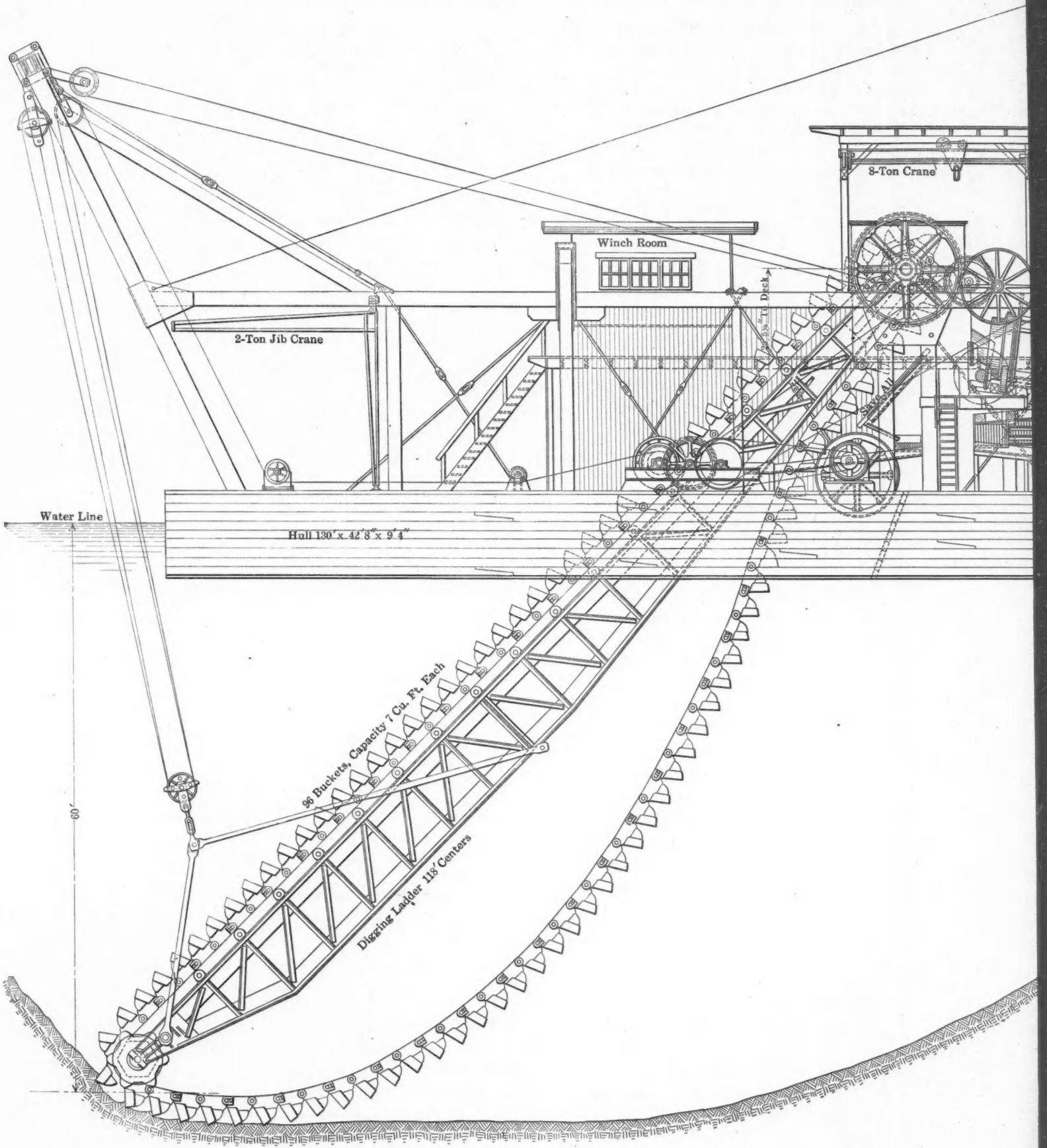
Table with columns: Name of Comp., Clg., Bid. Shows stock quotations for various companies on the New York Curb.

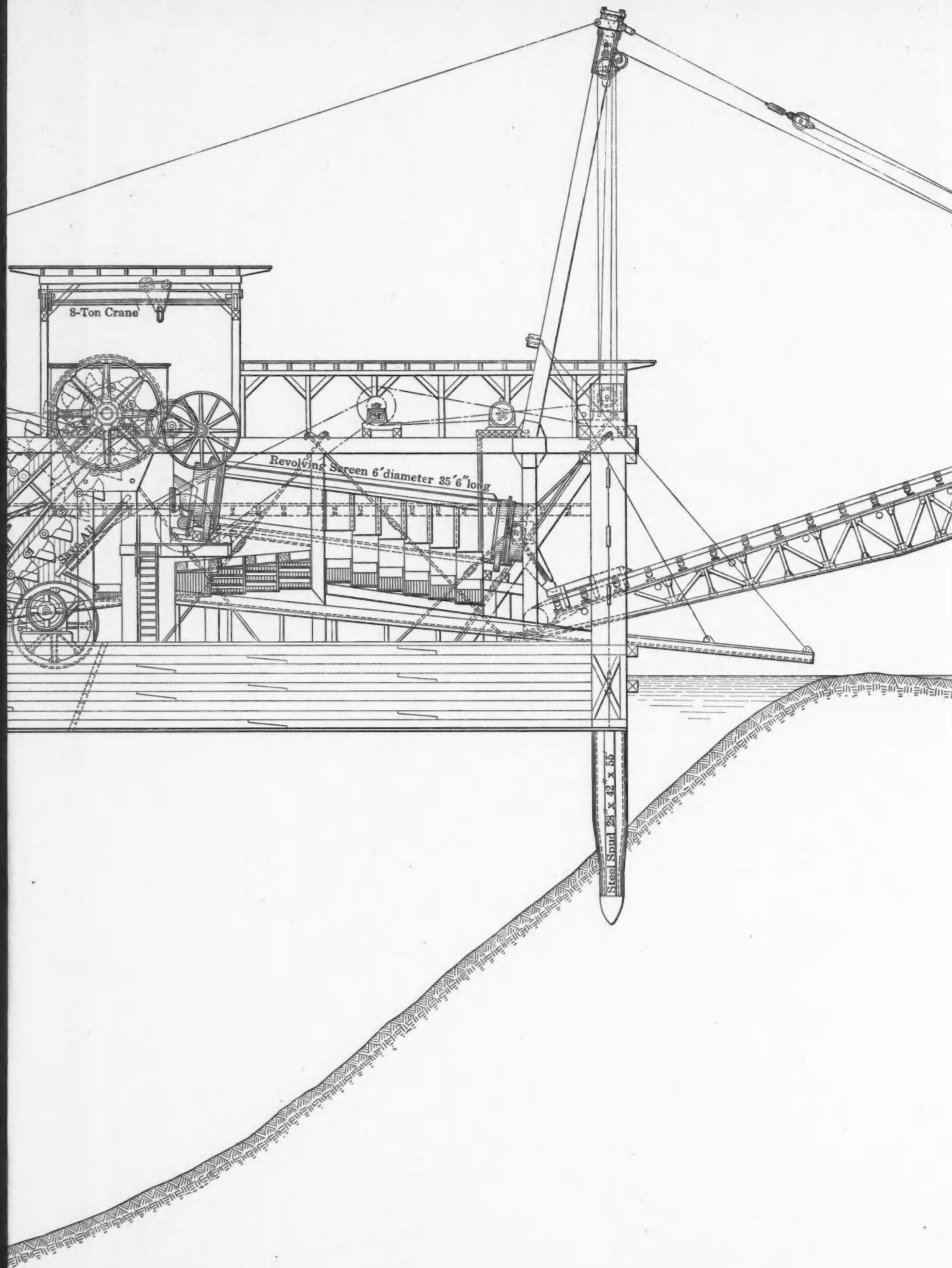
BOSTON CURB Oct. 10

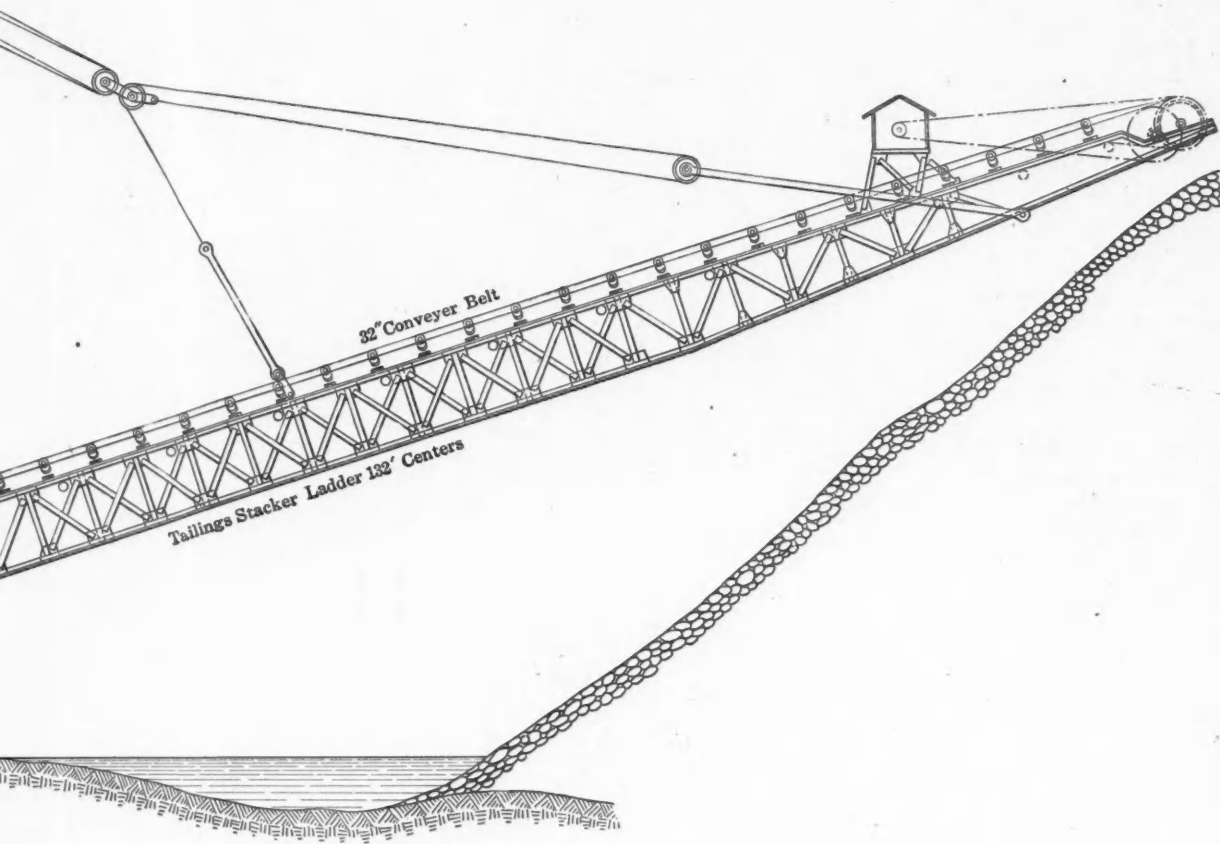
Table with columns: Name of Comp., Bid. Shows stock quotations for various companies on the Boston Curb.

LONDON Oct. 11

Table with columns: Name of Com., Clg., Bid. Shows stock quotations for various companies in London.







CALIFORNIA PLACER MINING DREDGE

Built for Use on the Yuba River
Buckets of 7 Cu. Ft. Capacity,
Close connected Bucket Chain Used.

The Engineering & Mining Journal

